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An Evaluation of Colour Change in Abrasion and its Correlation to Time: A Cross-Sectional Study From a Tertiary Care Centre

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ABSTRACT

Ageing of abrasions among Indian population compared to the West has a wide range of variations. There is not much reported work from India as to the healing pattern and morphological appearance of abrasions in correlation to time since injury. A cross sectional study of patients randomly selected for a naked eye examination of the abrasions compared with standard colour-charts. Comparison was then made between the standard literature and the data gathered to ascertain the applicability of the Western findings on Indian population. It is observed that fresh injuries and injuries which are more than 7 days old have a high percentage of agreement with the available literature. The Spearman's rho showed positive correlation between time since injury and colour of abrasion to be 0.902 (p value<0.001). However those abrasions which age between 12 hours to 7 days have a lesser percentage agreement with the available literature in the standard text. The Spearman's test of correlation for abrasions between 12 hours-7 days, after excluding extreme intervals which correlated completely with literature, still showed high correlation (Correlation Coefficient- 0.749, p value <0.001).

In patients with head injury the percentage agreement falls to 50 percent, conveying a delay in healing of abrasions. Subjects with diabetes in this study did not differ from other subjects in terms of healing statistically, possibly due to small sub-sample size.

Keywords: *Abrassion, Colour change, Time since injury*

INTRODUCTION

Dating of an injury in both living and dead is an important medico-legal issue in the field of crime investigation to fix the liability and to correlate with the crime scene. A doctor is required to date injuries specifically and individually while preparing an injury report or while performing a post mortem examination.[1]

It is essential to age the injuries on the body of victim or the accused himself as it aids in proving or disproving the guilt or innocence of a person charged with criminal act, for its appearance may or may not correspond to the time when it is alleged that all to have been inflicted according to the prosecution theory. In Indian scenario, usually, we adopt the 'naked eye examination' method to date an injury.[2]

There is obvious incongruity existing in the standard textbooks, sufficient enough to pose difficulty for dating of mechanical and thermal injuries.[1] An abrasion is bright red between 12-24 hrs and the scab becomes reddish brown in 2-3 days [3] is documented by one author, but reddish brown scab within 12-24 hrs and brownish scabbed abrasion in 24-48 hours by another author. [4]An eminent author [5] claims that it is impossible to comment on the age of a bruise less than 24 hours. Another reported bluish discoloration of bruises not later than 18 hours.[6]A bruise looks bluish black, brown or livid red by 2 to 3 days and become greenish from 5th to 6th day was the observation of a distinguished Indian author.[7]

Most of the literature available in text books regarding ageing of injuries has been borrowed from western literature

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and very less work has been done on Indian population. Our Study is an attempt to study the morphological changes in the most common injuries i.e. abrasions and compare the same with the standard text books.

MATERIAL AND METHOD

A cross-sectional observational study of patients was conducted and data was collected from 100 patients who presented to the hospital with abrasions. Detailed history including time of injury, mechanism of injury, history concerned with head injury, preexisting diabetes, history of previous or chronic medical illness were documented.

Inclusion Criteria:

1. Data collected from trauma patients visiting the hospital
2. Trauma as a result of road traffic accident, fall from height or self fall.

Exclusion Criteria:

1. A known case of bleeding disorders, connective tissue disorders, skin disorders.
2. Patients who have used pigmented ointments prior to hospital visit.
3. Abrasions with super-added infection

The study looks at the pattern of colour change in abrasion over a specific time line. The naked eye appearance of abrasions was matched with a standard colour chart for colour changes over a period of time and the observations obtained were compared with the standard literature

Using standard colour-charts wounds were inspected in proper illumination and were compared with the colour chart to assign a colour code. For this purpose Hex colour codes are used, HEX colour codes are HTML colours defined by using a hexadecimal notation (HEX) for the combination of Red, Green, and Blue colour values (RGB). The lowest value that can be given to one of the light sources is 0 (in HEX: 00). The highest value is 255 (in HEX: FF). HEX values are specified as 3 pairs of two-digit numbers, starting with a # sign.[8]

Minimum of 94 subjects were required for adequate power of the study as calculated by pre-study analyses of past studies. A sample size of 100 was arrived such that it will ensure 80% power to test the hypothesis that colour change occurring one day after injury in 85 % of the wounds in comparison to past studies which state colour change in 74.33% with 5% alpha error.[9]

Descriptive statistics were applied to present the distribution in gender, subjects' age and frequency of abrasions in various time intervals. To establish the relationship between occurrence of abrasions and time elapsed at evaluation by the examiner Spearman's Correlation test was used. The correlation test was re-administered excluding one group at either end of spectrum to establish robust evidence.

FINDINGS

On a total of 100 patients in the study ninety percent were males, only ten percent of the patients were females.

Table 1: Gender Distribution

Gender	Total (n = 100)
Male	90 (90%)
Female	10 (10%)

Majority of patients were from age group of 16-30

Table2: Age Intervals

Age (Yrs)	Frequency (n = 100)
1-15	04
16-30	48
31-45	28
46-60	13
61-75	07

On a total of 18 fresh abrasions observed 16 appeared bright red in colour, which amounts to 88.9 percent. Hence the percentage agreement between fresh abrasion and bright red colour appearance of wound is 88.9.

Table 3: Percentage agreement with existing literature between fresh abrasion and bright red colour appearance of abrasions

	Bright red colouration (Obresved in literature)	Frequency n = 18	Percentage
Fresh Abrasion	Correlating	16	88.9
	Not Correlating	02	11.1

On a total of 29 abrasions observed between 12 to 24 hours, 16 abrasions were covered with red colored scab, which amounts to 55.2 percent. Hence the percentage agreement between 12-24 hours old abrasion and red colour appearance of wound scab is 55.2.

Table 4: Percentage agreement with existing literature between 12-24 hours old abrasion and red colour appearance of wound scab

	Red colouration (Observed in literature)	Frequency n = 29	Percentage
Abrasion 12-24 hours old	Correlating	16	55.2
	Not Correlating	13	44.8

On a total of 24 abrasions observed between 2 to 3 days, 9 abrasions were covered with reddish brown scab, which amounts to 37.5 percent. Hence the percentage agreement between 2-3 days old abrasion and reddish brown colour appearance of wound scab is 37.5.

Table 5: Percentage agreement with existing literature between 2-3 days old abrasion and reddish brown colour appearance of wound scab

	Reddish-brown colouration (Observed in literature)	Frequency n = 24	Percentage
Abrasion 2-3 days old	Correlating	09	37.5
	Not Correlating	15	62.5

On a total of 15 abrasions observed between 4 to 7 days, 7 abrasions were covered with brown colour scab, which amounts to 46.7 percent. Hence the percentage agreement between 4-7 days old abrasion and brown colour appearance of wound scab is 46.7.

Table 6: Percentage agreement with existing literature between 4-7 days old abrasion and brown colour appearance of wound scab

	Brown (Observed in literature)	Frequency n = 15	Percentage
Abrasion 4-7 days old	Correlating	07	46.7
	Not Correlating	08	53.3

All the abrasions observed after 7 days appeared to have a black scab which was fallen off at place, exposing healed hypo pigmented areas of skin. Hence the percentage agreement between a more than 7 days old abrasion and black colour appearance of wound scab is 100.

Table 7: Percentage agreement with existing literature between more than 7 days old abrasion and black colour appearance of wound scab and shedding of wound Scab

	Black colouration and Scab schredding (Observed in literature)	Frequency n = 14	Percentage
Abrasion beyond 7 days	Correlating	14	100
	Not Correlating	00	00

The 20 patients observed with head injury, fifty percent of the patient had healing pattern as described in the standard literature.

Table 8: Percentage agreement with existing literature between healing patterns of wounds with respect to time among patients with Head injury

	colour change pattern (Observed in literature)	Frequency n = 20	Percentage
Abrasion among head injury patients	Correlating	10	50
	Not Correlating	10	50

Among the 11diabetic patients observed 9 patients showed healing patterns as described in the standard literature, which amounts to 81.82 percent.

Table 9: Percentage agreement with existing literature between healing patterns of wounds with respect to time among patients with Diabetes

	Colour change pattern (Observed in literature)	Frequency n = 11	Percentage
Abrasion among Diabetic patients	Correlating	09	81.82
	Not Correlating	02	18.18

Study looks at the pattern of colour change in abrasion over a specific time line. The naked eye appearance of abrasions was matched with a standard colour chart for colour changes over a period of time and the observations obtained were compared with the standard literature, the percentage agreement of abrasion colour changes observed were then compared to similar studies by Lavlesh Kumar et al and Sandhu S. S et al.[1,9]

It was noted in our study that 16 abrasions in a total of 18 fresh abrasions were observed to be bright red in colour, which amounts to 88.9 percent. The percentage agreement between fresh abrasion and bright red colour appearance of abrasion is 88.9. Twenty nine abrasions observed between 12 to 24 hours after injury showed 16 abrasions to be red in colour, which amounted to 55.2 percent. Hence the percentage agreement between 12-24 hours old abrasion and red colour appearance of wound scab is 55.2.

Lavlesh Kumar et al[1] noted that on the first day, in their study, out of 45 cases 32 cases appeared dark red instead of bright red and Sandhu S. S et al[9] noted among the injuries between 7-12 hours 22 had bleeding, 34 depicted red colour scab, and among the 13-18 hours group 85 patients out of 89 depicted red colour scab, by 24 hours all abrasions were covered with a red coloured scab. In conclusion all three studies point red colour appearance of wound at 24 hours after injury. The current study emphasises on the bright red appearance of wound upto 12 hours, distinct from red coloured appearance, which was not commented in the aforementioned studies.

In the 24 abrasions, aged between 2 to 3 days, observed in the study, 9 of them appeared Reddish brown in colour, which amounted to 37.5 percent. The percentage agreement between 2-3 days old abrasion and reddish brown colour appearance of wound scab is lesser than the observed standard progression of wound maturation.

Lavlesh kumar et al[1] reported that on the 2nd day out of 6 cases 3(50%) cases appeared reddish black. On the 3rd day out of 6 cases 4(66%) cases appeared dark red. Sandhu S. S et al[9] reported that between 25-36 hours 11 injuries depicted red brown scab among the 89 observed. 74 abrasions were covered with a red scab and 49 covered by red brown scab among the 123 abrasions observed between 37-48 hours. Shedding of scab started on day three, among those between days 3 to 5 out of 138 cases 21 cases still had reddish brown scab whereas 70 cases depicted partial shedding of scab and there was complete shedding of scab in 47 cases.

Our study has findings similar to the findings of Sandhu S. S et al[9] stating the low percentage agreement of reddish brown appearance of abrasion 2 to 3 days after the injury.

Among the 15 abrasions observed in our study which were between 4 - 7 days, 7 appeared brown in colour, which amounts to 46.7 percent. The percentage agreement between 4-7 days old abrasion and reddish brown colour appearance of wound scab is more than the abrasions of 2-3 days old compared to standard literature.

All the abrasions observed in our study, after 7 days appeared to have a black scab which was fallen off at place, exposing hypopigmented healed areas of skin. The agreement between a more than 7 days old abrasion and black colour scab is high.

Lavlesh Kumar et al[1] reports that on the 5th day out of 6 cases, 84% cases appeared dark red. On the 9th day all are dark brown in colour during the first three days, the colour appeared bright to dark red, by 9th day the colour changed to dark brown and complete healing was seen by 20th day in 8.6% of cases.

Sandhu S. S et al[9] reports that average duration of formation of reddish brown scab is from 36 hrs to 10th day. Partial shedding of scab is seen from 3 days to 10 days. Complete shedding of scab is seen between 5-10 days. Discoloured skin is seen between 7-10 days. Regeneration and appearance back to normal skin is observed 10 days onwards.

Thus all the studies point towards a low agreement on colour change as a method to ageing injuries between 3 to 7 days. Findings are reinforced by the fact that on statistical analysis Spearman's rho showed very strong positive correlation between time since injury and colour of abrasion to be 0.902 (p value<0.001).

It is also observed that the percentage agreement between the healing patterns of abrasions with the standard literature was higher among fresh abrasions and in abrasions aged more than seven days. The correlation seems above par in comparison to the day-to-day clinical assessment and observation. Hence, the data was reassessed after excluding the two groups with high percentage agreement i.e., less than 12 hours and more than 7 days for correlation by Spearman's test. Then it was observed that there was a significant fall in the correlation coefficient to 0.749 (p value <0.001) which was still significant.

Among the patients with head injury the percentage agreement falls to 50 percent and among diabetes it is 81.82 percent, much higher as compared to head injury patients inferring that head injury has a greater impact on healing of abrasions as compared to diabetes, also a small sample size of diabetic patients does not provide the real picture as to the effect of diabetes on healing pattern of abrasions.

The Spearman's rho for patients with head injury showed Correlation Coefficient between time since injury and colour of Abrasion to be 0.553(p value 0.012), which shows that head injury has a significant impact on the healing of abrasions.

The Spearman's rho for patients with diabetes showed Correlation Coefficient between time since injury and colour of Abrasion to be 0.902(p value <0.001). The value does not show a significant change in the healing pattern of abrasions among diabetic patients. This could be due to the small sample size of diabetic patients in the study, hence it could be stated that a bigger sample size would be required to study the effect of diabetes on healing pattern of abrasions.

It is evident from the studies that the colour change in abrasion with lapse of time varies from person to person and also among different geographic areas. The current literature can be used for ageing abrasions but can often be misleading. The deviations observed in individuals could be linked to the individual himself or to various external factors.

CONCLUSION

- Ageing of injures as per the standard literature is not a fool proof method in crime investigation.
- Abrasions within 24 hours and beyond 7 days have a higher accuracy in ageing based on naked eye examination.
- Ageing of abrasions between 12 hours to 7 days have a very high chance of inappropriate judgment of the time lapsed.
- It is noted that head injury prolongs healing in this study and hence needs further inquiry to analyze its affect on healing of abrasion and possibly its correlations with severity of head injury.
- The effect of diabetes is well known and its effect was not evident due to small sub-sample size.

Conflict of Interest: Declared none

Source of Funding: Self

Ethical Clearance: All Ethical parameters were taken care of in the study

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Correlation of the Age of Eruption of Teeth with the Body Mass Index among School Children

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ABSTRACT

The timing of tooth eruption is influenced by various factors, especially the nutritional status of the individual. Body Mass Index gives an indication about the nutritional status of the child. Hence this study was done to determine the correlation between the mean age of eruption of permanent teeth and the Body Mass Index among school children in Thiruvananthapuram. A cross sectional study was done among the students of Thiruvananthapuram. Two thousand nine hundred students (males and females) were included in the study. Only those with the documentary proof of their date of birth were included in the study. For statistical purposes, only completed year was taken into consideration. Random sampling was done by selecting the alternate students from the attendance register. The dental examination was made in the adequate light with the aid of a mouth mirror and a probe. The details of eruption were observed and charted according to the Modified System of Federation Dentaire Internationale (Modified F.D.I). There were 1568 males and 1357 females out of the total sample of 2925 children. The mean age of eruption of mandubular central incisors, mandibular lateral incisors, maxillary second premolars and maxillary first molars were found to have statistical significant difference among the different categories of BMI status. Among the different categories of BMI, Underweight children were found to have late eruption of teeth compared to overweight children.

Keywords: *Mean age of eruption, Permanent Teeth, Body Mass Index*

INTRODUCTION

Assessment of age is often required while administering justice to an individual involved in civil and criminal litigation. A documentary evidence regarding the age of a person is required by the law enforcing agencies in matters like criminal responsibilities, identification, judicial punishment, consent, rape, criminal abortion, employment, attainment of majority, kidnapping and prostitution.[1]Teeth are the most indestructible part of the body and exhibit the least turnover of natural structure, and do need special dissection. Hence teeth provide excellent material in living and non living populations for anthropological, genetic, odontological and forensic investigations.[2] The clinical method to assess dental age is based on the emergence of teeth in mouth. The timing of tooth eruption is influenced by various factors: physiological factors (i.e. heredity, constitution, geographical factors, sex, race, nutrition, climate, urbanisation), pathological systemic factors (various diseases i.e. endocrine diseases, cerebral palsy, severe intoxications, severe renal diseases, genetic disorders) and pathological local factors (local eruption obstacles, hypodontia, lack of space). [3] Demirjian stated that emergence standards should be derived from the population in which they are to be applied, as factors related to emergence may vary considerably.[4]

Very few studies have been published correlating body mass index (BMI) and chronology of tooth eruption among children in India.

Therefore the objective of the present study was to determine the mean eruption time of permanent teeth

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and to compare the relationship of mean eruption time with BMI of school children in Thiruvananthapuram.

MATERIALS AND METHOD

A cross sectional study was done among the students of three different schools from rural, semiurban and urban areas of Thiruvananthapuram. 2925 students (1568 males and 1357 females) were included in the study. Only those with the documentary proof of their date of birth were included in the study. The study was conducted with the approval letter from the Institutional Ethical Committee, Governmental Medical College, Thiruvananthapuram and the Principals of the schools where survey was done. Students who did not have the documentary proof of date of birth and those who were not willing to participate were excluded from the study. For statistical purposes, only completed year was taken into consideration. Random sampling was done by selecting the alternate students from the attendance register. The dental examination was made in the adequate light with the aid of a mouth mirror and a probe. The details of eruption were observed and charted according to the Modified System of Federation Dentaire Internationale (Modified F.D.I).

The age distribution of the samples was found. The percentage of different teeth erupted at different ages was analysed separately for boys and girls to determine the mean age of eruption of individual tooth. BMI was calculated where height and weight of the individual child were measured using height chart and weighing machine.

BMI for age percentiles = weight in kilograms/ height in meter^2.

Underweight was defined as BMI-for-age <5th percentile.

Normal weight was defined as 5th≤BMI for age <85th percentile.

At the risk of overweight was defined as 85th ≤BMI for age <95th percentile.

Overweight was defined as BMI for age ≥95th percentile.

https://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html.

ANOVA, *t*-test were used for statistical analysis in SPSS version 17.0. $P \leq 0.05$ was considered statistical significance.

FINDINGS

Distribution of study population among males and females is shown in Figure 1.

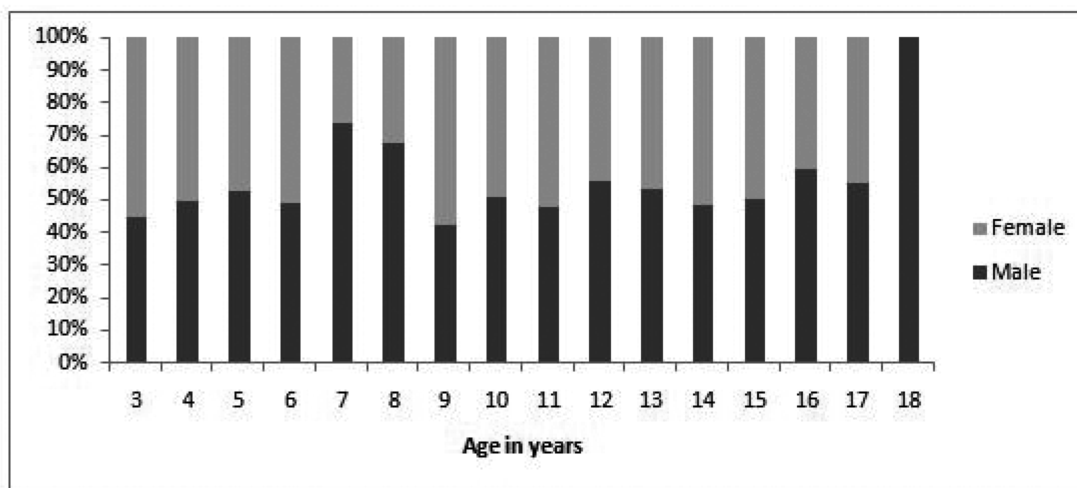

Figure 1

The study subjects were categorized according to BMI scores as underweight, normal weight, at risk of overweight and overweight children. (Table 1)

Table 1

BMI	SEX				Total	
	Male		Female			
	N	%	N	%	N	%
Underweight	300	19.1	203	15.0	503	17.2
Normal weight	1038	66.2	989	72.9	2027	69.3
At the risk of overweight	148	9.4	107	7.9	255	8.7
Overweight	82	5.2	58	4.3	140	4.8
Total	1568	100.0	1357	100.0	2925	100.0

The mean age of eruption (and standard deviation) were obtained and compared with different BMI groups. (Table 2)

Table 2

Age of eruption in years	BMI								p
	Underweight		Normal weight		At the risk of overweight		Overweight		
	mean	sd	mean	sd	mean	sd	mean	sd	
Maxillary central incisor	7.20	0.73	6.96	0.60	6.80	0.39	6.83	0.87	.196
Mandibular central incisor	6.65	0.99	6.46	0.65	6.16	0.66	5.91	0.72	.016
Maxillary lateral incisor	8.19	0.86	7.99	0.92	7.89	0.98	7.94	0.48	.711
Mandibular lateral incisor	7.49	0.85	7.15	0.66	7.62	0.97	7.26	0.92	.043
Maxillary canine	10.54	0.86	10.57	1.07	11.03	1.14	10.83	0.71	.470
Mandibular canine	10.27	0.91	10.16	0.80	10.80	1.52	10.10	0.57	.165
Maxillary first premolar	9.84	0.89	9.74	1.12	10.48	1.45	9.88	0.50	.191
Mandibular first premolar	10.30	0.75	10.33	0.76	10.67	1.79	10.30	0.64	.722
Maxillary second premolar	10.66	0.76	10.40	1.09	11.22	0.64	10.98	0.95	.009
Mandibular second premolar	10.52	1.17	10.71	1.14	11.50	1.08	10.61	0.98	.066
Maxillary first molar	6.24	0.66	6.35	0.62	7.07	1.89	6.21	0.32	.015
Mandibular first molar	6.10	0.60	6.36	1.05	6.74	1.84	6.20	0.33	.301
Maxillary second molar	13.17	2.70	12.43	2.84	12.08	1.62	12.94	2.56	.364
Mandibular second molar	10.64	1.06	10.49	1.35	11.18	1.27	10.67	0.50	.357

P <0.05 significant

Underweight children were found to have late eruption of teeth compared to overweight children. Among the various BMI groups, mandibular central incisors, mandibular lateral incisors, maxillary second premolars and maxillary first molars were shown to have statistically significant difference in the age of eruption.

DISCUSSION

In this study the mean age of eruption of mandubular central incisors, mandibular lateral incisors, maxillary second premolars and maxillary first molars were found to have statistical significant difference between underweight, normal weight, risk of being overweight according to BMI status.

The findings in the present study were found to be contradictory to that of Nagaratna B et Al.[5] in which no statistical correlation was observed incisors and maxillary first molars. However the same study revealed a positive correlation between the mean age of eruption of maxillary second premolar and BMI, which is also noted in the present study.

The findings of the present study were contradicting to that of Khan et al.[6], in which there was no statistical significance between BMI and mean age of eruption except for mandibular lateral incisor. Observations of the present study were also in contrast to the study of Hoffding et al.[7], who reported only minor changes in tooth emergence with pronounced acceleration in physical development.

In this study, children in underweight category showed delayed eruption patters, which was similar to that done by chohan et al.[8]

CONCLUSION

Correlation between the different categories of BMI with the mean age of Eruption of permanent teeth was studied. Mandibular Incisors, Maxillary First Molars and Maxillary Second Premolars were found to have statistically significant eruption time among different categories of BMI.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: Approved by Institutional Ethical Committee

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Profile of Internal Injuries to Thorax, Abdomen and Pelvis Sustained by the Victim During Fatal Road Traffic Accident in Central India

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ABSTRACT

Road traffic accident is a complex phenomenon. Constant rise in the number of motor vehicles, rampant encroachment of road, easy to avail the vehicle because of loan facility, nasty tendency of violating traffic rules and anarchic traffic systems have greatly contributed to rapid increase in RTAs. Population explosion is a catalyzing factor for a number of accidents. The rise of road traffic accidents has become a major public health problem. The injuries, disability and fatality resulting from unexpected RTAs put a significant drain on the economy of the nation. The present study was a cross-sectional study conducted in central India during 1.6 year period from 1st June 2014 to 1st Jan 2017. During the study period, a total of 757 medicolegal autopsies were conducted in this institute, out of which 109 cases of fatal road traffic accidents (died on spot or within 24 hours of accident) were studied. The purpose of the study was to know the pattern of injuries in victims of fatal RTAs and to establish the correlation between the injury and the cause of death.

Keywords: *Fatal road traffic accident, Head Injuries, Thoracic injuries, Shock, death.*

INTRODUCTION

Accidents are world's most serious health problem. Road Traffic Accident (RTA) is any vehicular accident occurring on the roadway (i.e. originating on, or involving a vehicle partially on the roadway)[9]. This includes collision of an automobile with a pedestrian, another automobile or with a non-automobile on the roadway or fall from a moving vehicle causing injuries or death of involved individuals.

In recent years, death due to RTAs are increasing at an alarming rate throughout the world. Thereby it poses itself as a major epidemiological as well as medico legal problem. This is due to the tremendous increase in the number of vehicle, high speed technology along with other contributing factors like congestion and poor condition of roads, intoxicating influence of alcohol or drugs, inexperienced drivers without proper driving license, ignorance or intentional violation of traffic rules etc. Victims in RTAs sustain large varieties of injuries, external as well as internal. External injuries may be abrasions, lacerations, contusions etc. Internal injuries may be fractures, rupture of viscera, destruction of major arteries etc. Fatality in RTAs can be due to immediate cause like hemorrhage, injury to vital organs, vagal inhibition, neurogenic shock, embolism etc.

According to an expert study group appointed by Government of India "RTAs have come to be considered as the third deadly killer, next to heart disease and cancer." Every year the World Health Organization (WHO) hosts an event, usually on 7th April, to celebrate the anniversary of its founding in 1946. Each year the event focuses on one health issue. In response to a growing concern about RTAs the WHO Director-General, Dr. Lee Jong Wook has for the first time in history of WHO devoted 7th April 2004 specifically to road safety and the slogan was "Road Safety Is No Accident." Early detection of the injury and prompt treatment are necessary in saving the lives of many of these victims.

AIMS AND OBJECTIVES

1. To make a detailed study of the internal injuries to the thorax, abdomen & pelvis.

2. To analyze the cause of death due to fatal road traffic accident brought to mortuary of our institute for post - mortem examination with respect to the above injuries.

MATERIALS AND METHOD

The present study was a two year cross–sectional study. The material for the study was the cases of road traffic accidents brought to mortuary for post mortem of this institution situated in central India, during the period from 1st June 2014 to 31st May 2016.The present study includes documenting types of wound, their anatomical location and commonest injuries leading to death in fatal road traffic accidents. Ethical clearance for the present study was obtained from the institutional ethical committee.

On the arrival of the case in Mortuary of this institute, informed expressed consent was taken from the relative of deceased for examination of wound and their documentation. In the present study, detailed information regarding the wounds and various factors regarding the circumstances of the occurrence, like type of road traffic accidents, time and place of accidents, who treat case first, occupation and other relevant information were gathered from relative and were recorded in the predefined proforma. In addition to these, X-ray or CT scan reports were examined for the presence or absence of fracture. In mortuary consent was obtained from relative for examination and medico legal documentation was done in the predefined proforma.

Details of name, age, sex, address, occupation, type of accident etc. were recorded from relative. All the wounds were examined for their location, size and shape. All the fractures were examined by palpation for crepitus, deformity, shortness of limb and by X-ray/CT scan. In the present study though the size of all wounds were noted but it is not included in the analysis because it is beyond the preview of present study.

During the present study period from 1st June 2014 to 31st May 2016 at this institute in central India–

1. Total no of medicolegal autopsies were conducted during the study period = 757.
2. Autopsies of fatal road traffic accident (died on spot, brought dead to hospital or died within 24 hours of accident) = 109.

Inclusion Criteria: All the victims of road traffic accidents who were died on spot or brought dead to hospital or died within 24 hours of accident.

Exclusion Criteria:

1. All the victims who died in an incidence other than road traffic accidents.
2. All the victims of road traffic accidents who were died after 24 hours of accident.

Statistical Analysis:

1. The software for graphs and calculation of statistical values is – SPSS
2. The software used during creation or modification of some of the diagrams
   a. ADOBE PHOTOSHOP(R) 7.0
   b. COREL DRAW X3
   c. WINDOWS -10

RESULTS

Table 1: Profile of distribution of internal injuries in Thorax

Internal injuries on Thorax	No. of cases	Percentage
Rib fracture	32	29.36%
Lungs	16	14.68%
Heart	01	00.92%
Diaphragm	01	00.92%
Thoracic vertebra fracture	01	00.92%

Table 2: Profile of distribution of internal injuries in Abdomen and Pelvis

Internal injuries on Abdomen	No. of cases	Percentage
Stomach and intestine	02	01.83%
Liver	24	22.02%
Spleen	02	01.83%
Kidney	01	00.92%
Lumbar vertebra	01	00.92%
Sacral vertebra	01	00.92%
Bladder	01	00.92%
Genitalia	01	00.92%
Pelvis	04	03.67%

Table 3: Profile of cause of death

Cause of death	No. of cases	Percentage
Intracranial injuries (intracranial hemorrhage/ brain injury)	86	78.90%
Hemorrhagic shock	17	15.60%
Traumatic asphyxia	04	03.67%
Spinal cord injury	02	01.83%
Total	109	100%

DISCUSSION

Profile of Internal injury in Thorax (Table 1): In the present study, out of total 109 cases internal injuries in thorax were seen in 33 cases. Injuries in thorax were classified as rib fracture, lung injury, injury to heart, injury to diaphragm and thoracic vertebra fracture. Rib fracture was seen in 32 cases (29.36%) followed by injury to lung in 16 cases (14.68%) and minimum were injury to heart, injury to diaphragm and injury to fracture thoracic vertebra in 01 case (00.92%) respectively. Most of the lung injuries were associated with rib fracture. All the cases involving heart, diaphragm and thoracic vertebra shows fracture of rib. The findings of present study are similar to studies done by Gupta S, Roychaudhary UB et al at North Bengal,[4] except in injuries associated with rib fracture. The findings of our study are also comparable with the finding of study done by Singh H, Dhattarwal et al at Rohtak Haryana.[8] The finding of our study and study done by Suresh Kumar Shetty[7] are nearly similar 30% and 27% respectively.

Blunt force trauma to the chest can damage the organ without damaging the thoracic wall. Thoraco-abdominal involvement in the RTA can be related to the anatomical location of this region that makes it easily susceptible to impact in any form of blunt force trauma.

Profile of internal injuries in Abdomen and Pelvis (Table 2): In the present study out of total 109 cases the internal injuries in abdomen and pelvis were seen in 26 cases. The abdominal injuries were classified as stomach & intestine, liver, spleen, kidney, lumbar vertebra and pelvis. Amongst them injury to liver was maximum seen in 24 cases (22.02%) followed by injury to pelvis fracture hip bone 04 cases (03.67%), injury to stomach & intestine and spleen in 2 cases (01.83%) respectively and injury to kidney, lumbar vertebra, sacral vertebra, bladder and genitalia in 01 case (00.92%) each. The findings of our study are comparable with study done by Chaudhary B L, Tirpude BH et al at Mahatma Gandhi Institute of Medical Sciences Sewagram Wardha,[2] Gupta S, Roychaudhary U B et al at North Bengal region[7] and NB Kumar, PS Ghormade et al at IGMC Nagpur.[6]

The findings of our study 23.85% of abdominal injuries are correlated with the study carried out by Chandra et al,[1] who observed 22.52% of abdominal injuries in their study at Delhi. The finding of our study are correlated with the study carried out by Tirpude BH et al[17] who observed 26.25% of abdominal injuries in their study at MGIMS Sewagram, Wardha. The finding of our study injury to the liver correlates with the study done by Chandra J, Dogra TD et al New Delhi,[1] Ghosh PK[3] and Honnungar RS, Aramani SC et al.[5]

Profile of cause of death (Table 3): In our study cause of death was intracranial injuries 86 (78.90%) in maximum number of cases. Next to intracranial injuries was hemorrhagic shock seen in 17 cases (15.60%), traumatic asphyxia in 4 cases (03.67%) and spinal cord injury in 2 cases (01.83%). The finding of present study are similar to studies [11, 10, 2, 12, 14.] In the study conducted in Finland involving RTA during the period 1972 to 1982,[15] in which an injury to cervical spine was the main cause of death. Increasing age seems to increase the risk of fatal cervical spinal injuries. Patients between 16 to 25 years of age had the lowest risk and the patient over the age of 60 years had the highest risk of sustaining a fatal cervical spinal injury [13.] Accordingly in our study most of the cervical spinal cord injury cases were above 40 years.

Source of Funding: Self

Conflict of Interest: Nil

Summary and Conclusion:

1. The most common injury in thorax is rib fracture seen in 29.36 % of cases followed by lung injury in 14.68 % cases.
2. The most common organ involved in abdomen & pelvis is liver in 22.02% of cases.
3. The most common cause of death is intracranial injury in 78.90 % of cases.

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Profile of Cases of Fatal Road Traffic Accident with Respect to Diurnal Variation of Time, Age, Sex and Death of Victim in Central Rural India-Autopsy Based Study

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ABSTRACT

Road traffic accident is a complex phenomenon. Constant rise in the number of motor vehicles, rampant encroachment of road, easy to avail the vehicle because of loan facility, nasty tendency of violating traffic rules and anarchic traffic systems have greatly contributed to rapid increase in RTAs. The rise of road traffic accidents has become a major public health problem. RTAs cost a lot not only to the individuals affected and their families but also to the nation. The injuries, disability and fatality resulting from unexpected RTAs put a significant drain on the economy of the nation.

The present study was a cross-sectional study conducted in central India during 2 year period from 1st June 2014 to 31st May 2016. During the study period, a total of 757 medicolegal autopsies were conducted in this institute, out of which 109 cases of fatal road traffic accidents (died on spot or within 24 hours of accident) were studied. The purpose of the study was to know the age and sex wise distribution, diurnal variation and to correlate the above parameters with the cause of death.

Keywords: *Fatal road traffic accident, Intracranial hemorrhage, Diurnal variation, death.*

INTRODUCTION

Accidents are world's most serious health problem. The motorized transportation media like vehicles, trains, aeroplanes etc, with fast moving vehicular traffic, vast urbanization and changing social patterns, have contributed to increase in the incidence of trauma to human body.

Road Traffic Accident (RTA) is any vehicular accident occurring on the roadway (i.e. originating on, or involving a vehicle partially on the roadway)[19]. This includes collision of an automobile with a pedestrian, another automobile or with a non-automobile on the roadway or fall from a moving vehicle causing injuries or death of involved individuals.

In 2013, global rate of death from Road Traffic Injuries was 16.6 per 1,00,000 population, 1.25 million people died globally from road traffic injuries in year 2013[19]. In India, more than 4.8 lakh accidents and more than 1.3 lakh deaths were reported during 2013[5]. According to an expert study group appointed by Government of India "RTAs have come to be considered as the third deadly killer, next to heart disease and cancer." Every year the World Health Organization (WHO) hosts an event, usually on 7th April, to celebrate the anniversary of its founding in 1946. Each year the event focuses on one health issue. In response to a growing concern about RTAs the WHO Director-General, Dr. Lee Jong Wook has for the first time in history of WHO devoted[9] 7th April 2004 specifically to road safety and the slogan was "Road Safety Is No Accident." Early detection of the injury and prompt treatment are necessary in saving the lives of many of these victims[11].

AIMS AND OBJECTIVES

1. To analyze the cause of death due to fatal road traffic accident brought to mortuary of our institute for post-mortem examination.
2. To study age and sex wise distribution of fatal road traffic accidents.

3. To study diurnal variation of time of fatal road traffic accidents.

MATERIALS AND METHOD

The present study was a two year cross–sectional study. The material for the study was the cases of road traffic accidents brought to mortuary for post mortem of this institution situated in central India, during the period from 1st June 2014 to 31st May 2016.The present study includes documenting types of wound, their anatomical location and commonest injuries leading to death in fatal road traffic accidents. Ethical clearance for the present study was obtained from the institutional ethical committee. On the arrival of the case in Mortuary of this institute, informed expressed consent was taken from the relative of deceased for examination of wound and their documentation. In the present study, detailed information regarding the wounds and various factors regarding the circumstances of the occurrence, like type of road traffic accidents, time and place of accidents, who treat case first, occupation and other relevant information were gathered from relative and were recorded in the predefined proforma. Details of name, age, sex, address, occupation, type of accident etc. were recorded from relative. All the wounds were examined for their location, size and shape. In the present study though the size of all wounds were noted but it is not included in the analysis because it is beyond the preview of present study.

During the present study period from 1st June 2014 to 31st May 2016 at this institute in central India–

1. Total no of medicolegal autopsies were conducted during the study period = 757.
2. Autopsies of fatal road traffic accident (died on spot, brought dead to hospital or died within 24 hours of accident) = 109.

Inclusion Criteria: All the victims of road traffic accidents who were died on spot or brought dead to hospital or died within 24 hours of accident.

Exclusion Criteria:

1. All the victims who died in an incidence other than road traffic accidents.
2. All the victims of road traffic accidents who died after 24 hours of accident.

Statistical Analysis:

1. The software for graphs and calculation of statistical values is – SPSS.
2. The software used during creation or modification of some of the diagrams.
   a. ADOBE PHOTOSHOP(R) 7.0
   b. COREL DRAW X3
   c. WINDOWS-10

RESULTS

Table 1: Age and sex wise distribution of cases of fatal Road Traffic Accidents

Age group (in years)	Male	Female	Percentage	
			Male	Female
1 - 10	2	2	01.84%	01.84%
11 - 20	8	4	07.34%	03.67%
21 - 30	30	2	27.52%	01.84%
31 - 40	17	2	15.59%	01.84%
41 - 50	10	1	09.17%	00.92%
51 - 60	12	4	11.01%	03.67%
61 - 70	9	3	08.25%	02.75%
71 - Above	3	0	02.75%	00.00%
Total	91	18	83.47%	16.53%

Table 2: Distribution of cases of fatal Road Traffic Accident as per diurnal variation of time

Time of accident	No. of cases	Percentage
Morning (06:01 am to 12:00 noon)	21	19.27%
After noon (12:01 pm to 06:00 pm)	53	48.62%
Evening (06:01 pm to 12:00 midnight)	33	30.28%
Night (12:01 am to 06:00 am)	02	01.83%
Total	109	100%

Table 3: Profile of cause of death

Cause of death	No. of cases	Percentage
Intracranial injuries (intracranial hemorrhage/brain injury)	86	78.90%
Hemorrhagic shock	17	15.60%
Traumatic asphyxia	04	03.67%
Spinal cord injury	02	01.83%
Total	109	100%

DISCUSSION

Age and sex wise distribution of cases of fatal RTA (Table 1): Out of 109 (91 cases, 83.47%) were male and (18 cases, 16.53%) were female indicating that large majority of victims were males. Male to female ratio was 5.06:1. Maximum number of victims (32 cases, 29.36%) were in the age group of 21 – 30 years, followed by 31 – 40 years (19 cases, 17.43%). Minimum victims were found in age group of 71 years and above (3 cases, 02.75%) followed by 1 – 10 years (4 cases, 03.68%). Youngest victim was 4 years old male child and the eldest was 85 years male.

Our findings are similar to result of following studies. In the study conducted at PGIMS, Rohtak,[15] males were involved in 89.30% of cases and females in 11.70%. Commonest age group involved was 21 – 30 years (27.30%), followed by 31 – 40 years (20.60%). In other study done at Government Medical College, Jammu,[7] majority of the victims were male (88.13%), while females were involved in 11.87% of cases. Most commonly involved age group was 21 – 30 years (30%), followed by 31 – 40 years (19.20%). In another study carried out at Office of Judicial Medical Officer, Colombo,[10] 84.54% of victims were male and 15.44% were females. Maximum numbers of victims were in the age 20 – 29 years (20.12%) followed by 30 – 39 years (16.10%). In all the above studies minimum number of victims were in the extremes of age. In the study conducted at Belgaum, Karnataka[13] majority of victims were male (89%). Male to female ratio was 8.09:1. Maximum number of victims (28 cases, 28%) were in the age group of 21 – 30 years followed by 51 – 60 years (18 cases, 18%). Minimum of victims (3 cases, 3%) were found in the extreme age group of 71 – 80 years old male. Similar findings have also been observed in other studies.[12, 4, 1, 14]

The male preponderance in fatal road traffic accidents may be due to the paternalistic nature of our society where males lead a more active life and most of the time is involved in outdoor activities such as driving and travelling. On the contrary, females mostly keep themselves indoor because of cultural background and with the habit of watching TV programs. Totally more than half (56.88%) of victims were in the age group 21 – 50 years. This may be due to the fact that persons of this age group lead more active life, more mobile and go out for work and keep themselves outdoors most of the time. Besides, there is craziness in fast driving, less experience, less traffic sense, late night driving, especially after parties is usually seen in this age group. In our study, people in the extremes of age group comprised the minimum number of fatalities. Least fatalities in older persons may be due to more experience, more traffic sense, less tendency to take undue risks and they remain mostly indoors and leads less active life. Lesser involvement of children below 10 years may be because some senior members of the family accompanies them on road or non availability of driving license of motor vehicles.

Diurnal variation of cases of fatal RTA (Table 2): Maximum number of accidents occurred in the afternoon hour’s 53 cases (48.62%) and minimum 02 cases (01.83%) in the night. In the evening it was 33 cases (30.28%) and in the morning it was 21 cases (19.27%). Our result is similar to the observations made in the study conducted at Regional Institute of Medical Sciences (RIMS), Imphal, Manipur,[16] in which maximum number of accidents 49.27% occurred during afternoon hours and minimum 03.41% in the night, in the morning

hours the maximum number of accidents occurred were 31.71%. However the result of our study dose not match with the study done by Satish Babu at Belgaum, Karnataka[13] and Patel NS at Greater Lusaka, Zambia[12] and study conducted by Lal S Kohli et al in North East Delhi.[10] This difference can be attributed to the fact that the biggest period in the area where our study has been conducted is between 12:00 noon to 06:00 PM, where majority of people travel for work, school etc. with a sense of urgency to reach the destination. Moreover the peoples in rural area prefer to stay indoor and do not venture out after dark, there by low incidence of accidents in night. The second in order of the time of occurrence of accidents in our study was in the evening hours 30.28% and the tall of accidents in the evening may be due to high rush hour traffic (people return home from work), tiredness after day work, urgency to reach home, poor visibility due to insufficient road lighting in the rural area.

Profile of cause of death (Table 3): In our study cause of death was intracranial injuries 86 (78.90%) in maximum number of cases. Next to intracranial injuries was hemorrhagic shock seen in 17 cases (15.60%), traumatic asphyxia in 4 cases (03.67%) and spinal cord injury in 2 cases (01.83%). The finding of present study are similar to studies[6, 3, 2, 8, 17]. In the study conducted in Finland involving RTA during the period 1972 to 1982,[18] in which an injury to cervical spine was the main cause of death. Increasing age seems to increase the risk of fatal cervical spinal injuries. Patients between 16 to 25 years of age had the lowest risk and the patient over the age of 60 years had the highest risk of sustaining a fatal cervical spinal injury 16. Accordingly in our study most of the cervical spinal cord injury cases were above 40 years.

CONCLUSION

Road traffic accident is a complex phenomenon. Constant rise in the number of motor vehicles, rampant encroachment of road, easy to avail the vehicle because of loan facility, nasty tendency of violating traffic rules and anarchic traffic systems have greatly contributed to rapid increase in RTAs. Population explosion is a catalyzing factor for a number of accidents. The rise of road traffic accidents has become a major public health problem. RTAs cost a lot not only to the individuals affected and their families but also to the nation. The injuries, disability and fatality resulting from unexpected RTAs put a significant drain on the economy of the nation. The deaths due to RTAs accounted for 14.40% of total medico legal autopsies conducted (i.e. died on spot, brought dead to hospital or died within 24 hours of accident). All the victims of fatal RTAs had injuries of one or other system. Intracranial injuries were seen in 80.73% of the cases. In majority of victims, intracranial injuries contributed either directly or indirectly to death. Intracranial injuries cause alone was responsible for death in 78.90% of cases, followed by hemorrhagic shock 15.60%, spinal cord injury 01.83% and traumatic shock 03.67%. This shows that intracranial injuries are most common fatal injuries in road traffic accidents in this region. This could be due to the fact that, the intracranial injuries cannot be treated successfully, even in tertiary level hospitals. This may be because of their physiological and anatomical configuration. Therefore, the old saying, "Prevention is better than cure" holds true even here. Injuries and fatalities due to RTA can be prevented or at least can be reduced by preventing the accidents/crashes, in turn reducing fatal injuries and fatalities.

The present study was cross-sectional study conducted in central India during 2 year period from 1st June 2014 to 31st May 2016. During the study period, a total of 757 medicolegal autopsies were conducted in this institute, out of which 109 cases of fatal road traffic accidents (died on spot or within 24 hours of accident) were studied.

The predesigned and pretested proforma was used to collect the required data and following were the findings

1. Out of 109 victims of fatal RTA, 91 (83.47%) were male and 18 (16.53%) were female.
2. The largest number of victims were in the age group 21 – 30 years (27.52%).
3. Most of the accidents occurred in the afternoon hours (48.62%).
4. An intracranial injury alone was responsible for death in 86 cases (78.90%).

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Conflict of Interest: NIL

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A Two-Year Prospective Study from Punjab Region of India

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ABSTRACT

On one hand the horizon of human rights is expanding but at the same time the crime rate is also increasing. In this context, custodial deaths are among most contentious deaths for investigation by forensic experts. These deaths sometimes invite mass resentment and condemnation. Not that always such deaths are due to unnatural or violent causes; indeed most of the time they are due to natural causes. To analyse custodial deaths from all aspects present prospective study was undertaken. A total of 135 (119 male and 16 female) cases of custodial deaths were examined in detail over a study period of 2 years. Based on place of confinement 100 cases (74.07%) died in jail custody, 33 cases (24.45%) died in mental hospital custody and in 2 cases (1.48%) death occurred in police custody. Among 92 cases (out of 135) in which final cause of death was declared, the death was natural in 95.65% while in 4.35% it was unnatural. Pulmonary tuberculosis was the most common natural cause among prison custodial deaths (22.8%, n=16). In mental hospital custody coronary artery disease (12.8%, n=9) was the leading cause of natural death. As far as unnatural deaths are concerned, there were two cases each of suicidal and accidental deaths (2.17% each) and no case of homicidal death was noticed.

Keywords: *custodial deaths, jail, police, mental hospital.*

INTRODUCTION

Unfortunately, the term 'custody' has not been defined in Criminal Procedure Code (CrPC). Its core meaning is that the law has taken control of the person. This control is not the final or absolute control of ownership but controlling of a person's liberty or curtailing in a substantial manner a person's freedom of action. But at the same time there is implied responsibility for the protection and preservation of the person in custody. The person in custody is thus totally dependent on his or her custodian for proper care and attention.

Custodial death is heard in news and media from time to time and most of the highlighted cases invite public resentment and condemnation. Such events invariably have substantial allegations of omission of proper care and attention or commission of atrocities and torture or abuse of power in one or the other way on part of the authorities' concerned.

Not that always such deaths are due to unnatural or violent causes; indeed most of the time they are due to natural causes.[1,2] Inadequate medical facilities, delayed medical attention, inadequately trained staff and insensitive custodial authorities are frequently blamed causes by the researchers, to contribute to untimely natural or unnatural prison deaths. Therefore all cases of custodial deaths need to be investigated thoroughly to bring out the actual facts surrounding the death.

Every case of custodial death is supposed to be reported to the National Human Rights Commission (NHRC) and the police is also required to report the findings of the magistrate's inquiry to the Commission along with the postmortem report.[1] This is an important protection but these steps are frequently ignored. According to Human Rights Watch investigation, a judicial inquiry was conducted only in 31 of the 97 custodial deaths reported in 2015 and 26 cases were not even submitted for an autopsy.[3]

The autopsy surgeon has a unique role in documenting medical evidence in cases of custodial deaths. His/her role assumes significance in events when the custodial authorities try to hide or alter the

actual facts behind the death to save themselves from any penal action. He/she can find out the cause of death after meticulous examination and may also come out clear about manner of death on thorough evaluation of available information.

MATERIAL & METHOD

The prospective analytic study was carried out in the Department of Forensic Medicine and Toxicology, Government Medical College Amritsar (GMCA) from 1.10.2014 to 30.9.2016 on cases of custodial deaths brought for postmortem examination. The postmortem was conducted as per the guidelines laid down by NHRC.

Custodial deaths were categorized into three groups namely jail custody, police custody and mental hospital custody (in the custody of Government Mental Hospital Amritsar) deaths.

The inquest papers, hospital record, autopsy findings and the results of laboratory investigations including histopathology and chemical analysis were perused. All the observations are tabulated and the results are compared with the previous studies.

OBSERVATIONS

Out of 695 autopsies conducted during this period, the number of custodial death cases was 135 (19.42%). Based on place of confinement 100 cases (74.07%) died in jail custody, 33 cases (24.45%) died in mental hospital custody and in 2 cases (1.48%) death occurred in police custody. (Table-1) Among those dying in jail custody 50% were convicted prisoners, 47% were undertrial prisoners and 3% were internee. (Fig-1)

Out of 135 deaths 88.1% (n=119) were male and 11.9% (n=16) were female. Among males maximum deaths occurred in jail custody (82.35%; n=98) followed by mental hospital custody (16.81%; n=20) and one (0.84%) died in police custody. Among females 13 (81.25%) died in mental hospital, 2(12.5%) died in judicial custody and 1(6.25%) died in police custody. (Table-2)

The proportion of overall custodial deaths was highest in 26-35 years (26.7%) age group followed by 36-45 years (21.50%) and 46-55 years (16.30%) age groups. In jail, maximum deaths 32% (n=32) occurred in the age group of 26-35 years. While in mental hospital maximum deaths 45.7% (n=16) occurred in the age groups of 46-65 years. Two cases-a 35 year old female and a 16 year old male-died in police custody. (Table-3)

A total of 104 (77.04%) persons received medical care before their death, while 31 (22.96%) died at their place of confinement and had not received medical care before their death.

In 43 cases of custodial deaths laboratory reports (chemical analysis and/or histopathology) were still pending. So the statistical analysis regarding cause and manner of death could be performed only in 92 cases (out of 135) in which final cause of death were established. Out of these 92 cases 88 (95.65%) died of natural causes while 4 (4.35%) died due to unnatural causes. (Table-4)

Among natural causes 38.64% cases had single organ involved, majority having pulmonary involvement, 28.26% cases had two organ system involved and 20% had multi-organ failure. Pulmonary tuberculosis was the most common natural cause of death in prison custody (22.8%, n=16). In mental hospital custody coronary artery disease (12.8%, n=9) was the main cause of natural death. (Table-5) Out of total 33 cases of mental hospital deaths only 2 cases (6.06%) had pulmonary tuberculosis. (Table-6)

Out of total 102 cases of judicial/police custody deaths 53 cases (51.96%) were suffering either from TB or HIV or HCV or multiple infections. (Table-6)

As far as manner of unnatural deaths is concerned, there were two cases each of suicidal and accidental deaths (2.17% each) and no case of homicidal death has been noticed. Suicide was committed by 2 cases (n=2/92; 2.17%); one each in police and mental hospital custody. Hanging was the method used for suicide in both the cases.

Accidental death also accounted for 2 cases (n=2/92; 2.17%); one each died in jail and police custody. Accidental death in jail occurred due to accidental overdose of intravenous morphine in an undertrial prisoner. In police custody the accidental fall from height and consequent head injury resulted into death of the female inmate. (Table-4)

Table 1: Incidence of custodial death cases as per confinement

Type of custody	No. of cases	Percentage
Jail custody	100	74.07
Police custody	2	1.48
Mental Hospital custody	33	24.45
Total	135	100

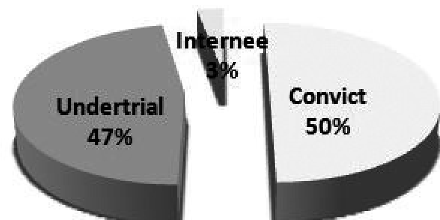

Figure 1: Conviction status of prisoners in jail custody

Table 2: Age wise distribution of custodial death cases

Age group (in years)	No. of cases	Percentage
16-25	20	14.8
26-35	36	26.7
36-45	29	21.5
46-55	22	16.3
56-65	15	11.1
66-75	11	8.1
76-85	2	1.5
Total	**135**	**100**

Table 3: Gender wise distribution of custodial death cases

Gender	Judicial			Police	Mental Hospital	Total
	Convict	Undertrial	Internee			
Male	48 (96%)	47 (100%)	3 (100%)	1 (50%)	20 (61.61%)	119 (88.10%)
Female	2 (4%)	0 (0%)	0 (0%)	1 (50%)	13 (39.39%)	16 (11.90%)
Total cases	50	47	3	2	33	135

Table 4: Manner of death in custodial death cases (n = 92/135)

Manner of death	Mental Hospital	Judicial			Police	Total
		Convict	Undertrial	Internee		
NATURAL	23	36	26	3	0	88(95.65%)
UNNATURAL						
Accidental	0	0	1	0	1	2(2.17%)
Suicidal	1	0	0	0	1	2(2.17%)
Homicidal	0	0	0	0	0	0(0%)
Total	24	36	27	3	2	92(100%)

Table 5: Cause of death in custodial death cases (n = 92/135)

Cause of death	Mental Hospital	Judicial			Police	Total
		Convict	Undertrial	Internee		
Asphyxia	1*	0	0	0	1*	2
Hemorrhage & Shock	0	1	1	1	0	3
Septicemia	2	1	2	0	0	5
Poisoning	0	0	1*	0	0	1
Shock	0	0	1	0	0	1

Conted…

Organ failure						
One organ failure						
Brain	2	1	1	0	1*	5
Lungs	4	11	10	1	0	26
Liver	0	2	0	0	0	2
Heart	1	0	0	0	0	1
Two organ failure						
Brain &Heart	2	0	0	0	0	2
Brain &Lung	2	3	3	0	0	8
Heart &Lung	7	4	1	0	0	12
Liver &Lung	1	2	0	0	0	3
Kidney &Lung	0	1	0	0	0	1
Multi-organ failure	2	10	7	1	0	20
Total	24	36	27	3	2	92

*Unnatural deaths

Table 6: Prevalence of HIV, TB and HCV infections in custodial death cases

	TB	**HIV**	**HCV**	**HIV+ HCV**	**HIV+ TB**	**TB+ HCV**	**HIV+ HCV+TB**	**Total**
Judicial/police (n = 102)	22 (21.57)	11 (10.78)	12 (11.76)	4 (3.92)	1 (0.98)	1 (0.98)	2 (1.96)	53 (51.96)
Mental hospital (n = 33)	2 (6.06)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (6.06)

(Parenthesis indicates percentage)

DISCUSSION

According to the NHRC, the number of custodial deaths in 2000-2001 was 1,037 while in the year 2012-2013 they have increased to 2,157. A total of 1,702 prisoners have died in Indian jails during 2014; out of which 1,507 were natural deaths and 195 were unnatural deaths.[2]

In present study the incidence of custodial death was 19.42% of the total autopsies. In previous studies from same region conducted by Gargi[4] (1995-97) and Vohra[5] (2009-2010) the incidence of custodial death was 0.77% and 2.93% respectively. This increased proportion of custodial deaths is on account of the fact that since 2013, the GMCA is conducting autopsies in custodial death cases and referred cases requiring forensic pathologist expertise besides in-hospital deaths. Autopsies in all other cases are now being conducted at District hospital.

Out of 135 cases of custodial deaths, 11.9% were female and majority of them died in mental hospital with only two deaths occurred in prison. Vohra[5] has also mentioned 18.6% female deaths, majority of them died in mental hospital. Gargi[4] and Bardale[6] reported all males while Mittal[7] reported only one female death in prison. Higher incidence of female deaths in mental hospital was during their old age after they had been left here by the relatives for rest of their life.

Predominantly the custodial deaths (26.7%) were seen in the age group of 26-35 years while Bardale[6] and Vohra[5] reported maximum age incidence (24.3%) in age group of 31-40 years. It shows that crime rate is enhancing amongst the younger age group.

The present study found more incidence of death among convicts (50%) comparative to undertrials (47%); the finding is in line with findings of Bansal et al[8] who has reported, respectively 58.7% and 41.3% deaths among convicts and undertrials. Contrary to this observation Vohra[5] has mentioned 71.4% deaths involving undertrial prisoners.

In present study 77.04% of inmates received medical care before their death. The studies of Vohra[5], Bardale[6] and Mittal[7] put this figure respectively at 55.71%, 64.28% and 69.56%. It points towards a positive trend of timely referral of sick custodial patients.

Natural Deaths: The current study found that natural causes were responsible for majority of custodial deaths (about 95%).[4-12] Among natural deaths most of the deaths were due to pulmonary system involvement; pulmonary tuberculosis being the leading cause. This finding is supported by various other researchers.[4-6,11-14] However, Wobeser et al[9] and Frueshwald et al[10] found that majority of deaths were due to cardio-vascular diseases. This is attributed to overcrowding, closed living conditions, insufficient ventilation and poor nutrition in Indian jails as compared to western countries.

In our study out of 102 cases in judicial/police custody 21.57% were having tuberculosis, 10.78% were HIV infected and 11.76% were HCV infected. Besides, 8.7% cases were infected with multiple infections. (Table-6) Bansal[8] and Bardale[6] found the prevalence of HIV respectively in 13.5% and 14.08% of prison inmates. From above observation it is clear that prisoners constitute high risk group for acquisition of these infections.

Unnatural Deaths: The unnatural deaths comprised only 4.35% of cases which is lowest figure found as compared to figures reported by other authors. General welfare of prisoners and vigilance in Punjab jails might be comparably better than other study regions. The reason for this can be attributed to NHRC activism, media and general public awareness regarding custodial deaths, and constant fights of various NGO's against the custodial torture.

Suicidal and accidental deaths were found to have equal incidence (2.17% each). In this respect, the present study differs from other researchers, who found overall higher incidence of suicides, and also the most common manner of unnatural death. (Table-4)

However present study is in consonance with studies by Vohra[5], Bardale[6], Bansal[8], Agnihotri[11], Sonawane[12] and Sonar V et al[13] as far as most common method used for suicide viz. hanging. Therefore authorities should be careful that the inmates are not in the possession of such materials which may help them in taking the extreme step of ending their lives.

No case of homicide has been noticed in present study and this indicates effective control of authorities over inmates. However one disturbing fact is that all deaths occurring under police custody were unnatural. **(Table-4)** Moreover these deaths had occurred shortly after arrest and one of the arrestee was detained without any entry in daily diary. These shocking practices used by police undermine public faith in law enforcement.

Accidental deaths were due to drug overdose (poisoning) and accidental fall. The access of prisoners to poisons/drugs of abuse indicates lapses in jail security and has been found to be the commonest cause of unnatural deaths by few authors.[7,14]

CONCLUSION

Custodial deaths are predominantly due to natural causes and pulmonary tuberculosis is the leading cause in developing countries, which is further compounded by high prevalence of HIV and HCV infections among prisoners. There should be regular health check-up and an effective programme to screen and treat inmates. Better maintenance of prisons, trained, sensitive and more dedicated staff including medical staff and de-crowding of prisons are few of important suggestions to be followed.

Access to various drugs and poisons inside jail is also a matter of concern and this could not be possible without connivance of jail officials. Those involved in such practices should be warned and strict action need to be taken. De-addiction and rehabilitation services to addict prisoners and timely medical care to sick ones should be provisioned as a matter of right.

An unnatural death in police custody is another grave area of concern. The way forward is to strictly enforce existing laws and guidelines on arrest and detention. The Supreme Court's D.K Basu decision particularly with respect to recording detentions, informing families, producing suspects before magistrates and providing medical examinations should be adhered to by the police.

Only a more humane approach towards prisoners and providing care and timely medical aid as a matter of right will go a long way to bring down the incidence of prison deaths in India.

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A Prospective Study of Unnatural Deaths in Married Women within Seven Years of Marriage in Hapur District of Western Uttar Pradesh

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ABSTRACT

In Indian society marriage is considered sacrosanct and essential for procreation and propagation of humanity. The sizable numbers of deaths in female are unnatural. In young married women more often they are associated with demands of dowry or harassment & cruelty by husband or in-laws. Present autopsy based study was conducted to study the socio-demographic pattern and reasons behind unnatural deaths in newly married females. Females living in Hindu joint family structure from lower socioeconomic strata have shown increased incidence of unnatural death, predominantly during early years of their marriage. The most common incident resulting in unnatural death was vehicular accident injuries (37.14%), followed by Hanging (20%), Strangulation (17%) and Poisoning (14%). Accidental deaths were most frequent comprising 40% of total cases, followed by suicides comprising 37.14% and homicides had a share of 22.86%. Significantly in 20% cases there was allegation of dowry demand/torture/harassment by in-laws/husband of the deceased and most of them were homicides, killed either by strangulation or burning.

Keywords: *dowry, unnatural death, marriage, women.*

INTRODUCTION

The religious and mythological scriptures in India vividly depict marriage as sacrosanct and an essential phenomenon for procreating and propagating the humanity. In Indian patriarchal society women always have been at receiving end. Death is unnatural when caused prematurely against the order of nature by injury, poison or other means of violence. The sizable numbers of deaths in female are unnatural. In young married women more often they are associated with demands of dowry or harassment & cruelty by husband or in-laws.[1,2,3,4,6]

Despite so many statutory provisions in law books, dowry death or suicide by young married women due to cruelty or harassment is still continued.[1-4] Moreover such deaths are not only prevalent in Hindu castes but studies in recent past have also reported cases from non-Hindu religious communities.[1,3,4,6]

The present study was conducted to find out the incidence and causes of unnatural deaths in married women occurring within seven years of the marriage. Through this study the authors will analyse the demography, incidence, causes, manner and reasons behind these unnatural deaths and compare the findings with previous studies.

MATERIAL AND METHOD

Study Settings: The present study was carried out at the Saraswathi Institute of Medical Sciences (SIMS), Hapur in western Uttar Pradesh. The college falls under rural area of western UP and all the medico-legal deaths reported at the District Civil Hospital and the Medical College are autopsied here.

Study design: Prospective autopsy-based descriptive observational study carried out from July, 2015 to October, 2016.

Study subjects: The cases of unnatural married female deaths dying within seven years of the marriage autopsied at the mortuary of SIMS Hapur.

Exclusion criteria:

1. Unidentified female deaths.
2. Widow or divorced females dying within seven years of their marriage living with her parents.

Data collection and Analysis: The inquest papers, clinical hospital records and postmortem findings were used to get preliminary details and circumstances of cause and manner of death. Besides, the close relatives and identifiers were interviewed for recording sociological profile of deceased and to find out reasons/motives behind non-accidental deaths by inquiring into the recent past of the deceased. All details were systematically recorded in Performa. Data was organized and statistically analysed using Microsoft Excel to generate tabulated and pictorial representations for deduction of results. These results were compared with other relevant studies from various parts of India.

OBSERVATIONS

Incidence and Demographic profile: A total 688 medicolegal autopsies were conducted at SIMS during this period. Out of these 76% (n = 524) were male and female comprised 24% (n = 164) with male:female ratio of 3.2 : 1. Among female deaths, 74% cases (n = 121/164) were identified, including 35 cases of married females dying within 7 years of their marriage and one widow living with her parents who had complete disconnect with in-laws. The remaining 26% cases (n=43/164) were unidentified/unclaimed females. Thus the study subjects (n = 35) comprised 5% of total deaths, 21.3% of total female deaths and 28.9% of identified female deaths.

Out of these 35 cases, 31.4% female deaths occurred in their late twenties (26-30 years) followed by 25.7% of deaths in early twenties (21-25 years). The least number of cases 20% were found in youngest age group (16-20 years) including two victims of less than the legal age for marriage. [Table 1]

A total of 45.71% of unnatural deaths among married females occurred in initial three years of marriage. The single largest group affecting 25.71% of victims died during the third year of their married life. Another peak was seen in the sixth year of married life comprising 22.86% of victims. Incidence of deaths in very first year (n = 3) and the seventh year (n = 2) of marriage was least. [Table 2]

Socio-economic profile: Mostly the female victims belonged to rural domiciliary region (88.57%). About 83% belonged to Hindu religion predominantly living in joint family structure (58.6%). The remaining 17% cases belonged to Muslim religion with 83.3% living in joint families.

About 74% belonged to lower class while remaining belonged to lower middle class of socio-economic strata. No female belonged to extremely rich or poor class.

Only 20% of females were employed and majority were housewives. About 29% of females were issueless while 37% had both male and female children. Remaining had either female children (17%) or male children (17%).

All females were literate with 97% being matriculate or above. Only one victim studied upto primary level. Those educated upto Intermediate level were 42.86% and significantly graduates comprised 31.43%. None was having any technical/professional education. [Table 3]

Circumstances and cause of death: The most common incident resulting in unnatural death was vehicular accident injuries (37.14%), followed by Hanging (20%), Strangulation (17%) and Poisoning (14%). **[Table 4]**

Out of total of 43% cases of fatal injuries the vehicular accidents claimed 37.14% lives and remaining 5.71% suffered injuries due to causes other than road traffic accidents (fall from height, homicidal stabbing). [Table 4]

Accidental deaths (n = 14) were most frequent comprising 40% of total cases, followed by suicides (n = 13) comprising 37.14% and homicides (n = 8) had a share of 22.86%. [Table 5]

As regard to circumstances, 40% (n=14) of deaths were accidental deaths and had no acclaimed reasons behind. In 20% (n=7) the reason could never be known. There were seven cases i.e. 20% where allegations of dowry demand and torture/harassment were made by parents/relatives of the deceased and cases were brought u/s 304-B IPC. Of these seven cases, 5 deaths were homicidal (Burns-2, Strangulation-2 and Poisoning-1) and 2 victims committed suicide (Hanging-1 and Poisoning-1).

In remaining 20% cases (n=7) the precipitating event was quarrel with husband/in-laws. Of these infidelities and being issueless were found to be the root cause in three cases. [Table 6]

DISCUSSION

Incidence and Demographic profile: The present study found that the number of unnatural deaths in newly married females had a share of 5% among total autopsies, which is similar to the finding of Arora P et al[5] (4.95%) but lesser than figure reported by Verma RK et al[3] i.e 7.74%. Kulshrestha P et al[1] and Jaswinder S et al[4] did not mention the incidence in their studies.

Most vulnerable age group has been reported to be 21-25 years by most of authors[1-4]. They have reported the proportion of victims aged less than 25 years from 58% to 83.75% in their studies. The present study has recorded 45.71% cases died under age of 25 years.

Not in agreement with the findings of these authors[1-4], 26-30 years has been the most vulnerable age group affected comprising 31.4% of victims, followed by 21-25 years age group with 25.71% of victims. The age of marriage in most of the urban, sub-urban and educated rural societies has certainly gone up to somewhere near early twenties to mid-twenties. The married female if falling prey to the dowry demands or cruelty, would in all probability lie in the age group of mid-twenty or above, even if the incidence occurs in initial few years of her married life. Also the employment opportunities opened up for educated married women (with proportion of graduates near one-third and those of employed one-fifth in present study) have increased the risk of vehicular accidents thereby wobbling the incidence across various age groups.

The various authors have reported majority of victims (about 45% to 60%) died within three years of their marriage with peak incidence occurring during second year of the married life [1-4]. The present study has found 45.71% victims dying within three years of their marriage with peak incidence occurring during third year of the marriage (25.71%). This shift of victimization from earlier years of marriage could be attributed to the increasing use of divorce by younger population as a rescue to harassment/cruelty/dowry demands during early years of marriage. This has been facilitated by changing social norms.

Social trends originating in metros slowly percolate down to smaller towns and from there to villages. Divorce is no longer a taboo and a divorced daughter is not unwelcome in her parents' home even in smaller towns. In the new socio-economic environment, women do not feel shy of walking out of marriage. The increased communication through mobile phones with their parents has also emboldened the women to take early decision regarding dissolution of marriage. But once the child is born out of wedlock, the decision of divorce becomes hard to take and the women gives up tolerating the victimization, until the point of catastrophe is reached.

There is another peak in deaths during sixth year of married life (22.86%). Majority of these were on account of vehicular accidents due to involvement and exposure of educated females to the outdoor world. This peak during sixth year of married life has also been observed by Verma[3].

Socio-economic profile: Religion wise distribution of cases showed the results similar to those of other authors [1-4]. However, the findings are in slight variance with the study of Kulshrestha[1], Verma[3], Jaswinder[4] and Sinha[6] who have reported a few cases from Sikh and/or Christian communities in their studies. Very low population, higher or professional qualification and cultural differences may be the reasons for no case having been reported from other religions in present study.

The present study is in concurrence with study of Verma[3] showing that majority of the victims belonged to lower and lower middle socio-economic strata. The dissimilarity with the studies of Kulshrestha[1] and Arora[5] who have reported highest incidence of unnatural deaths in lower middle and middle socio-economic strata, could be on account of comparatively more rural population (88.57%) in present study.

Circumstances and cause of death: The major cause of death in present study was injuries (vehicular accidents), followed by hanging and strangulation. Similar to the present study Lalwani[7] observed vehicular accidents (32.6%) followed by hanging (17.3%), poisoning (12.6%) and burns (10.2%) as the common causes of unnatural deaths in females. Verma[3] has also reported vehicular accident as second common cause of death after burns.

Burn as a major cause of death in females was concluded by most of other authors in their studies.[1-4, 6] This is in variance with the present study which has found burn as cause of death in just 5.71% of cases. The difference could be attributed to the fact that the serious burn cases are referred to higher government tertiary centres in nearby national capital region. Further the government efforts directed to curb dowry related deaths like restricted sale of kerosene oil, prohibiting disbursing of petrol/diesel in free containers etc. might have started

showing the desired results. The stringent view taken by courts in cases of bride burning may be other important deterrent factor.

Hanging was second common cause of death in 20% of victims. Srivastava[2] and Verma[3] reported hanging in 29.37% and 18.56% of cases while Jaswinder[4] and Kulshrestha[1] noticed hanging as a cause of death in 13.52% and 11.96% of cases, respectively. Hanging has also been found as the most common method for committing suicide which has also been concluded by Srivastava[2] and Verma[3].

Study reveals that accidental manner was responsible for 40% of deaths while suicidal deaths were 37.14% and strikingly homicides have accounted for 22.86% of deaths. In consonance with present study Kulshrestha[1] has reported accident as the most common manner of death and Verma[3] attributed 42.07% deaths to accidents which is close to the present figure. However present findings are in disagreement with the study of Srivastava[2] who has reported suicide in about half of cases and accidental deaths only in 23% of cases, which could be due to the fact that vehicular accidental deaths were not included in his study.

Homicidal deaths (22.86%) were responsible for significantly higher proportion of deaths in present study as compared to studies by Verma[3] (10%) and Kulshrestha[1] (5.12%). However the finding of Srivastava[2] who has recorded 25.17% of deaths due to homicides is consistent with present study.

The persistent patriarchal attitude, increasing consumerism and show off is manifesting in constantly rising dowry demands. At the same time increased resistance is offered by wives who are now more educated, employed, and aware of their legal and social-cultural rights and are increasingly interacting with outer world. These opposing factors have led to women becoming more vocal, determined and resistant, not easily giving up to undue pressure and this is punished by more cruelty and violence by husband/in-laws. Moreover decreased kitchen accidents (burns) due to reasons explained above, have led to proportional increase of other violent means of homicide i.e strangulation.

Dowry demand by husband or his family members and quarrel with husband/ in-laws are two important reasons behind homicidal as well as suicidal deaths and this finding is consistent with other authors too [1-6].

Table 1: Age-wise incidence of unnatural deaths in married female

Age group (in years)	No. of cases	Percentage
16-20	7	20.00
21-25	9	25.71
26-30	11	31.43
> 31	8	22.86
Total	35	100.00

Table 2: The running year after marriage in which death occurred

Running Year of marriage	No. of cases	Percentage
I	3	08.57
II	4	11.43
III	9	**25.71**
IV	4	11.43
V	5	14.29
VI	8	**22.86**
VII	2	05.71
Total	35	100.00

Table 3: Educational status and incidence of unnatural deaths

Educational status	No. of cases	Percentage
Illiterate	0	00.00
Primary	1	02.86
Matriculate	8	22.86
Intermediate	15	42.86
Graduate	11	31.43
Technical/Professional	0	00.00
Total	35	100.00

Table 4: Cause of unnatural death

Cause of death	No. of cases	Percentage
Injuries (vehicular accidents)	13	37.14
Hanging	7	20.00
Strangulation	6	17.14
Poison	5	14.29
Burns	2	5.71
Injuries other than RTA (Fall from height, stab injury)	2	5.71
Total	35	100.00

Table 5: Manner of unnatural death

Manner of death	No. of cases	Percentage
Accidental	14	40
Suicidal	13	37.14
Homicidal	8	22.86
Total	35	100.00

Table 6: Reasons behind the unnatural deaths

Reason behind death	No. of cases	Percentage
Vehicular accident injuries	13	37.14
Dowry demand and Harassment/Torture	7	20
Quarrel with spouse/in-laws	4	11.43
Infidelity	2	05.71
Infertility	1	02.86
Prolonged illness following fall	1	02.86
Not Known	7	20
Total	35	100.00

CONCLUSION

There is high incidence of unnatural deaths among young Hindu females from rural areas, within initial years of their marriage. Most of these victims are from lower socio-economic strata of the society.

The road traffic accidents accounted for majority of deaths in this young adult population owing to increased contact with outer world. Also the shift in peak incidence of these deaths in mid-twenties and during third year of the marriage, reflects a trend of late marriages and probably early decision-within one or two years of marriage- regarding dissolution of marriages being taken by females, if married in a dowry greedy family.

It is unfortunate that the allegation of dowry demands is still responsible for about one-third of non-accidental unnatural deaths among newly married females. It is also evident that more violent means of homicide are appearing to take the place vacated by traditional burn deaths on account of various reasons cited above.

Recommendations: These deaths can be prevented only through increasing efforts directed at educating females; making them self-dependent by providing vocational training and by expanding the network of self-help groups in rural areas, with an aim to empower every woman.

The misogyny attitude and patriarchal societal view of subjugation of women can be changed slowly over time, by glorifying bold fights taken by females against these practices and encouraging mass and print media to focus on reporting such cases, especially from lower strata of the society. Last but not the least every father should be encouraged neither to take nor to offer dowry.

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Pattern and Distribution of Injuries in Victims of Fatal Road Traffic Accident Cases of Bikers in Haryana a Retrospective Study

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ABSTRACT

Expansion in road network, motorization, and urbanization in the state of Haryana has been accompanied by a rise in road accidents leading to road traffic injuries. Road traffic injuries are one of the leading causes of death in the world. The present study aims at evaluation of pattern and distribution of injuries among bikers thereby planning successful measures to minimize fatalities. The present retrospective study was conducted in the Department of Forensic Medicine and Toxicology, Pt. B. D. Sharma PGIMS Rohtak, Haryana. During one year study period a total of 1557 cases of medico-legal autopsies were conducted out of which 654 cases were of fatal road traffic accidents. This study included 53 cases of bikers victims of fatal road traffic accident, brought for medico-legal post-mortem examination details of which had been recorded regarding the pattern and distribution of injuries. Highest number of fatalities occurred in the age group of 21-30 years followed by the age group 31-40 years. Male victims outnumbered female resulting in male to female ratio of 52:1. Abrasions, contusions and lacerations were the most common type of injuries. The most of deaths were caused by head injury and more than one-sixth of the deaths were due to pelvic and extremities injuries.

Keywords: *Bikers, Road Traffic Accident, Victim, Pattern of Injuries.*

INTRODUCTION

The term accident has been defined "as an occurrence in the sequence of events, which usually produces unintended injury, death or property damage."[1] Accidents today are among the leading cause of death. In some countries road traffic accidents are number one cause of deaths; especially in many parts of the world particularly the more highly industrialized nations. The alarming increase in morbidity and mortality owing to road traffic accidents over the past few decades is a matter of great concern globally. Road accidents have become a serious health hazard throughout the world by killing and crippling thousands of persons each year. A middle aged male is more likely to die from injuries received in traffic accident than from any other cause and motor vehicle accidents are single leading cause of death. By 2020, death and disability resulting from road traffic accidents in comparison to other diseases will rise from 9th to 3rd spot and developing nations will account for 90 percent of world traffic fatalities. Worldwide the number of people killed in road traffic crashes each year is estimated at almost 1.2 million, while the number injured could be as high as 50 million[2].

India is a signatory to Brasilia Declaration and is committed to reduce the number of road accidents and fatalities by 50 per cent by 2020.

However, with one of the highest motorization growth rate in the world accompanied by rapid expansion in road network and urbanization over the years, our country is faced with serious impacts on road safety levels. The total number of road accidents increased by 2.5 per cent from 4,89,400 in 2014 to 5,01,423 in 2015. The total

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number of persons killed in road accidents increased by 4.6 per cent from 1,39,671 in 2014 to 1,46,133 in 2015. Road accident injuries have also increased by 1.4 per cent from 4,93,474 in 2014 to 5,00,279 in 2015. The severity of road accidents, measured in terms of number of persons killed per 100 accidents has increased from 28.5 in 2014 to 29.1 in 2015[3].

Motorized two wheelers account for a significant number of premature death and disability cases in developing countries like India[4]. Two Wheelers accounted for a highest share in total road accidents and next to it was the share of the group of Cars, Jeeps &Taxis in 2015 as reported by the States/UTs. Share of two wheelers in total road accidents has increased continuously from 26.3 per cent in 2013 to 27.3 per cent in 2014 and 28.8 per cent in 2015. Motorcyclists constitute a large number among vehicle population, responsible for more road traffic accidents and thereby injuries.[3]

Bike users involved in crashes are likely to die or be severely injured due to high frequency of head, chest and leg injuries. We carried out a retrospective study to determine crash characteristics and injury distribution and patterns among the autopsy cases brought to mortuary Rohtak Haryana in year 2015.

MATERIAL METHOD

The study is conducted in the mortuary, PGIMS, Rohtak, Haryana. A total of 53 motorcyclists death was studied for the pattern of injuries using a standard proforma. The detailed analysis of these cases was based on the inquest report, medical records and evaluation of autopsy reports. The data thus collected was analysed statistically. Only bike operators were involved not the pillion rider and collision with any object, surface or any animal or fall from vehicle was considered in it. Pedestrians and bicyclers, who died as a result of hit with motorcycle, were not included in this study

OBSERVATIONS

Table 1: Categories of Bike crashes

Category of crash	Number of cases			Percentage
	Male	Female	Total	
Slipped after crashes with breakers	15	Nil	15	28.31%
Crashes with four wheeler	37	1	38	71.69%
Total	52	1	53	100%

Table 1 Shows the category of bike crashes. It shows that 28.30% bike were crashed because of slipping and 71.69% were crashes with four wheelers. The table also depicts the sex wise distribution of bikers involved in fatal bike accidents. It shows that out of 53 bike riders 52 were male and 1 was female.

Table 2 Shows the age wise distribution of fatal cases of bike accidents. It shows that highest number of cases (45.28%) were of age group 21-30 years and second highest (22.64%) were of age group 31-40years . In age group >70years and 0-10 years the affected cases were nil.

Table 2: Age wise distribution of fatal Bike accident cases

Sl. No.	Age in years	No of bike accident fatal cases	Percentage
1.	0-10	Nil	Nil
2.	11-20	5	9.43
3.	21-30	24	45.28
4.	31-40	12	22.64
5.	41-50	5	9.43
6.	51-60	4	7.55
7.	61-70	3	5.67
8.	>70	Nil	Nil
9.	Total	53	100

Table 3: Region wise distribution of fatal injuries over the body

Region of body involved	Number of cases	Percentage
Only Head injury	7	13.20
Head and face injury	38	71.69
Neck injury	2	3.77

Conted…

Only Chest injury	1	1.88
Chest injury	29	54.72
Only Abdominal injury	Nil	Nil
Abdominal injury	22	41.51
Only upper extremity	Nil	Nil
upper extremity	9	16.98
Only lower extremity	2	3.77
lower extremity with pelvic girdle	28	52.83

Table 3 Shows the distribution of fatal injuries over different body regions of bikers. The table shows that the only region affected without other body region injury are head (13.20%), chest (1.88%)and lower extremity (3.77%). The region involved in highest number is head and face (71.69%) and the second highest is chest region (54.72%). The lower extremity with pelvic girdle is also affected in 52.83% cases and abdomen region injury present in 41.51% cases.

Table 4 shows the pattern of head injuries. It shows that intracranial hematomas were present in 67.92% cases and fracture of skull is present in 39.62% of cases. The laceration of brain is present in 16.98% of cases. Abrasion, contusion and laceration of scalp is present in 60.37% of cases. Table also shows the pattern of injuries over the chest. The table shows that the abrasion, contusion and laceration present in 37.74% cases. The fracture of rib present in 28.30% and fracture of clavicle present in 24.53%. The contusion or laceration of pericardium or lungs is present in 33.96% cases.

Table 4: Pattern of Head Injury and Chest Injuries

	Head injury cases = 38			**Chest injury = 29**		
	Fracture of Skull	Cranial hematoma (EDH or SDH or SAH or ALL)	Laceration of brain	Fracture Ribs	Fracture clavicle	Contusion or laceration of pericardium or lungs
	21 (39.62%)	36 (67.92%)	9 (16.98%)	15 (28.30%)	13 (24.53%)	18 (33.96%)
Abrasion or Contusion or laceration of scalp.	32 (60.37%)			20 (37.74%)		

Table 5: Pattern of abdominal and pelvic Injury

Abdominal injury = 22					
Abrasion or Contusion or laceration of abdominal wall	**Liver injury**	**Spleen injury**	**Kidney injury**	**Mesentery injury**	**Pelvis Fracture**
12(22.64%)	6(11.32%)	3(5.66%)	5(9.43%)	7(13.21%)	5(9.43%)

Table 5 Shows the pattern of injuries over the abdomen. The table shows that the abrasion, contusion and laceration is present in 22.64% cases. The fracture of pelvic bone present in 9.43%. The liver injury is present in 11.32% cases, spleen injury in 5.66% cases, kidney injury present in 9.43% and mesentery is injured in 13.21% cases.

Table 6: Pattern of extremities Injury:

Extremities Injury = 32					
Abrasion or Contusion or laceration	**Fracture of upper extremity bones = 9**		**Fracture of lower extremity bones = 23**		**Crush injury**
	Fracture of Forearm bones	**Fracture of Humerus bone**	**Fracture of leg bones**	**Fracture of Thigh bones**	
28 (52.83%)	8 (15.09%)	1 (1.89%)	9 (16.98%)	14 (26.42%)	2 (3.77%)

DISCUSSION

This study includes 53 fatal cases of two wheeler accidents. Out of 53 fatal crashes (28.30%)15 bikes were crashed because of slipping and (71.69%) 38 bikes were crashed with four wheelers. Out of 53 bike riders 52 were male and 1 was female. The maximum cases (45.28%) of deaths were of age group 21-30 years followed by age group 31-40 years (22.64%). In age group >70 years and 0-10 years the cases were nil.

As far as distribution of injuries over the body of victims of bike accident was concerned injuries to head/ face occurred in most of the cases (71.69%) followed by the chest injuries (54.72%), the lower extremity with pelvic girdle injury was present in 52.83% cases and abdomen region injury was present in 41.51% cases . Similar results were observed by Hajek S[5] who recorded 73% head injuries, 62% chest injuries, 30% abdomen injuries, 26% spinal injuries, 52% pelvic injuries, 26% upper extremity injuries and 51% lower extremity injuries. Similar results were also observed by Nilambar Jha et al study[6].

A fracture of the skull with associated brain injury was the most common cause of death but multiple injuries constitute a typical feature of fatal bike accidents[7]. This was also observed in our study that the head injury was most common cause of death and multiple injuries were present over the different regions of the body only isolated region affected without other body region were head in (13.20%) 7cases, chest in (1.88%) 1 cases and lower extremity in (3.77%) 2 cases. Hossack DW[8] showed head/chest injuries to be the major cause of deaths. Our study shows that Abrasion, contusion and laceration of scalp was present in 60.37% of cases, intracranial hematomas were present in 67.92% cases and fracture of skull was present in 39.62% of cases. The laceration of brain was present in 16.98% of cases. Similar results were observed by Schmitz M et al[9] they detected that deaths occurred due to injuries of the head (62%), consequence of bleeding (13%) and because of contusion of medulla oblongata (10.8%) Menon A et al[10] showed 88.88% skull fractures as cause of deaths occurring in fatal accidents.

High incidence of head injuries can be due to reception of maximum force because of restricted movement of the head. In the trunk, the predominance of injuries in chest can be explained by the fragile nature of bony cage sometimes even damaging the internal organs, while the abdomen is protected by its elasticity and rebound nature. The rolling nature of trunk during accidents makes it more susceptible to injuries.

Our study shows that the abrasion, contusion and laceration in chest region present in 37.74% cases. The fracture of rib was present in 28.30% cases and fracture of clavicle was present in 24.53% cases. The contusion or laceration of pericardium or lungs was present in 33.96% cases consistent with KY Tham et al study[11]. High incidence of lung injuries can be explained by their anatomical position and more surface area covering antero-posteriorly, medially and laterally, while heart was injured only in few cases because of its anatomical position and the protection offered by lungs, layers of heart and blood.

It was also observed in our study that the abrasion, contusion and laceration in the abdominal region of the body was present in 22.64% cases. The fracture of pelvic bone was present in 9.43% of cases. The liver injury was present in 11.32% cases, spleen injury was in 5.66% cases, kidney injury was present in 9.43% and mesentery was injured in 13.21% cases.

Banerjee et al[12] showed that majority of victims had involvement of both chest and abdomen (29%) in the road side accidental injuries.

Our study shows that the abrasion, contusion and laceration of upper and lower extremity region was present in 52.83% cases. The fracture of forearm bone was present in 15.09% of cases. The fracture of humerus was present in 1.89% cases. The fracture of leg bones was present in 16.98% cases. The fracture of femur bone present in 26.42% cases. The crush injury was present in 3.77% cases.

In this study, upper and lower limbs suffered maximum with abrasions, contusion as the predominant injuries (52.83%). In upper limbs, humerus fractured in 1 case followed by ulna and radius in 8 cases. In lower limbs, femur was fractured in 14 cases followed by tibia and fibula in 9 cases. Lower limb long bones were comparatively at high risk than upper limb long bones, consistent with Nilambar Jha et al's study[6]. Higher risk of injuries to the lower limbs can be attributed to landing on the lower limbs receiving the first impact, weight of the bike and dragging at the time of accident.

CONCLUSION

Bike users involved in crashes were died due to high frequency of head, chest and leg injuries. Abrasions, contusions were the common injuries observed throughout the body. Skull fracture was the most common fracture. Intracranial haemorrhages were observed more frequently among brain injuries. Lungs, liver suffered more than other organs in their cavities. Limbs suffered maximum injuries second to head injuries when compared to other regions of the body. Cause of death in majority of cases was due to head injury associated with fracture of skull or intracranial haemorrhages or brain injury.

Acknowledgment: Nil.

Conflict-of-Interest Statement: There is no conflict of interest as it was a retrospective study based on the already available record.

Statement of Informed consent: This study is based on the available record so there is no matter of consent.

Statement of Human and Animal Rights: No human right and animal right is violated in this case.

No ethical violation is done.

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Applicability of Three Component System of Age Estimation in Haryana Population

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ABSTRACT

Various methods has been postulated to estimate the age of skeletonised remains which is a very essential aspect in forensic medicine. Mc Kern and Stewart formulated three component system of age estimation in pubic bones. Component I, II and III were based on development of dorsal half, ventral half and outline of the pubic symphysis respectively. A total of 300 pubic bones were evaluated of which 225 were male send 75 were females. Each pubic bone was given a score based on Mc Kern and Stewart method. The observation were tabulated according to the Mc Kern Stewart score. Suitable adjustments in the age range should be made in the Mc Kern and Stewart method for using it in different population

Keywords: *Mc Kern and Stewart, three component system, pubis symphysis, age, Haryana Population*

INTRODUCTION

Estimating the age of a person is very important in the field of forensic medicine. Since the bones resist decomposition it is more reliable in assessing the various identification parameters in decomposed or mutilated bodies and skeletonised remains. Pubic symphysis is one such bony region which can be used to assess the age of the individual even after the epiphyseal closure of the long bones has occurred. The pubic symphysis was first used by hunter and found that lipping of dorsal side of pubic bone and bevelling on the ventral side occurred at third decade of life.[1] Aeby (1858) discovered morphological changes in symphysis as age progresses.[2] Cleland (1889) with changes in pubis approximated the age of the individual bone.[3] Martin R (1914) measured the height of pubic symphysis and correlated with age.[4]

Later Todd made an exhaustive work on pubic bones in Hamann museum and formulated a ten phase system of age assessment using the morphological changes in the pubic symphysis.[5,6] In 1957 Mc Kern and Stewart devised a new system to estimate the age from pubic symphysis.[7] They published their three component system of age determination form the male pubic symphysis of Americans killed in Korean war with the age documented from military records. The components system was based on the morphological progression of the various features on the dorsal side, ventral side and symphysis face. Each component has different feature and each feature is given a score from 0 to 5.[7]

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The Component I–scores were based on developmental features on the dorsal half of the pubic symphysis.

Score 0 - The dorsal margin not present.

Score 1- Dorsal border formation occurs.

Score 2- The dorsal margin formation is complete

Score 3- The dorsal plateau formation occurs.

Score 4- The plateau is formed in most of the dorsal half of the pubic symphysis , vestiges of billowing are present.

Score 5- The dorsal plateau is complete and billows disappear.

The Component II scores were based on developmental features on the ventral half of the pubic symphysis.

Score 0- The ventral beveling not present.

Score 1- Ventral bevel formation occurs.

Score 2- There is extension of bevel along the ventral border.

Score 3- Ventral rampart formation occurs either of extremities.

Score 4- Rampart formation is present most of the areas but gaps are evident.

Score 5- Rampart formation is complete.

The Component III scores were based on developmental features on the symphyseal rim of the pubic symphysis.

Score 0- The symphyseal rim is absent.

Score 1- the Dorsal rim is present.

Score 2- Dorsal rim is complete

Score 3- Complete symphyseal rim.

Score 4- The rim starts to break.

Score 5- Break down of the rim especially along the superior ventral rim and rarefaction of face.

Many studies have been conducted on pubic symphysis in India based on Mc Kern and Stewart method. Since variations are present in different populations this study was conducted on a particular population i.e., Haryana population and this study will provide data for age assessment in this population

METHOD AND MATERIALS

The present study was conducted in a tertiary care centre in North West region of India. With the consent from the deceased legal guardians the pubic bones were removed from the deceased. The pubic bones were cleaned by boiling in water containing caustic soda and the morphological features required for Mc Kern Stewart method were examined. A total of 300 pubic bones were examined. The metamorphic features of the pubic symphysis were analyzed according to three component system of Mc Kern and Stewart criteria and scoring was given to each pubic bone depending on the features present. Each pubic bone was assigned a score ranging 0-15 depending on the features present. Scores for Male and female pubic bones were assigned and tabulated.

RESULTS

Out of 300 pubic bones examined 225 were from males and 75 were from females. Component I was based on the changes on the dorsal side of the pubic bone the scoring system was done the scores were tabulated (Table I)

Table I : Distribution of male and female pubic bones with various scores of Component I

Component I	Mc Kern -Stewart Study	Present study male			Present study female		
	Age Range (years)	Age Range (years)	n	Mean (years)	Age Range (years)	n	Mean (years)
0	17-18				18-22	5	18.50
1	18-21	--	--	--	--	-- -	---
2	18-21	18-22	15	20.2500	18-24	3	21.40
3	18-24	19-27	35	22.0556	21-26	6	23.17
4	19-29	21-30	13	25.6667	24-32	8	28.60
5	23+	22+	162	43.7516	25+	53	47.45

Component II was based on the morphological changes in the ventral hemi face the component scores were assigned. The table II shows the various scores given to each pubic bone for component II.

Table II: Distribution of male and female pubic bones with various scores of Component II

Component II	Mc Kern -Stewart Study	Present study male			Present study female		
	Age Range (years)	Age Range (years)	N	Mean (years)	Age Range	n	Mean (Years)
0	17-22	18-23	20.59	37	18-22	9	19.78
1	19-23	22-23	22.50	4	22-23	3	22.33
2	19-24	23-32	25.69	16	24-26	3	25.00
3	21-28	24-29	25.90	21	25-31	10	28.00
4	22-23	25-35	33.67	16	27-32	4	30.00
5	23+	>30	47.09	131	30-80	46	50.43

The component III scores were assigned based on the formation, completion, and destruction of symphyseal rim. Table III gives the component III score for each pubic bone

Table III : Distribution of male and female pubic bones with various scores of Component III

Component III	Mc Kern -Stewart Study	Present study male			Present study female		
	Age Range (years)	Age Range (years)	n	Mean (years)	Age Range (years)	n	Mean (years)
0	17-24	18-35	21.54	39	18-27	14	21.40
1	21-28	22-35	27.35	66	25-35	12	28.73
2	24-32	28-45	37.80	41	27-36	9	31.22
3	24-39	40-48	44.04	26	35-40	8	39.50
4	29+	48-72	59.21	39	42-52	10	46.20
5	38+	50-75	58.53	14	45-80	22	61.09

Total Mc Kern Stewart Score: (Table IV, Figure 1).

According to Mc Kern–Stewart study, for score zero, the age was about 17 years and the mean was 17.29 years. In the present study, the score 0 was not observed in males. With regard to female samples, for score 0 the age ranged from 18-22 years with a mean age of 18.5 years.

According to Mc Kern –Stewart study, for score 1-2, the age varied from 17 to 20 years with a mean of 19 years. In the present study, the score 1 to 2 was observed from 18 to 22 in males with a mean age of 20.12 years. With regard to female samples, for score 1 to 2 the age ranged from 18-24 years with a mean age of 21.4 years.

Table IV: Distribution of male and female pubic bones with various scores of Mc Kern Stewart

Mc Kern -Stewart Score	Mc Kern -Stewart (American)		Present study male			Present study female		
	Mean (years)	Age Range (years)	Mean (years)	N	Age Range (years)	Mean (years)	n	Age Range (years)
0	17.29	-17	--	---	---	18.50	5	18-22
1-2	19	17-20	20.12	16	18-22	21.40	4	18-24
3	19.8	18-21	20.28	14	19-22	22.50	2	21-24
4-5	20.8	18-23	22.56	16	22-23	23.00	3	22-25
6-7	22.4	20-24	24.9	7	23-27	24.5	2	24-25
8-9	24.1	22-28	27.05	26	24-35	28.00	9	25-31

Conted…

10	26.1	23-28	30.06	16	25-35	30.50	4	29-32
11-13	29.2	23-39	39.3	77	25-48	36.71	14	30-40
14	35.8	29+	59.19	37	48-72	46.20	10	42-52
15	41	36+	61.44	16	50-75	61.09	22	45-80

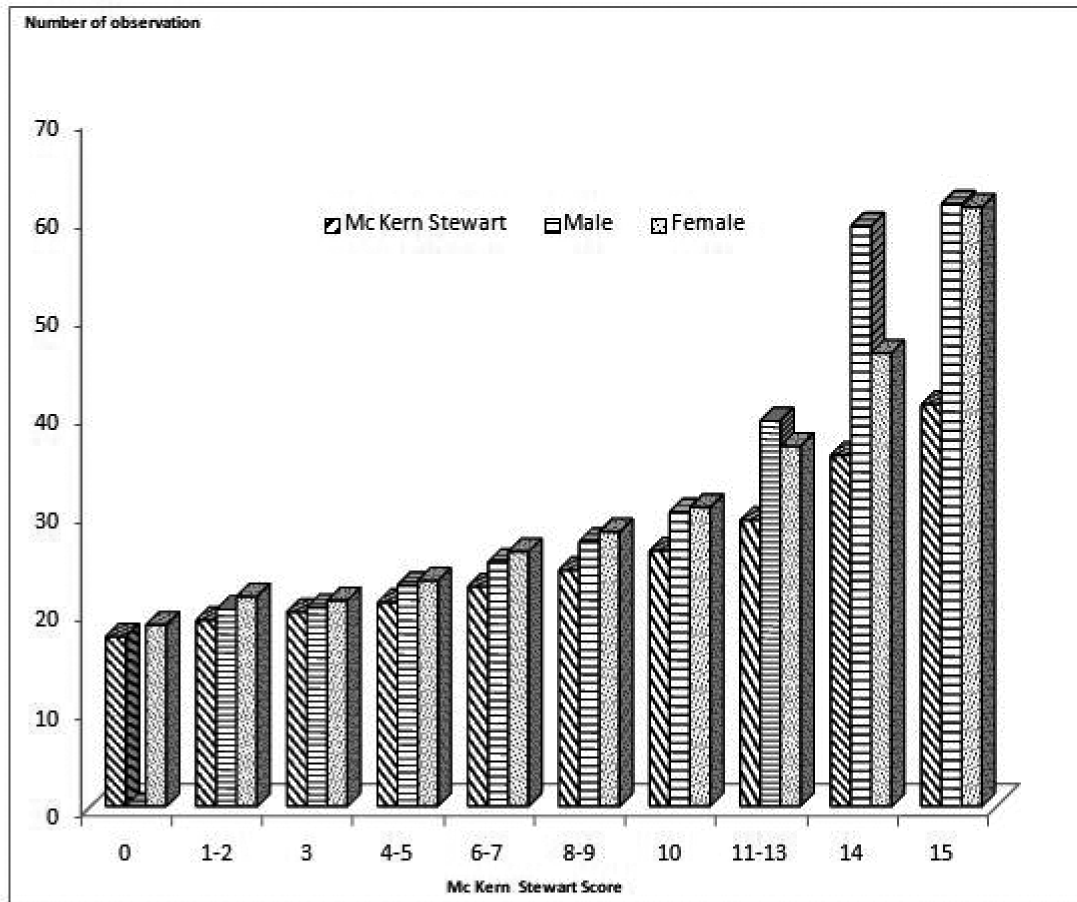

Figure 1: Mean ages of Pubic bones in present study and Mc Kern-Stewart study

DISCUSSION

A comparison of mean ages for different Mc Kern -Stewart score was made with the present study and studies conducted at Delhi[8], Amritsar [9], Hyderabad[10] and the original Mc Kern - Stewart[7] study in male pubic bones(Table V). The morphological variation of the pubic bones for different age groups was reflected in various Mc Kern Stewart scores and their mean ages. The difference in distribution of samples in different age groups might not affect the mean age for the scores to a greater extent except for the extreme scores. So the mean ages for different scores of the Mc Kern -Stewart among different studies were compared and statistical significance was found.

The Mc Kern Stewart scores of present study in males did not show statistical difference in mean for scores 1-2, 4-5, 6-7, 8-9, 10, 11-13 and showed a statistical difference in mean for scores 3,14,15 when compared with study conducted at Amritsar [9]. The study showed a significant difference in mean ages for scores 4-5 and 14 when compared with a study at Delhi. When correlated with a study at Hyderabad, significant difference in mean was obtained for scores 1-2, 4-5, 8-9, 10, 11-13, and 14. In the present study, the mean ages for all scores showed a significant difference when compared with Mc Kern Stewart study. Harkrishna (1985)[10] examined 115 pubic bones in the age group of 16 -70 years (77 male, 38 female) and applied Mckern and Stewart method to both male and female bones. It

concluded that, in males age estimation by McKern and Stewart method was accurate in the younger age group (17-35 years) and in females age estimation by Mckern and Stewart method was not accurate. Snow,[11] found that a strong curvilinear correlation exists between symphyseal score and age.

The variation of the present study with other studies could be attributed to *racial variation, geographical variation of the studies, environmental, nutritional and dietetic factors*. The similarities in the mean ages with the present study and studies conducted at Amritsar and Delhi suggests that the *age range should be adjusted suitably so that* the Mc Kern Stewart method can be used for different population. When the age range for different Mc Kern Stewart scores were adjusted for particular population, Mc Kern Stewart method would prove to be a useful method for age estimation.

Table V: Comparison of mean ages of Mc Kern -Stewart scores of the present study with other studies (Males)

Mc Kern score	Age (Mean)							
	Present study	Harikrishna[10] (Hyderabad)	Sinha (Delhi)[8]	Sharma (Amritsar)[9]	Mc Kern (American)	Arvind Kumar (Delhi)[10]	Pal and tamankar[12,13]	Janardhanan [14]
1-2	20.12	18 **	---	20.5	19 *	21#	14.6#	21#
3	20.28	19	----	25.25 *	19.8 *	22#	19.66#	22#
4-5	22.56	20.5 **	20.33***	22.05	20.8 **	25.5#	20.87#	25.5#
6-7	24.9	23	23.8	27.72 *	22.4 **	-	25.6#	-
8-9	27.05	24 *	27.5	28.44	24.1 *	31.87#	29.14#	31.87#
10	30.06	25.25*	27.33	30.23	26.1 ***	34.87#	35.66#	34.75#
11-13	39.3	31.46 ***	38.15	36.87	29.2 ***	36.9#	38.12#	36.9#
14	59.19	42.58***	48.882	42.17 *	35.8 ***	47.83#	45#	47.83#
15	61.44	57.86	59.4	52.07 **	41 ***	49#	55#	49#

*** - p value <0.001. **p<0.01 *p<0.05

data not available for statistical correlation

Conflict of Interest: Declared none

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Ethical Clearance: Institutional ethical clearance

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Bite Marks: An Indispensible Tool for Forensic Odontological Evidence

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ABSTRACT

Forensic odontology has gained wide acceptance in the field of criminal justice because no two people have identical teeth. Presence of physical evidence such as bite-marks in cases of rape, murder and violence are considered very valuable. These are considered to be an expression of dominance, rage and animalistic behavior.

Bite-marks are the commonest form of dental evidence presented in criminal court in rape cases. These marks are also valuable in determining the type of physical abuse and age bracket of the criminal.

With increase in criminal cases like rapes the use of bite-marks as Forensic odontological evidence in nailing the culprits truly points out the important role odontology plays in field of criminal justice. This review highlights the importance of bite-marks as indispensible Forensic odontological evidence in rape cases.

Keywords: *Forensic odontology, Bite marks, Rape, Identification, Crime*

INTRODUCTION

Forensic Odontology is a branch of forensic medicine that in the interest of justice deals with dental evidence presented in the courts of law. [1]A Forensic Odontologist is involved in the analysis of bite marks on victims and presentation of bite mark evidence in court as an expert witness. As no two fingerprints are alike, neither are two bite-marks.[3]

The age bracket of the criminal can also be analyzed through these marks. Bite marks can also exclude a suspect on basis of tooth pattern and opening range.[4]

During sexual attacks including sexual homicide, rape and child sexual abuse, bite marks are clustered around parts of body associated with sexuality. Females are usually bitten on the breasts, nipples, abdomen, thighs, buttocks and pubis, while men are usually bitten on the back, arms, shoulders, chest and penis.[6]

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Definition: ABFO defines bite-marks as "a pattern left in an object or tissue by the dental structures of an animal or human," [3]

Mac Donald described it as a mark caused by the teeth either alone or in combination with other mouth parts.[2]

Hence a bite mark shows unique pattern of an individual's teeth, also it can help in excluding suspects to whom the mark does not belong to.[2]

Historical Review: Bite mark evidence has slowly gained acceptance as a Forensic tool. The earliest recorded bite mark case in the United States was Ohio vs. Robinson in 1870.

Ansil Robinson was suspected of murdering his mistress, Mary Lunsford. His teeth matched to bite marks on the victim's arm, but Robinson was acquitted.[7]

The most famous bite mark case was of Ted Bundy (raped and killed more than 30 women) who was

convicted of rape and murder of Lisa Levy and Martha Bowman. He had left a bite mark on Lisa levy's buttock. While investigation, the mark was photographed with a ruler kept alongside.

Bundy's teeth were photographed, the bite mark was matched against his teeth and he was convicted. [8] Many other rapists and serial killers have been convicted based on bite mark testimony over the years.[9]

Classification of Bite Marks:

(a) **Cameron And SIMS Classification:** This is based on the type of agent producing the bite mark and material exhibiting

(b) **Obviously Defined:** first degree pressure

(c) **Quite Noticeable:** violent pressure[10]

(d) **Lacerated:** skin violently torn from body. [11]

The severity of the injury gives indications of the mental state of the offender. Accordingly there may be presence of hemorrhage, abrasion, contusion, laceration, avulsion or artefact.

Location: A study done to evaluate the anatomical location of bite-marks in 101 cases from United States courts of appeal found that human bite-marks can be found at almost every anatomical location, with a bias towards certain areas.

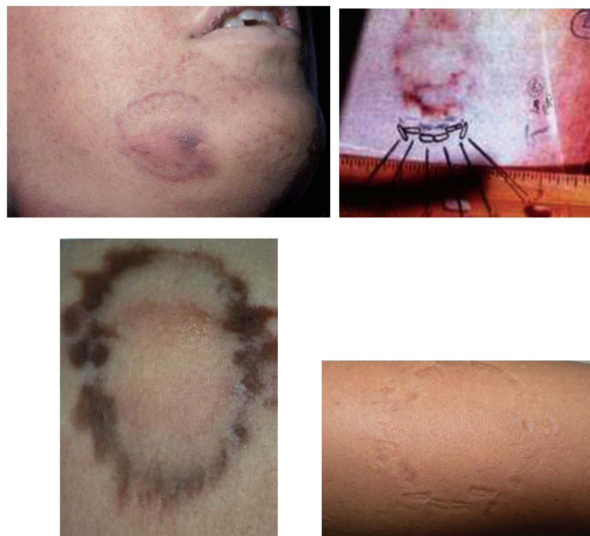
The crime type, age and sex of the subject affect anatomical location of a bite injury. Biting is seen in crimes like homicide, rape, sexual assault, robbery and child abuse.[11]

The study also revealed that females are four times more likely to be bitten than males, and the bites are concentrated on the breasts, arms, and legs. In case of female children bite marks are seen on the face, legs, and arms. Males are most frequently bitten on the arms, back, and hands. Also more than one bite-mark in a different anatomical location from the first can be found in a victim.[12]

Factors Affecting Bite Marks in Skin:

1. Some marks are made through clothing. Hence clothing is considered a potential source of bite mark impressions and biological evidence from transferred saliva.[12]
2. Loose skin/subcutaneous fat lead to a poor bite mark. Whereas areas of fibrous tissue or high muscle content bruise less easily and demonstrate good bite mark. Infants, elderly and females tend to bruise more easily.[5]
3. The size and shape of bite-mark is affected by its location on the body, because certain areas of the body bend distorting the surface area of the skin due to high viscoelasticity.[5]

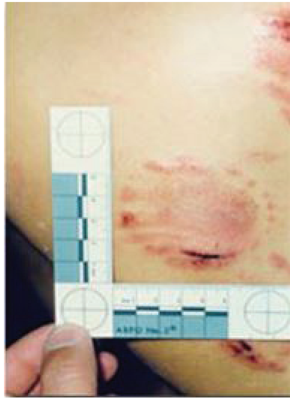
Mechanism of Bite Marks: A bite mark occurs mainly due to pressure of teeth on skin. It is accompanied by mandibular closure and suction of skin (as a negative pressure). Upper jaw is usually stationery and holds and stretches the skin and lower jaw is moveable and gives the most biting force. A human bite mark is an elliptical or circular injury with specific characteristics of the teeth. If there is a single "C" shaped mark, then only one jaw (lower jaw) was involved. The diameter of injury ranges from 25-40 mm[13]



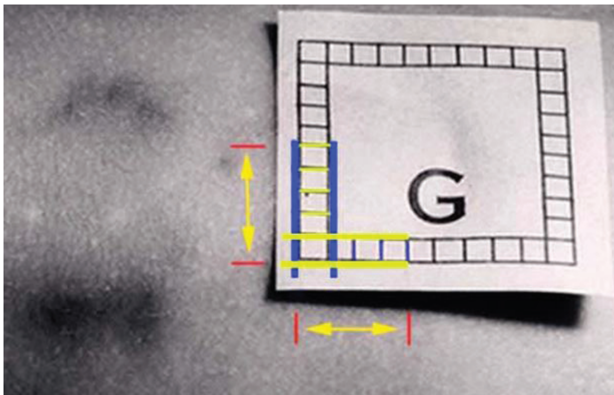
Different Types of Bitemarks (Fig. 1, 2, 3, 4)

Analysis of Bite Marks: Any analysis involves two steps, first the discovery and preservation of evidence and second involves evaluation, comparison and findings of the recovered evidence. In examination and analyzing of bite-marks, first it should be determined if the injury is a bite-mark and whether it is caused by human teeth. Consistency of marks with the time of the crime should be determined.

To standardize the analysis of bite marks the American Board of Forensic Odontology (ABFO) established the following guidelines in 1986:



Bite Mark



Computer digitization method

ANALYSIS OF BITEMARKS (Fig 5, 6)

(1) **History:** Thorough history of any dental treatment carried out after the suspected date of the bite mark should be taken.

(2) **Photography:** Extra oral photographs including full face and profile views, intraoral should include frontal views, two lateral views and an occlusal view of each arch, a photograph of maximal mouth opening.

(3) **Extra-oral Examination:** Soft tissue and hard tissue factors that may influence biting dynamics. Measurements of maximal opening and any deviations on opening or closing should be noted

(4) **Intraoral Examination:** Examination of tongue and periodontal status like mobility of teeth. In case of recent marks, they should be swabbed for DNA from saliva left in the wound.

(5) **Impressions:** Two impressions of each arch using materials that meet the American Dental Association specifications. The occlusal relationship should be recorded.

(6) **Sample Bites:** Sample of suspects bite in centric occlusion using wafer of base plate wax or silicone putty material. The sample is photographed immediately & used for future comparison

(7) **Study Casts:** are prepared using type II stone. [18,19]

Various Physical Characteristics of a Bite Mark Pattern: The amount and degree of detail recorded in the bitten surface varies from case to case. First it is important to determine which teeth made the marks. The term 'characteristic', is a distinguishing feature, trait, or pattern within the mark. It is of two types, class characteristic & individual characteristic.

Class characteristic is a feature, pattern, or trait which reflects a given group and is not related to a particular individual. The biting surfaces of teeth are related to their function like incising, tearing or grinding. Front teeth are the primary biting teeth in bite marks.

The two upper central incisors are wide, lateral incisors are narrower and cuspids are cone shaped. The two lower centrals and two laterals are uniform in width and lower cuspids are cone shaped. The upper jaw is wider than the lower jaw. The characteristics of individual teeth are

(1) **Incisors:** Rectangular shaped mark, sometimes with perforations at the incisal angle areas

(2) **Canines:** Triangular markings with apex towards labial and base towards lingual

(3) **Premolars:** Single or dual triangle with bases of triangles facing each other or coming together as diamond shaped

(4) **Molars:** Rarely leave bite marks, usually quadrilateral markings.[13]

An individual characteristic is a feature, pattern, or trait that represents a variation from the expected finding in a given group, like a rotated, damaged, or broken tooth that differentiates two different dentitions and is helpful in determining the dentition that caused the bite injury or mark.

Cases with class characteristics are used to confirm the events of a crime & those with individual characteristics can identify an individual source.[15]

Thus depending on the characteristics it is possible to use terms like "unique", "possible bite mark", "definite bite mark", "positive match", "consistent with" and "probable biter".

For a positive identification to be made there must be marks left by four or five approximate teeth.[16]

Types of Distortions: Two associated terms are primary and secondary distortion. Primary distortion depends on dynamics of the bite. Secondary distortion isof three types: time related distortion, posture distortion, and photographic distortion. The longer the time interval after the mark is made, the less distinct the mark will be in both living and dead. In the living, bruising occurs. In the dead, the body begins to decompose and shrinkage by rigor mortis occurs.[16,17]

Collection of Bite Mark Evidence from Rape Victim: In living and deceased victim the information to be collected from the bite mark i

Demographics: Name, age, sex, race, case number, date of examination and name of the examiners should be recorded.

Location of the Bite Mark: Describe the anatomic location, indicate the contour of the surface (flat, curved or irregular) and state of the tissue characters. Underlying tissue-bone, cartilage, muscle or fat

Shape of the Bite Marks: whether it is round, ovoid, crescent or irregular in shape.

Colour and Size of the Mark: Both vertical and horizontal dimensions should be recorded in metric system.[17]

Type of Injury: due to bite mark may be Petechial haemorrhages, Contusion, Abrasion, Laceration, Incision, Avulsion, Artefact etc.

Whether the surface of the skin is smooth or indented should be noted.[20]

Photographing of the Bite Mark: This is an important step during investigation as the photograph of bite-mark should be accurately produced. The use of digital camera instead of traditional allows the Odontologist to reduce the margin of error.[8]

Problems in Bite Mark Analysis: Doubts have been raised about the accuracy of the bite imprint as skin is considered a poor medium for accurate impressions due to curves and other irregularities producing intrinsic distortion. Thus comparison of a person's teeth to bite-mark on a victim's body is prone to errorleading to false implications of persons in crimes they did not commit.[24]

CONCLUSION

The importance of bite marks providing valuable information in nailing a rape accused is based on the fact that the majority of rapists leave bite marks on their victims. Bite marks carry a high Forensic value based on the characteristics of the bite marks that are similar to the defendant's. Such evidence is as conclusive as DNA and fingerprint evidence in rape cases. Analysis of bite mark evidence has been assisting the judiciary to answer crucial questions about interactions between people at the scene of a crime for years. But currently, there is no agreement among forensic odontologists about the individuality(uniqueness) of the dentition and on the behaviour of human skin during and after biting.

With technological advances and recent use of ultra violet lighting to detect human bite marks on rape victims **Odontology** has proved to be boon. To conclude it is rightly said 'while the criminal may lie through his teeth, his bite marks reveal all, and do not lie'.

Ethical Clarence: Taken (Review Article)

Source of Funding: Nil

Conflict of Interest: Nil

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A Study on Pattern of Adolescent Deaths- A Retrospective Study

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ABSTRACT

Adolescence is a transitional stage of physical and psychological development that generally occurs during the period from puberty to legal adulthood. During transition from childhood to adulthood people are exposed to various hazards having potentiality to lead to unnatural deaths by distorting physical, mental and social wellbeing. Studying pattern of unnatural deaths helps stakeholders to formulate policies for prevention of loss of important human resource. The present study is a retrospective study undertaken in the Department of Forensic Medicine and Toxicology, Karnataka Institute of Medical Sciences, Hubballi, to determine the pattern of adolescents deaths (10-19 years) brought for autopsy during the period of January 2016 to December 2016. Total 82 cases were studied and it was observed that the incidence rate of adolescent deaths was 6.49% among which 43were males (52.43%) and 39 females (47.56%). Rural deaths were higher when compared to urban, accidental deaths were the highest and road traffic accidents followed by poisoning and burns were the commonest causes of deaths. In conclusion, behavior change communication of parents, teachers, career guides, office masters, law keepers etc. for fostering congenial environment for upbringings of adolescents is needed to prevent unnatural deaths.

Keywords: *Adolescence, accidental deaths, road traffic accidents, congenial environment, upbringing.*

INTRODUCTION

The World Health Organization (WHO) defines an adolescent as a person between the ages of 10 and 19 years old. Around 1 in every 6 persons in the world is an adolescent: that is 1.2 billion people are aged 10 to 19[1]. Adolescence is further divided into early adolescence (11-14 yr), middle adolescence (15-17 yr), and late adolescence (18-21 yr)[2]. Adolescents (10-19 years) constitute about one fourth (21.4% or 243 million) of India's population and young people (10-24 years) about one third (or 350 million) of the population[3].

Youth - the critical phase of life is a period of major physical, physiological, psychological, and behavioral changes with changing patterns of social interactions and relationships[4]. During this turbulent phase of life the young individuals are exposed to various needs, demands, challenge, failure, conflicts, problems, uncertainty of career etc. leading to be the prey of stress and addictions. Many of them fail to cope with the growing stress and develop psychiatric illnesses.

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In India, nearly 1,36,000 persons voluntarily ended their lives in a suicidal act as per official reports in 2011[5]. About 40 per cent of suicides in India are committed by persons below the age of 30 years[6]. Out of their enthusiasm, curiosity and lack of experience adolescents indulge in risky life styles. Road traffic injuries (1,85,000 deaths; 29 per cent of all unintentional injury deaths) are the leading cause of unintentional injury mortality in India[7]. An average of 565 adolescents and young adults between the ages of 10 and 29 years die each day as a result of interpersonal violence across the world[8].

Studies from India reported that 19 to 42.8 per cent of adolescent females had experienced domestic violence[9,10]. Even if the distribution of skills and autonomy varies within the age groups, adolescents will still grow up and become fundamental contributors to development in any country. For this reason alone, it is necessary to investigate the levels and causes of adolescent mortality since it has a direct impact on the size and health of the future population[11]. That's why the present study was contemplated to describe the state of the art about the unnatural deaths among adolescents.

MATERIAL AND METHOD

This study was performed in department of Forensic Medicine & Toxicology at KIMS, Hubballi. The data was collected retrospectively from the police inquest and autopsy reports from January 2016 to December 2016. Finally, the obtained data were tabulated and analyzed.

DATA ANALYSIS

Data analysis was performed by SPSS (version 22), and results were presented as frequency and percentage in figures and tables.

Ethics: Confidentiality of patient's information was maintained when data were obtained from the medical records. All guidelines of the declaration of Helsinki were observed in all stages of the study.

RESULTS

Total 1262 cases were autopsied at KIMS mortuary from 1st January 2016 till 31st December 2016, out of which 82cases were between the adolescent age group of 10-19 years. So the prevalence of adolescent deaths was 6.49%.

Sex wise distribution: Out of 82 cases studied, 43 were males (52.43%) and 39 females (47.56%).

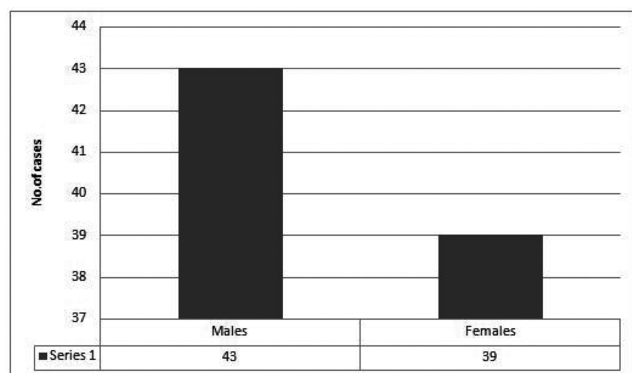

Fig. 01: Showing sex wise distribution of cases

Age wise distribution: Among 43 males, 08 males (18.60%) belonged to early adolescent age group of 10-14 years and 35 males (81.40%) were between 15- 19 years. Among females out of 39 cases majority of the cases were between 15-19 years 36 cases (92.30%) while only 03(7.7%) cases were between 10-14 years. From this in can be inferred that late adolescent period that is age group of 15-19 years is more prone and vulnerable group of adolescent unnatural deaths.

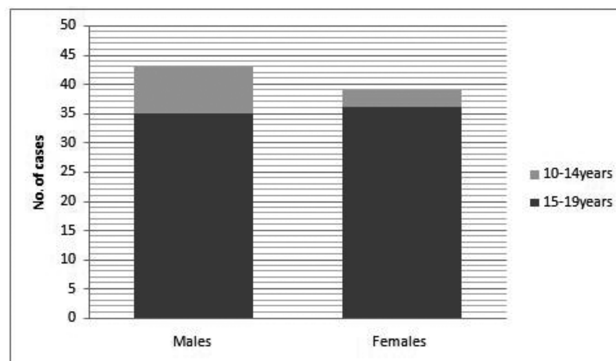

Fig. 02: Showing age wise distribution of cases.

Area wise distribution: The incidence was highest in rural areas when compared to urban areas. 51 cases (62.19%) were in rural area and 31 cases (37.81%) were noted in urban area.

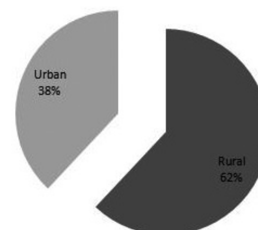

Fig. 03: Showing area wise distribution of cases

Manner of death: Among 43 males, accidental death was most common 27 cases (62.79%), followed by suicidal deaths in 13 cases (30.23%) and homicidal deaths in 03 cases (06.97%).

In 39 females, 21 cases were accidental (53.84%), 17 cases were suicidal (43.58%), no homicidal cases were noted among females and one case was death due to natural disease.

Table 01: Showing manner of death among adolescents

	Accidental	Suicidal	Homicidal	Natural Disease	Total
Males	27 cases (62.79%)	13 cases (30.23%)	03 cases (06.97%)	00	43
Females	21 cases 53.84%),	17 cases (43.58%)	00	01(2.56%)	39
Total	48	30	03	01	82

Cause/Mode of death: In males most common cause of death was road traffic accidents 20 (53.48%), followed by poisoning in 09 cases (20.93%), hanging in 04 cases (9.30%), 03 cases of assault with stab injuries (6.97%), 02 cases each of snake bite and electrocution and one case each of drowning, burns and railway accident were noted.

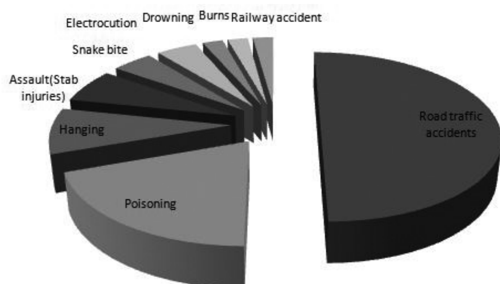

Fig. 04: Showing cause of deaths in males

Among 39 females, most common cause of death was poisoning and burns 18 cases each (33.33%), followed by hanging in 04 cases (10.25%), snake bite and road traffic accidents 03 cases each (7.69%) and one case each of electrocution, fall from height and death due to natural disease (lobar pneumonia).

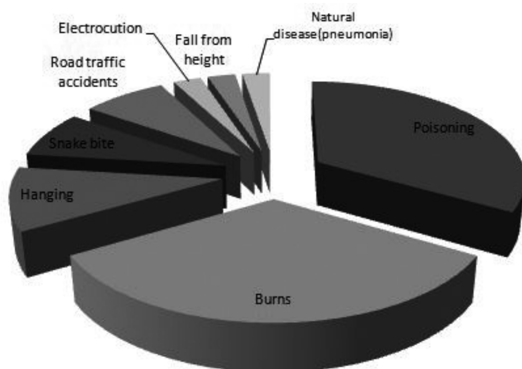

Fig. 05: Showing cause of deaths in females

DISCUSSION

The present study reported higher number of unnatural deaths from rural area (62.19%) and majority were males 43 cases (52.43%) which has concurrence with the observation made by Kumar A et.al[12] who found in their study conducted at Varanasi involving children below 19 years of age that 88.37% were rural inhabitants and male predominance (56.55%) in similar to the present study.

Kanchan T et.al[13] reported in their study conducted at Manipal that Road traffic injuries were responsible for maximum mortalities (38.4%), followed by those because of burns (24.9%) and poisoning (15.9%), similar to our study which constituted maximum mortalities due to road traffic accidents (28.04%), followed by poisoning (26.82%) and burns (17.07%).

In this study most of the cases took place in the rural area which might be due to multiple causes like high probability of snake bite, fall, drowning, death caused by easy accessibility of pesticides at household level etc. As per Ghatak S[14], the most suicidal deaths took place in rural areas because of the higher availability of pesticides combined with poorer access to emergency medical care in such areas. Indians prefer to consume pesticides for killing themselves instead of taking an overdose of sleeping pills. Therefore, the fatality rates may be higher in India as compared to the western countries. Nearly, 49 percent suicide deaths in men and 44 per cent suicide deaths in women aged 15 years and above occurred due to poisoning, mostly from consuming pesticides, similar to our study in which poisoning and burns were commonest mode to commit suicide employed by females belonging to rural areas.

Meel B L[15] carried out a study between 1996 and 2004 at Umtata General Hospital (UGH) reviewing medico-legal autopsies of subjects aged 18 years or below and reported that trauma accounted for 70.9% deaths and 29.1% deaths were due to other causes such as hanging, burns, lightning stroke, drowning, gas suffocation, falls from a height and poisoning. Motor vehicle accidents and homicides accounted for 45.6% and 54.4% deaths. Hanging, 81 (19.2%), drowning, 166 (39.4%), lightning strike, 38 (9%), burns, 51 (12.1%), gas suffocation, 24 (5.7%), poisoning, 33 (8.4%) and falls from a height 28 (6.7%) were non-traumatic deaths. Contrary to that the present study reported only 3.65% homicidal deaths. But 58.53% deaths were reported due to trauma, due to hanging, due to burns 17.07% etc. were found to be in concurrence with the present study.

Limitation of the study: Sample size was small consisting of only one year's unnatural deaths. Analysis involving data for few more years e.g. five years could help between groups comparison more effective by meeting the requirement of adequate sample size of different subgroups and also could reflect the changing pattern over time.

CONCLUSION

Adolescence is viewed as a transitional period between childhood and adulthood, whose cultural purpose is the preparation of children for adult roles. It is a period of multiple transitions involving education, training,

employment and unemployment, as well as transitions from one living circumstance to another. Hence it is important to study from all perspectives to prevent the unnatural deaths among adolescents who form the major part of the society and considered to be the future pillars of the nation's development and success.

Multipronged concerted efforts should be taken to develop congenial environment for successful fostering of responsible groups to monitor, evaluate and mentor adolescents. During any behavior change they, specially the parents can help adolescents by providing love, affection, care and concern, and hold their hands for leading a successful life in stressful period, without the journey unreached letting the dreams unfulfilled, the goals unachieved. Parents, teachers, career guides, seniors, office masters, physicians etc. are the stakeholders and increasing awareness and behavior change communication (BCC) of them regarding the problems and needs of adolescence may be the starting block. Measures like strict enforcement of traffic rules, certifying system by Panchayat Raj Institution (PRI) for purchasing of pesticide can also yield palpable outcome. The cause of death was found to vary across gender and sex- specific programmes and interventions need to be developed to avert further increase in mortality with special emphasis in rural settings. Innovation for better treatment modality for burns and mild to moderate degree of poisoning may bring better hope in future. A community based study would help more in this regards.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Taken from institution ethical clearance committee.

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A Study of Thermal Deaths in Rohtak, Haryana

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ABSTRACT

Every burn injury recorded in vital Statistics represents a catastrophic injury: catastrophic in the overwhelming insult to the patients, catastrophic in its psychological aspects and catastrophic in cost and suffering to the family involved. A severe burn is the most devastating injury a person can sustain and yet hope to survive. It is a common catastrophe today as burn injury cases are one of the common emergencies admitted in any hospital. As the etiological factors of the burn injuries vary considerably in different communities, careful analysis of the epidemiological features in every community is needed before a sound prevention programme can be planned and implemented. The present study was carried out in the department of Forensic medicine and Toxicology of PGIMS and General Hospital Rohtak, Haryana and total 448 cases were collected for this study purpose. Female victims were most commonly affected as compared to male victims. The majority of deaths 232 (51.8%) occurred in the age group of 20-39 years followed by 119 (26.5%) in the age group of 40-59 years. Married females were most common victim compared to unmarried female victim. The majority of burn deaths were accidental (85.3%) in nature followed by suicidal (8.1%) and homicidal deaths (6.6%)

Keywords: *Burns, Dowry Deaths, Manner of death, Marital status, Period of survival.*

INTRODUCTION

Among all the discoveries made by men, only a few, such as cultivation of the soil, speech and writing, have borne such eventful developments as has finding out how to make a fire. It can be assumed that the earliest fire man encountered was generated by natural events – falling meteors, lightning, material ejected from volcanoes. Probably it took many thousands of years for man to learn to cherish fire of his own making, and almost every country has a different legend about how the discovery of fire was affected. Whereas it took man a long time to understand, appreciate and reproduce these natural occurrences, it took him no time at all to realize that fire can hurt and hurt badly; and so the search for remedies got underway[1].

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Burn injuries have been a major cause of concern since prehistoric times to the present era of modern medicine. It is a common catastrophe today as burn injury cases are one of the common emergencies admitted to any hospital. Approximately seventy thousand patients are hospitalized annually in the United States with burns[2]**.** Burn injuries were most important as they were commonest cause of unnatural deaths in India. Dowry deaths by burns is most common in India and at the same time accidental burns in female also occur often while cooking food [3] . As everywhere else, the modes of sustaining burn injuries in India are the same i.e. Flames, scalds, electrical and thermal. The most common cause of flame burn is accidental[4] .

An accurate estimate of incidence of burns is going to be difficult to obtain for the huge and diversely composed population of our country. Unfortunately, no national figure is available for India. But the number is likely to be high due to socio-economic conditions, lack of awareness, cooking and dress habits etc.

In the present study we made an effort to study the pattern of burn injuries in relation to age, sex, marital status , level of education and occupation of victim , manner of death and period of survival.

MATERIALS AND METHOD

The present study was carried out in the department of Forensic medicine and Toxicology of PGIMS and General Hospital Rohtak, Haryana. The study consisted of 448 cases alleged to have died due to burns and brought to mortuary of PGIMS, Rohtak for autopsy from 2011 to 2013. After obtaining an informed consent, detailed history of the case was obtained from the patient's close relatives, friends, police and the other available persons who were present at the time of incidence and those accompanying the victims, with special reference to general information like Name, Age, Sex, Address, Marital Status, Educational and Occupational Status etc. and other information like Date and time of incidence, Date and time of Hospitalisation, Manner of the events, Date and time of death, and Period of Hospitalisation was recorded from the hospital records and inquest papers and noted on a pre designed and pre tested proforma. Only cases of thermal death due to flame burns were included and deaths due to moist heat, electrocution, radiation, chemical burns and lightening were excluded.

The data was collected and compiled in an excel sheet and proportion, rate were calculated using SPSS (Software Package for Social Studies) version 20 and chi-square test and percentages was applied to find out any significant statistical difference between different groups, and if required logistic regression test was applied.

OBSERVATIONS AND RESULTS

Present study demonstrated preponderance of female 254 (56.7%) victims over male 194(43.3%) victims. The overall female to male ratio was 1.3:1. The maximum incidence was seen in the age group of 20-39 years which comprised of 232 (51.8%) victims. (Table 1). Married females 208(46.4%) were most commonly affected followed by married males 148(33%) (Table2). Majority of victims affected were less educated. The maximum victims 139 (31.3%) affected were educated up to middle level followed by those educated up to primary level 128 (28.4%) (Table3). In our study housewives constituted the largest single population category amounting to 61.2% of cases, followed by labourers (16.8%) (Table4). Most common manner of death was accidental burns 382 (85.3%) followed by suicidal burns 36 (8.1%) (Table5). The most of the victims 284 (63.4%) survived for a period of 12 to 24 hours. (Table6).

Table 1: Distribution of cases according to Age group

Age Group (years)	No. of Cases	Percentage of cases (%)
01-19 years	84	18.8%
20-39 years	232	51.8%
40-59 years	119	26.5%
60 or above years	13	2.9%
	448	100%

Table 2: Distribution of cases according to marital status

	Males	Females	Total
Married	148	208	356
Unmarried	46	46	92
	194	254	448

Table 3: Distribution of cases according to Educational Status

Educational Status	No. of Cases	Percentage (%)
Illiterate	74	16.4%
Primary Level	128	28.4%
Middle Level	139	31.3%
Secondary Level	69	15.5%
Higher Secondary	35	7.8%
Graduate	02	0.4%
Postgraduate	01	0.2%
Total	448	100%

Table 4: Distribution of cases according to Occupational Status

Occupational Status	No. of Cases	Percentage (%)
Housewife	274	61.2%
Labourer	76	16.8%
Farmer	37	8.2%
Student	13	2.9%
Salaried/Private job	30	6.8%
Self Employed	04	0.9%
Unemployed	14	3.2%
Total	448	100%

Table 5: Distribution of cases according to Manner of death

S. No.	Manner of death	No .of cases	Percentage (%)
1.	Accidental	382	85.3%
2.	Suicidal	36	8.1%
3.	Homicidal	30	6.6%

Table 6: Distribution of cases according to Period of survival

Period of survival (Hours)	No. of Cases	Percentage of cases (%)
Up to 12 hours	110	24.5%
12-24hours	284	63.4%
24-36hours	37	8.3%
36-72hours	17	3.8%
Total	448	100%

DISCUSSION

Age: In our study, maximum cases of burns 232(51.8%) were seen in the age group of 20-39 years, followed by 119 (26.5%) in the age group of 40-59 years, 84 (18.8%) in the age group of 01-19 years and 13(2.9%) in the age group of 60 years and above respectively which was in concordance with studies of other researchers [5,6,7,8].

Sex: Sex distribution in our study shows preponderance of female 254 (56.7%) victims over male 194(43.3%) victims. The overall female to male ratio was 1.3:1. Similar findings have been reported by other researchers [5, 6, 7,8,9,10,11].

Marital Status: On Studying the marital status of the victims, it has been found, out of 194 males, 148 (76.2%) were married and 46 (23.8%) were unmarried. Out of 254 females, 208 (46.4%) were married and 46 (23.8%) were unmarried. This data suggested that, married population was more affected as compared to the unmarried population. Similar observations were made by other researchers [6, 9, 16, 17].

Educational Status: On Studying the Educational status of the victims, it has been found that the maximum victims 139 (31.3%) affected were educated up to middle level followed by those educated up to primary level 128 (28.4%). This data suggested that the less educated were mostly affected. The reason for this might be due to low educational maturity. The findings were consistent with studies done by other researchers [10, 11, 12,13,14,15].

Occupational Status: In our study housewives constituted the largest single population category amounting to 61.2% of cases, followed by labourers (16.8%), farmers (8.2%), salaried (6.8%), unemployed (3.2%), student (2.9%) and self employed (0.9%) which was in concordance with the studies done by other researchers [12,13,14,15].

Manner of Death: In this study, majority of cases 382(85.3%) were accidental whereas, 36 (8.1%) suicidal and 30(6.6%) homicidal. Similar observations were reported by other researchers [3, 5,6,7,8,13,15,16].

Period of Survival: In our study 284(63.4%) victims survived for a period of 12 to 24 hours, followed by 110 (24.5%) victims up to 12 hours, 37 (8.3%) victims up to 24-36 hours and 17(3.8%) victims up to 36-72 hours of sustaining burn which was in concordance with the studies conducted by other researchers [6, 15, 16].

CONCLUSION

Despite the modernization, the domestic fire is the major cause of burns with maximum involvement of females and the stove burst, being the main cause. The reproductive age group 20-39 years is highly susceptible for burns. Maximum victims were less educated. Hence, literacy should be increased in the society. Dowry deaths, curse to our so called modern society are still prevalent in spite of stringent laws and amendments in the act. As this problem of thermal deaths persist in our country the government along with various groups and bodies need to come together with more sincere efforts so as to minimise burn mortality and also to prevent and reduce their incidence.

Conflicts of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Obtained from Institutional Ethical Committee of Pt. B.D.Sharma PGIMS,Rohtak.

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Does Knowledge and Attitude is Needed Regarding Euthanasia in Clinical Course? A Narrative Review Based on an Available Literature

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ABSTRACT

Introduction: Euthanasia is one of the commonest morally controversial issues in the end of life care[4]. It is very important to examine the knowledge and attitude of nursing students because they have an important role to encounter the situations related to euthanasia during clinical courses.

Method: Articles concordant systematically from published literature & journal articles from PubMed & EBSCO. Search was specific to database by using synonyms. Initial search retrieved 19,464 titles then articles screened as per inclusion and exclusion criteria. 10 articles were selected which is clearly selected as per inclusion criteria.

Results: Out of 10 articles, 7 articles showed that there is a need to improve in knowledge and attitude among health care personnels , 3 studies showed that participants are strongly interested to practice euthanasia but no correlation with physician assisted suicide.

Conclusion: Enhancing and improvise the knowledge and attitude regarding euthanasia is necessary to participate in continuing educational programme because health care personnel plays an important role to fulfill patient's needs and care. They are expected to develop insight & implement into a practice.

Keywords: *Attitude, Euthanasia, Knowledge, Nursing Students , Physician Assisted Suicide*

INTRODUCTION

"Euthanasia" means that administering of a lethal medication to a patient by different persons (physician) with a merciful death after patient's particular appeal. 'PAS' refers to a patient's appeal for advised done on purpose and willful death of his or her peculiar life under the cooperation of a physician. Healthcare professionals' knowledge and attitudes regarding euthanasia may influence their behavior in situations in which this issue arises during practice in clinicals. This is mainly important in nurses cases because they are in constant contact with patients [6] and, therefore, are often facing this issue of euthanasia [7]. Euthanasia have a important role in current ethical controversial debates. Now the dilemma for physician assumed to dispense restfulness and mitigate from any of the torture in patient but still is not legalized all over.

The patient appealing euthanasia has to be an adapted adult who has insupportable adversity from a determined therapeutic situation, including mental health illnesses, with no analeptic aspect nor overview of mitigate adversity. According to the Belgian law, uncontrollable distress can be physical and/or mental[7]. The patients' appeals has to be deliberate and well advised, evidence acceptable managerial amplitude. In an end stage of situations one absolute physician is needed to appraise the patient and provide admonition over the appeal to the physician who got the basic application. If the patient is not in a end stage added compulsion commitment to be met.

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There is a astronomic aplenty of altercation, however, with reference another plausible assumption: explicity, allowance of the course to advisedly discriminate between the crack and form of one's eradication and to appeal the comfort and association of others, decidedly health-care professionals, in gather this about. This is the discussion of issues over whether a 'distinguished eradication' should accommodate the possibility to appeal euthanasia or physician-assisted suicide (PAS).[7,8]

Need for the knowledge and attitude regarding euthanasia: Euthanasia altercate that a physician's main aim is to save a life not to end. In 1980s, when first time the discussion of issue on euthanasia was increased by Richard selzer in his short story 'Mercy'.

For that particular time to till now this controversial issue has evaluate ambiguity in perception of his minds of physician & health care personnels worldwide. Some of the steps have been dispatch this issues in all over the world. However, the convenance of euthanasia still under a big dark cloud due to acute religious domination. In many countries from the last decade, discussion of issues about the approval, codification of euthanasia & end of life agreement in medical practice is still a main component of discussion of issues is developing public affection to a ethical to die for end stage wreck patients[3]. There is a mushrooming pervasiveness of failing affection which in curve can direct to a state of health called "end-stage". In end-stage scheme the altercation on euthanasia and affiliated affairs assume inmost.

It is needed to examine the knowledge and attitudes of nursing students related to euthanasia because they too, may appointment bearings related to the convention during this clinical courses. Bakalis et al examined Greek nursing attitude to euthanasia, in that they found that superiority of participant had a low level of knowledge regarding euthanasia. Further, most of them had an unfavorable attitude towards the legislation. However, the habitude of euthanasia debris inferior a cloud [11]. This is mainly due to the acute devotional domination. Many studies were outlined to appraise the appearance of inevitable doctors, nurses on this arguable affair and their knowledge and attitudes regarding euthanasia.

Hence, it was found that this is a controversial issue and necessary to flourish knowledge and attitude in end-of –life decision. Hence a narrative review is defined to find out the evidence from the available literature to have some knowledge and attitude regarding euthanasia among nursing students, physician, medical students and nurses.

Aim: The aim of this review is to find the affirmation to describe the knowledge and attitude regarding euthanasia of medical students, nurses, nursing students, physicians.

Objectives: To appraise the level of knowledge and attitude regarding euthanasia among health care personnel.

Methodology: Eligibility criteria of the articles were done on the basis of the following criteria:

Search Strategy Method: A exploration of records commodity issued in discrete journals till 2017 was accompany. Search was bounded to only English language. The database exploration done was PubMed & EBSCO. Articles accommodate following key search term was restricted like attitude, euthanasia, knowledge, nursing students, physician assisted suicide.

Study Design:

- Quantitative descriptive study
- Survey study
- Descriptive, cross-sectional study
- Prospective study
- Vignette study

Type of Participants:

- Nursing students
- Oncologists
- Physician
- Medical students
- Nurses
- Family members of patient in hospice

Settings:

- Hospitals
- Medical college
- Nursing college
- Hospice centers

Outcomes: Knowledge and attitude among health care professionals to practice in clinical courses.

Publication Time Scale: Recent and up to date articles are included for the review, only articles from 2009 onwards were included in the review.

FINDINGS

The search was organized by assemble the points singly and composite with all and equivalent, also concede to the database. Initial exploration retrieved 19464 articles, over which 1226 were chosen manually. 1176 articles were excluded because of duplications in two databases. 50 records screened, out of that 40 were excluded, full-text not related to knowledge and attitude regarding euthanasia. Hence, 10 articles were screened which include quantitative studies for qualitative synthesis and meta analysis was not done in this narrative review, detailed description of all studies mentioned below.

Description of all studies include in this narrative review: Anneser et al[11] in the year of 2016 (Deutschland) conducted Vigenette study; the study suggested that the treatment option for palliative sedation and euthanasia regarding assumed permissibility and personal attitude were have positive correlation. But no correlation found for physician assisted suicide. In this survey, strong interest with high response rate seen among student. Only 0.8% to 2% of students revealed that they had no opinion on ethical acceptable of palliative sedation, physician assisted suicide and euthanasia.

Xioli et al[16] in the year of 2016 in China conducted a cross-sectional study; this study concluded that Chinese oncologists were totally anomalous with the abstraction of euthanasia & end of life issue. The study revealed that inadequate attention paid towards euthanasia, it should be more on the education of palliative care.

Naseh et al[5] in the year 2016 in Iran conducted a quantitative descriptive design and study concluded that 52.5% have negative, 2.5% have neutral and 45% have positive attitude towards euthanasia, by using one way ANOVA method, the difference between the different group was not found any significance. The study also conclude that this issues should be handled carefully, deeply and explored more in every aspect especially in terms of determining patient's right.

Hert et al[12] in the year 2015 in Belgium conducted a quantitative descriptive study; study suggested that overall, 70% was mental health nurses were confronted again and again with a appeal for euthanasia and majority did not oppose euthanasia for those with UMS. It is needed to provide education training and guide clearly to the health care organizations.

Yousuf et al[4] in the year 2014 in Malaysia conducted a Survey study ; study concluded that both physicians and patients were in favor of eliminate and confining life sustaining doctoring to a patient have no opportunity of continuity. Statistically significance were found against EAS or its legislation. Patients view were basically and they determined by religious acceptance more than the cruetly of illness.

Albers et al[8] in the year 2014 in Belgium conducted a Survey study; study concluded that majority of nursing staff want to involved in ELD. And awareness on the role of nurses and ELD should be raised which can involved the nurses in patient's care and fulfill needs. Highly educated nursing staff and hospitals personnels indicated that they want to be involved in ELD and need to improve their knowledge and attitude in practice.

Hassan et al[15] in the year 2013 in Pakistan done Cross-sectional study; finding of study suggested that majority of students disagreed and were confused whether they will practice it or not in clinical courses. The awareness of euthanasia was aerial dispersion throughthe medical students, but only a small admeasurement of the students were willing to practice it.

Tamayovelazaug et al [13] in the year of 2012 in Spain conducted Descriptive cross-sectional study ; findings concluded that there is a need to improve the respondents knowledge regarding euthanasia. Most of the percentage of nurses who were helpless to analyze a adequate bearings involving euthanasia or PAS that indicates that nurses should need to participate in deepness education in End- of- life decisions.

Mickiewiz et al[9] in the year of 2012 in Poland conducted a Survey study ; study suggested that majority of the participants, do not want to participate in the process of end of life decisions, but most of the hospice worker were refused active euthanasia but many of the nursing students were supported it to the person's suffering immediately. The legislation of euthanasia was unfavorable by most of the students, however, it was barely admiration by the hospice workers.

Vilel et al[14] in the year of 2009 in Brazil conducted a Prospective study ; study concluded that knowledge about euthanasia in public is confined, even among people with good academic accomplishments , this lack of knowledge is not so marked but also might advised confined. A small admeasurement of family caretaker and also functional physician are in admiration of the convenance of euthanasia in severely ill patients.

Summary of findings: Out of 10 articles, 7 articles revealed that there is need to improve in attitude & knowledge of health care personnel, 3 studies revealed that participants are strongly interested to practice euthanasia but no such correlation with physician assisted suicide. Further study is needed for assessing knowledge and attitude regarding euthanasia and end-of –life call decision.

Future Significance: The findings of this narrative review suggested that it is important to develop insight, knowledge and attitude regarding euthanasia and its issue among health care professionals and also in nursing students which help them to encounter and make them able to face a certain situation related to end of life care of end stage ill patients.

Limitation:

- Database search was confined
- Search strategy was precise to use attitude, knowledge and euthanasia only
- Meta-analysis will give more exactness to findings
- Confined to area of medical and nursing

CONCLUSION

Knowledge and attitude can be enhanced among health care personnels through the participation in the continuing education programme. Health care professionals plays an important role in clinical decision making and patient's needs and care. They are expected to learn and develop insight and have to implement in to a practice.

Conflicts of Interests: There was no conflict of interest in this article.

Source of Funding: It was not a funded research study.

Ethical approval & consent to participates: This is a narrative review, ethics approval and consent is not applicable.

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A Study Pattern of Poisoning among the Autopsies Conducted at Adichunchanagiri Institute of Medical Sciences

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ABSTRACT

A Prospective analysis of poisoning deaths was conducted at Department of forensic medicine and Toxicology, Adichunchanagiri Institute of medical sciences and research Centre, B.G Nagar over a period of eighteen months(June 2012 to December 2013).Out of the total 160 autopsies conducted in the mentioned period, deaths due to poisoning comprised 35 cases(21.8%) cases. The data was analyzed with respect to age, sex, marital status, motive and type of poisoning. It was observed that the incidence of poisoning was highest in the age group of 31-40years (33.7%) followed by 21-30years (22.6%). Male (61.8%) preponderance was more over female (38.2%) and married (60.8%) outnumbered the unmarried (39.2%) in both sexes. The most common type of poisons consumed were organ phosphorus (65.71%). The common reasons of consuming poison were financial constraints (24.28%) followed by marital conflicts (17.28%). This study aims at highlighting the general pattern and factors associated with poisoning deaths. This epidemic of poisoning should be addressed on priority basis and information regarding the adverse effects of poisoning should be disseminated at all levels.

Keywords: *Poisoning Pattern, Organ phosphorus compound.*

INTRODUCTION

Acute poisoning is an important medical emergency. The nature of poison used varies in different parts of the world and may vary even in different parts of the same country depending on the socioeconomic factors and cultural diversity. Self-poisoning accounts for about one-third of the world's suicides. The proportion of all suicides using pesticides varies from 4% in the European region to over 50% in the Western Pacific region, but this proportion is not concordant with the volume of pesticides sold in each region; it is the pattern of pesticide use and the toxicity of the products, not the quantity used, that influences the likelihood that they will be used in acts of fatal self-harm. With the progress in the industrial and agricultural field and advances in medical sciences a vast number of insecticides have become available. In general, accidental poisoning is more common in children, whereas suicidal poisoning is more common in young adults. it is important to know the nature and severity of poisoning in order to take appropriate preventive measures. Studies of this nature will be a useful tool in planning and management of critically ill acute poisoning cases.[1] In this context the present study was carried out with the objective to investigate the pattern of poisoning among the autopsies conducted at Aims. . It will also help to make the required treatment facilities easily available at every place, health education for prevention and for adequate teaching in the institutes of medical education and upgrading the peripheral health centers to manage cases of poisoning in emergency could possible help us to bring down the morbidity and mortality rate.[2]

AIMS

- To determine the age and sex distribution of poisoning cases reported.
- To find out the pattern of poisoning reported to the hospital

MATERIALS AND METHOD

The study was conducted at Adichunchanagiri Institute of medical sciences and Research Centre, between June2012 to Dec2013 .The study included alleged poisoning deaths, inquest reports, suicidal notes,

PM Reports, hospital records and FSL reports were scrutinized.

The inclusive parameters included Age, sex, socio-economic status, educational qualification, hospital treatment, motive and type of poisoning.

Exclusion criteria: Highly decomposed cases.

RESULTS AND DISCUSSION

Total 160 cases were subjected and studied for autopsy, of which deaths due to poisoning comprised 35 cases (21.8%).

1. **Age and Sex:** AGE: The incidence of poisoning was highest in the age group of 31 -40years (33.7%) followed by 21-30years (22.6%), the least was encountered in elderly age group.

   Sex: Male (61.8%) preponderance was more over female (38.2%) and married (60.8%) outnumbered the unmarried (39.2%) in both sexes. The most common type of poisons consumed were organ phosphorus (65.71%) followed by over the counter medications (17%). The common reasons of consuming poison were financial constraints (21.4%) followed by ill health (15.55%). The maximum incidence of poisoning found in the age group of 31 to 40 years. Similar findings were observed in the studies conducted by S.K Dhattarwal et al.,[7] and disagreement with Taruni Ng.[10]This is attributed to factors like failures in academics, romantic failure, family disputes, marital disharmony, unemployment, romantic failures, ill health, and dowry harassment in case of females. As this age group are at the threshold of building their career and have the utmost zeal and urge to move ahead of others, the ever increasing demands and stress of the modern mechanical lifestyle, contribute to such an act. In children, the common reasons were due to conflict with parents for trivial issues and failure or less percentage in exams.

   Males being the main breadwinner in the family bear the burden of earning for livelihood. This was found to be prime reason for the increased incidence of poisoning in males. Since the study involved the subjects residing more in urban setup, the annual income of the lower middle class could not suffice to meet the basic amenities resulting in disillusionment.

   Economics and to the fact that poisoning by agro- chemicals is practically inevitable because modern farming is unthinkable without the use of these and especially for a developing country like ours. The easy availability and accessibility of over the counter medication like barbiturates, benzodiazepine, antihistamines, analgesics etc. and a belief that it causes less suffering assuring peaceful death, are the other causes for choosing these drugs. It is in agreement with the studies done by Dalbir Singh[4] and Karamjit Singh[8] and is in contrast with the studies of Adarsh Kumar.[6]

Table 1: Age and Sex distribution

AGE	2012		2013	
	Male	Female	Male	Female
0–10	0	0	0	0
11–20	2	2	3	0
21–30	4	3	3	4
31–40	9	3	8	4
41–50	3	2	3	2
51–60	3	2	2	2
61–70	2	0	2	1
Total	35 cases		35 cases	

2. **Motive:** The common reasons of consuming poison were financial constraints (21.4%) followed by marital conflicts (17.28%).

   Among financial constraints the reason were excessive debts, poverty, not able to pay the loan, extravagant lifestyle, engaging in activities in an urge to achieve instant richness were the prominent financial causes noticed. Among ill health, in majority of cases evidence of chronic illness like bronchial asthma, tuberculosis, gastrointestinal disorders, diabetes, hypertension and gynecological problems as procured through the history and hospital records, on autopsy corroborated with the findings. It is in disagreement with studies conducted by Dalbir Singh.[4]

Table 2: Motive of consumption of poison

Motive	2012	2013
Financial Matters	9	8
Marital constraints	5	6
Family	5	4

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Education	4	4
Love failure	4	3
Ill health	3	3
Unemployment	3	3
Depression	1	2
Unknown	1	2

3. **Treatment:** Out of 35 cases 25 cases (71.4%) received treatment and rest (28.57%) did not receive the medical attention. The reasons for rise in the number of victims culminating to death in spite of treatment may be due to the consumption of highly toxic poisons and also due to difference in individual responses. The treatment not received may be due to the delay in transportation and shifting of the victims to the nearby hospital from the site of incident. Improper and inadequate treatment in hospitals could have also played a key role in victims culminating to death without receiving treatment.

Table 3: Treatment status

Treatment	2012	2013
Treated	25 cases	23 cases
Untreated	10 cases	12 cases

4. **Type Of Poison Consumed:** The majority of cases were due to organ phosphorus compound it comprised to 23 cases (65.71%) fallowed by combination of alcohol and op compound. 8cases (22.8%) and rest were due to carbamates and phosphide

   The reason for more number of victims to choose organ phosphorus were due to low cost, easy availability of highly toxic pesticide, agricultural based In an urban setup, though ample opportunities for employment are present, yet there is stiff competition for these jobs by better qualified, which is the main cause for this group to take this extreme step of ending their lives. Similar opinions have been stated by Dalbir Singh.[4] But studies conducted by Karamjit Singh [8]disagree with this view.

   The poisoning by agro- chemicals is practically inevitable because modern farming is unthinkable without the use of these and especially for a developing country like ours. The easy availability and accessibility of over the counter medication like barbiturates, benzodiazepine, antihistaminic, analgesics etc. and a belief that it causes less suffering assuring peaceful death, are the other causes for choosing these drugs. It is in agreement with the studies done by Dalbir Singh[4] and Karamjit Singh[8] and is in contrast with the studies of Adarsh Kumar.[6]

Table 4: Type of poison consumed

Type	2012	2013
Op compound	23 cases	21 cases
Alcohol with op	08 cases	09 cases
Carbamates	03 cases	03 cases
Phosphide	01 cases	02 cases

CONCLUSION

Deaths due to poisoning are on steep rise due to which there is huge loss of lives and devastating impact on communities .Health care services particularly emergency resuscitative services should be made available at all levels , promoting poison information centers, introducing separate toxicological units in the hospitals and upgrading the peripheral health centers to manage cases of poisoning in emergency could possible help us to bring down the morbidity and mortality rate There is an urgent need for strict implementation of the Pesticide Act so that it could strengthen the legislature on availability of drugs and poisons substance in the market. This can regulate the import, manufacture, sale, transport, distribution and use of pesticides with a view to prevent risk to human beings. Enlightenment through educating young people about harmful effects of drugs. It is also imperative to provide psychological and counseling services to attempted suicide victim.

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Determination of Sex from Mastoid Dimensions among North Indians

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ABSTRACT

Introduction: Sex determination is the keystone of a biological profile and skulls of unknown provenance are best tested for race and sex using different variables. Determination of sex from the skeleton is vital to medico legalinvestigations. The mastoid region is analysed for determination of sex from fragmentary crania in Forensic Anthropology as it is one of the most protected region and resistant to damage due to its anatomical position at the base of the brain.

Objective: The purposeof this study was to determine the existence of sexual dimorphism in the dimensions of mastoid process among North Indians.

Material and Method: Material for the study consisted of 70 adult (above 18 years) human skulls (35 of either sex) of North Indians obtained from Anatomy and Forensic department of SGRDIMSAR, Amritsar. Mastoid measurements (Length, Breadth and A-P diameter) of both the sides were taken in millimeters with the help of sliding Vernier Caliper and size of mastoid process was calculated.

Results: All four mastoidvariables showed significant sexual dimorphism$p<0.001$. Canonical discriminant function Coefficient using stepwise analysis was -3.142 in females and 3.142 in males.In statistical analysis using Canonical Discriminant Functions, Eigen value was 10.015 and Wilks' Lambda was 0.091.

Conclusion: Accuracy of determination of gender using all four variables was 97.1% original and 96.4% cross- validated. Therefore, mastoid process can be used as a tool fordetermination of sex in fragmentary skeletal remains.

Keywords: *Mastoid Process, Forensic anthropology, Sexual dimorphism, North Indians*

INTRODUCTION

In Forensic science, identification of gender by examination of skeleton has been used widely. Skull alone is still widely used for sex determination because all the other human skeletons show variable degree of sexual dimorphism[1][2]. The mastoid process is favourable for sex determination because the petrous frequently survives circumstances that cause skeletal fragmentation[3] and it is less prone to damage due to its safe anatomical position at the base of the skull [4]. So it stays intact even the skull is fragmented and it remains intact in skeletons of very old age. To identify sex in fragmented skullbones, mathematical dimensions of mastoid are used by craniometric techniques . Many studies have been conducted on different populations on sexual dimorphism with respect to the skull. Nagaokaused two parameters on both sides of skull i.e. height and width of mastoid[5]. Paiva& Segre calculated the triangular area between Porion, Mastoidale and Asterion which is then used to identify sex[6]. The present study was undertaken to study the accuracy and reliability of the mastoid process in determination of sex

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of skulls among North Indians from a fragmentary piece of skull by taking different dimensions of the mastoid process and results were analysed statistically.

MATERIAL AND METHOD

Material for the study consisted of 70 adult (above 18 years) human skulls (35 of either sex) of North Indians obtained from Anatomy and Forensic department of SGRDIMSAR, Amritsar. Skulls with metopic bone in the region of craniometric points, diseased and damaged mastoid processes were discarded. Mastoid measurements of both the sides were taken in millimeters with the help of sliding Vernier Caliper (with a least count of 0.01mm). Average of readings of right and left sides were taken and subjected to statistical analysis using SPSS-17.

1. **Mastoid Length:** The length of mastoid is measured from a point on the Frankfurt plane vertically downwards to the tip of the mastoid process[7]. Frankfurt plane is a horizontal plane passing through the upper margin of external acoustic meatus and the lower margin of the orbital opening [8]

   The skull is rested on its right side and the calibrated bar of the caliper is applied just behind the mastoid process, with the fixed flat arm tangent to the upper border of the auditory meatus and pointing (by visual sighting) to the lower border of the orbit. The calibrated bar is perpendicular to the Frankfurt plane of the skull. The measuring arm is adjusted until it is level with the tip of mastoid process, using the base of the skull generally and the opposite mastoid process to control the plane of sighting.

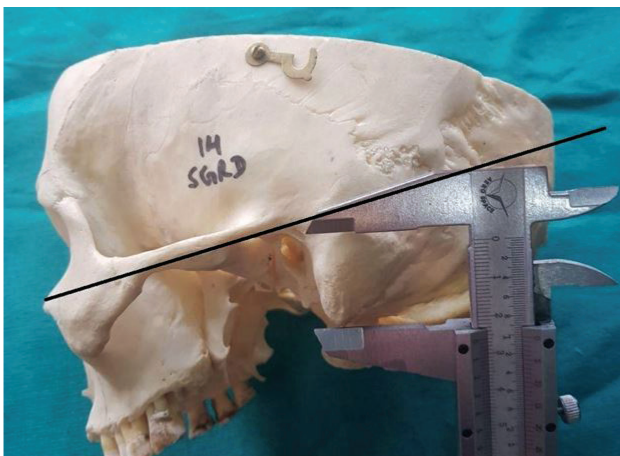

Figure 1: Showing Length of Mastoid Process Using Frankfurt Plane

2. **Mastoid Breadth (Medio- lateral Diameter):** It is taken from the highest part of the medial surface of the mastoid process within the digastric fossa to the most lateral point of the process on the same level[7]

Figure 2: Showing Breadth of Mastoid Process

3. **Mastoid A-P diameter:** It is taken from the lowest point at which the tympanic plate abuts against the anterior surface of the mastoid process to the posterior border of the process on the same level [7]

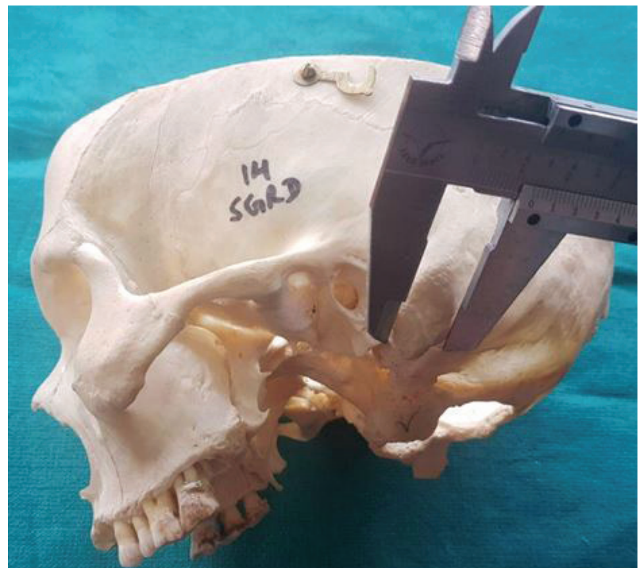

Figure 3: Showing Antero-Posterior Diameter of Mastoid Process

4. **Mastoid Size [7]:** It was obtained as following

$$\frac{\text{Lenght} \times \text{A-P diameter} \times \text{Breadth}}{100}$$

RESULTS

Table No. I

Variable	Females		Males		P value#
	Mean	SD	Mean	SD	
Mastoid L	22.880	1.093	27.501	1.137	<0.001**
Mastoid B	8.613	0.946	10.636	0.937	<0.001**
AP Diameter	13.520	1.066	16.768	0.956	<0.001**
Size	34.521	10.239	55.291	10.252	<0.001**

#Student 't' test; **p<0.001; Highly significant

Table II: Canonical Discriminant Function Coefficient using stepwise analysis

Variable	Standardized coefficient	Structure Matrix	Unstandardized coefficient	Raw Coefficient (Constant)	Group Coefficient	
					Female	Male
Mastoid L	0.918	0.659	0.823	-34.895	-3.142	3.142
Mastoid B	0.588	0.342	0.625			
AP Diameter	0.688	0.511	0.680			
Size	-0.489	0.323	-0.048			

Table III: Accuracy of determination of gender using all variables

Gender	Correctly classified	Misclassified
Female	68 (97.1%)	2 (2.9%)
Male	68 (97.1%)	2 (2.9%)
Total	136 (97.1%)	4 (2.9%)

Accuracy was 97.1% original

Table IV: Accuracy of determination of gender Cross-validated

Gender	Correctly classified	Misclassified
Female	68 (97.1%)	2 (2.9%)
Male	67 (95.7%)	3 (4.3%)
Total	135 (96.4%)	5 (3.6%)

Accuracy was 96.4% cross-validated

Table V: Stepwise Statistics

Variables Entered/Removed[a,b,c,d]

Step		Wilks' Lambda							
						Exact F			
	Entered	Statistic	df1	df2	df3	Statistic	df1	df2	Sig.
1	Mastoid L	.187	1	1	138.000	601.073	1	138.000	.000
2	AP Diameter	.119	2	1	138.000	507.416	2	137.000	.000
3	Mastoid B	.103	3	1	138.000	394.861	3	136.000	.000
4	Size	.091	4	1	138.000	337.990	4	135.000	.000

At each step, the variable that minimizes the overall Wilks' Lambda is entered.

a. Maximum number of steps is 8.

b. Minimum partial F to enter is 3.84.

c. Maximum partial F to remove is 2.71.

d. F level, tolerance, or VIN insufficient for further computation.

DISCUSSION

Mastoid region has drawn the interest of Forensic experts for its utility in sex determination since long. Larnach and macintosh calculated size of mastoid process and divided it into five grades (very small, small, medium, large or very large).They reported that females have very small to small sized mastoids while males have medium to large sized mastoids[7].

Krogman and Iscan stated that determination of sex, age and race in a collection of 750 skeletons was possible with levels of reliability of 92% using the skull alone and 98% using both pelvis and skull[9]. Bass reported that the skull is probably the second best region of the skeleton to determine the sex[10].

Hoshi classified the mastoid process into three main types based on the direction of the mastoid process in relation to a vertical plane as assessed visually i.e. M-male, N-neutral and F-female. He observed that when skulls were placed on flat surface, the male skulls rest on the mastoid processes while female skulls rest on occipital condyles or other portions of the skull indicating that male skulls have longer mastoid process as compared to female skulls due to whichmale skulls rest on mastoid process[11].

In Cape population[12] the mean mastoid length in male and female skulls was 29.3 mm and 26.5 mm respectively, in Caucasian population28.06mm and 25.21 mm respectively and in Negroes30.32mm and 26.34mm respectively[13]. Passey et al in their study on 70 adult skulls (44 males and 26 females skulls) reported mean mastoid length 29.7mm in males and 24.5mm in female skulls[14].Sumati et al in their study on 60 adult human skulls reported that mean mastoid length was 28.3 mm in males and 23.18mm in female skulls and concluded that subsequent to stepwise discriminant function analysis, mastoid length was found to the best sex determinant[15]. This is in accordance with our study where mastoid mean length in male skulls was 27.501mm and was 22.880mm in female skulls. Our study was further supported by observations of Nagaoka et al [5] on Japanese skulls. They reported larger mastoid length in Japanese male skulls, 49.0$\pm$ 3.47 mm as compare to Japanese female skulls where mastoid length was 47.0 $\pm$2.7 mm suggestive of population differences in measurements of the mastoid process. They concluded that the accuracy of sex classification was more than 80% when single parameter was used and accuracy of 82- 92% was achieved when mastoid height and width were taken together for sex estimation. Sumati et al[15] correctly classified sex in 76.7% crania included in the study while Gupta et al [16] observed an accuracy of 90% for the mastoid process in sexing the crania. Franklin et al[17] reported an accuracy of 68% for mastoid process in sexing of indigenous South African crania .Saini et al [18] utilized eight different measurements on mastoid process and reported an accuracy ranged between 68.1% and 75.4% using each variable in direct discriminant analysis while in step wise analysis , asterion- mastoidale and mastoid breadth provided an accuracy of 87% which is reasonably good for identification in forensic anthropology. Also, the mastoid process was found to be a good discriminator of sex even in condition of severe malnutrition with 87.3% accuracy[19]. The average accuracy by direct method was 85% in males and 80% in females [20], 61% in males and 52% in females [21], In our study, accuracy of determination of gender was 97.1% original and 96.4% cross- validated.

So, compared with the results of other studies, the present study shows that the dimensions of mastoid process measured by anthropometric technique could be of great help in medicolegal investigations and it can be taken as a sex indicator among North Indians

CONCLUSION

The Skull plays a vital role in distinguishing the sex when performing a forensic anthropological analysis. Morphological and morphometric are two basic methods of sexing the human skull. In fragmented skull bone, metric analysis provides greater statistical weight than the morphological analysis. In the skull, the mastoid bone is robust, tough and is located at a protected position at the base of the skull making it favouable for sex determination. By taking the mastoid process measurements carefully and after applying proper statistical analysis, it can be used as one of the bone determinant of sex of fragmentary remains.

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Implications of Maxillofacial Injuries on Quality of Life in Trauma Victims

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ABSTRACT

Aim: The objective of this study was to assess the Quality of Life on the patients with maxillofacial injuries.

Materials and Method: A cross-sectional prospective study was designed to identify patients admitted with maxillofacial injuries from June 2017 to February 2018. Details regarding the social demographics,nature and severity of injury,and treatment methods were recorded. To assess the Quality of Life,Short Form-36 Version 2.0(SF-36v2)questionnaire was administered with recall period of 4 weeks. Analysis involved descriptive statistics and box plots to correlate the quality of life among various age groups and gender.

Results: A total of 129 patients with maxillofacial injuries were identified(115 males, 14 females;mean age = 35.14 years).Road traffic accidents were the cause of injury in 104 patients (80.62%)and slip and fall accounting for 66.7% among the elderly population of above 60 years. Only 36.4% underwent open reduction mode of treatment while the rest were managed conservatively. The overall Quality of life among male and female was not statistically significant,however when correlated with different age groups significant results were seen among the elderly and the middle age group.

***Keywords:** Maxillofacial injury,trauma,quality of life,SF-36v2*

INTRODUCTION

Epidemiological survey adjusts with variation in the geographical region, socioeconomic status, cultural and surrounding factors. These factors can be evaluated for contrast in the statistics and to recognize the differences in the distribution and occurrence of maxillofacial fractures throughout the world. Information acquired can be used as documentary proof for formulating preventive measures taken for such accidents in future.[1] The mechanism of injury and direction of impact influences the anatomic position and fracture patterns. The exposure to the external environment, when compared to the rest of the human body, is more in case of maxillofacial region and hence will require meticulous assessment and treatment.[2] The impact of maxillofacial accidents result in interruption of quite a number integral functions of the head and neck region,such as visual acuity, olfaction, auditory perception,speech,breathing,and eating. These are particularly essential for a regular day to day living of a person.[3]Subsequently,the Quality of Life of the individual is negatively influenced due to incapacitating outcomes of maxillofacial trauma which make them a burden to their families.[4]This can lead to mental anguish in the patients after injury.Mental morbidities are one of the complexities following road traffic accidents and maxillofacial injury.[5]

The psychological problems consist of acute stress disorder, post-traumatic stress disorders (PTSDs),and substantial dejection.[6]These post-traumatic mental problems may additionally occur either quickly or later after injury and dismally,a few sufferers are left without fitting prognosis and treatment. Without suitable

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treatment[7],these psychological troubles can cease up in chronic state and affect the treatment response and normal social potential antagonistically.[8]Studies have proven that sufferers with maxillofacial injuries experience the ill outcomes of severe anxiety issues. In spite of global familiarity with these issues,there is still a lack of data on mental anxiety in cases of maxillofacial injury. Quality of life is influenced by social,economic,psychological,mental state of an individual. To be more precise,it is the assessment of perceived quality of an individual's daily life of their well-being or lack of it.[9]

The Medical Outcomes Study Short Form 36-Item Health Survey(SF-36) is the most widely used generic instrument to estimate quality of life of patients. The benefit of qualitative research is that it allows the researcher to look at individuals' conduct,represent what is necessary to them and understand how people sense and think about a particular situation.[10] After an accident,the victims are typically left in a risky situation where they long for appropriate treatment when they are brought to the hospital.[11]To improve the high-quality of care,appropriate communication between health-care staffs and patients is vital.It is important for the health care providers to apprehend how the patients sense and what they experience for the duration of the length right after the accident to the end of definitive treatment to enhance this communication and as a consequence to develop greater customized care for the individual patient. Medical ethics has constantly stressed that surgical care must include collaboration between surgical care and mental healthcare. Therefore,a trauma victim should be evaluated from both physical and psychosocial perspective. Research on enhancing the maxillofacial trauma care has been continually focused surgically. Surgeons have a tendency to pay little attention to their patient's emotional and psychological aspect. Poor documentation due to low attention of post trauma psychological problems among the doctor has been observed.[12]

In current years,qualitative study has been used to discover patients' experience on trauma care at various levels after an accident. Patient's feeling and understanding towards the nursing care have additionally been explored by the use of qualitative study. The benefit of qualitative study is that it enables the researcher to discover people's behaviour,define what is important to them and perceive how the patients sense and experience about a particular event.[4]The aim of this study was to explore and understand the experience of a maxillofacial trauma patient. The finding of this study would help in further improvement of patient care and communication.

METHODOLOGY

A Cross-sectional study with all cases of maxillofacial injury visiting the trauma center from June 2017 to February 2018 were included. Patients below the age of 18 years,brought in dead patients and patients not willing to participate were excluded from the study. The study included 129 participants treated for maxillofacial injuries by Department of Oral and Maxillofacial Surgery. Data collection was done in relation to social demographics,etiology of injury and the fracture area of maxillofacial region. Clinical information pertaining to the maxillofacial injury and treatment modality of the patient was obtained from the medical records department of the hospital.

For the study,the mandible was divided into condylar, coronoid, ramus, body, symphysis and dento-alveolar regions. In the middle-third of the face,injuries were recorded as Le Fort,I,II,and III types, zygomatic complex,nasal bones, naso-orbito-ethmoidal complex and dento-alveolar fractures. The frontal sinus and orbital rim were recorded for injuries of the upper face. Etiological factors were classified as road traffic accidents,slip and fall,assault,occupational hazards and sports injuries.

To assess the Quality of Life,the patients were approached when they visited Dept. of Oral and Maxillofacial Surgery for follow-up.SF-36v2 standard Quality of Life questionnaire was administered. With its 36 questions,the SF-36 QoL measure seeks to assess eight life domains of the interviewee: Physical Functioning, Role-Physical, Bodily Pain, General Health, Vitality, Social Functioning, Role-Emotional and Mental Health. The scores range from zero to 100, with higher scores representing better levels of physical and mental well-being. The scores range from zero to 100, with higher scores representing better levels of physical and mental well-being. The data obtained were interpreted using SPSS version 16 on various scales and measures.

RESULTS

A total of 129 patients who fulfilled the inclusion criteria were included for the study.There were 115 male patients and 14 female patients with a mean age of 35.14 years (range = 18-86 years).Road traffic accidents (RTAs)were the largest cause of maxillofacial injuries(104 cases,80.62%),followed by falls(15 cases, 11.63%),interpersonal assaults and sports injuries(16 cases,12.4%) and industrial accidents (4 cases,3.1%).(Table 1-2)

68(52.71%) of them suffered fractures of the Mid-face,while 20(15.5%) subjects suffered Mandibular fractures.Another 27(20.93%) suffered a combination of Mid-face and Mandibular fractures.The frontal fractures accounted for less than 5% of cases.(Table 2)

The Median of Quality of Life for male and female was comparatively similar at 53.67 (Range = 34.47-73.92) and 53.33 (Range = 43.39-65.02) respectively.(Fig 1) However when compared with individual domains, the male counterparts should slightly better results in Physical functioning and social functioning, whereas females fared better in terms of general health and mental health. (Fig 2)

Individuals in the middle age group showed a positive correlation when compared to the elder population. For the younger age group (18-30 years) Median was 52.98(standard deviation [SD] = 10.2396472; range = 24.5208-76.2708), lower middle age group (31-45 years)Median was 55.541 (standard deviation[SD] = 10.89; range = 24.52-76.2708), upper middle age group (46-60 years) Median was 52.61 (standard deviation [SD] = 8.97; range = 24.52-66.38), elder age group (>60 years) Median was 42.30 (standard deviation [SD] = 5.13; range = 37.41-52.73) (Fig 3)

Table 1: Socio-demographic characteristics of respondents

Characteristics	Frequency (%)
Age (years)	
18-30	60 (46.52%)
31-45	42 (32.55%)
46-60	21 (16.28%)
Above 60	6 (4.65%)

Conted…

Gender	
Male	115 (89.15%)
Female	14 (10.85%)
Medical expenses	
Self	59 (45.74%)
Family	8 (6.2%)
Employer	4 (3.1%)
Insurance	58 (44.96%)
-Medicare	9 (6.98%)
-Manipal Arogya Suraksha	28 (21.7%)
-Manipal Sampoorna Suraksha	4 (3.1%)
-Mukhyamantri Santwana Harish Scheme	12 (9.3%)
-ESI; Corporate TPA	7 (5.4%)
-Charitable trust (Shankar fund; Dr. Hegde fund) (*In addition to other payment methods)	5* (3.88%)

Table 1 shows 60 respondents fall in the age group of 18 to 30 years and only 6 respondents in elderly category, with M: F ratio of 8.9: 1. 44.96% had access to medical insurance whereas 45.74% paid out of pocket.

Table 2: Injury and treatment characteristics of respondents

Characteristics	Frequency (%)
Etiology	
RTA	104 (80.62%)
Slip and Fall	15 (11.63%)
Assault	5 (3.88%)
Occupational injuries	4 (3.1%)
Sports injuries	1 (0.77%)
Fracture site	
Frontal	6 (4.66%)
Mid-face	68 (52.71%)
Mandible	20 (15.5%)
Frontal + Mid-face	5 (3.88%)
Frontal + Mandible	1 (0.77%)
Mid-face + Mandible	27 (20.93%)
Frontal + Mid-face + Mandible	2 (1.55%)
Treatment Procedure	
Open reduction/Surgical	47 (36.4%)
Closed reduction/Non-surgical	82 (63.6%)

In table 2,RTAs accounted for 80.62% of cause of trauma and Mid-face was the most affected constituting 52.71% of respondents followed by mid-face and mandible at 20.93%.

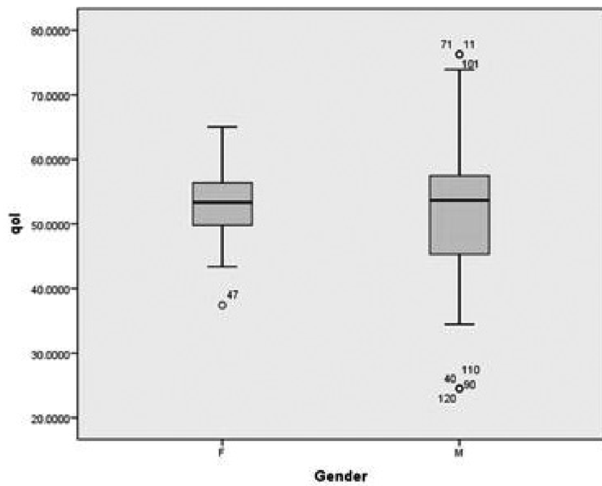

Fig. 1: Box plot comparing the Quality of life among males and females

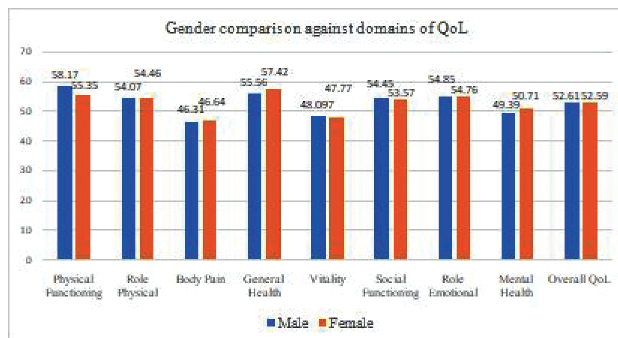

Fig. 2: Gender comparison against 8 domains of Quality of Life

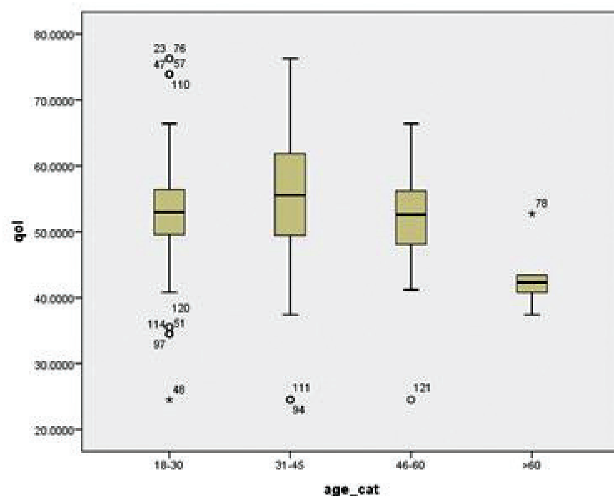

Fig. 3: Box plot comparing the Quality of life among different age groups

DISCUSSION

With a changing population pattern, increasing industrialization and urbanization, there is a rise in episodes of facial injuries, because of which maxillofacial trauma is turning into a burden and leading medical problem in the trauma rooms. Facial trauma is common in assaults and accidents and can be accompanied by distressing psychological sequelae. Numerous factors influence the recovery and rehabilitation from facial trauma, many of which are psychological in nature.

A retrospective study was performed to evaluate the pattern of maxillofacial fractures, associated injuries, and treatment used at AIIMS, New Delhi, between January 2007 and June 2010. The study provided a base for establishing trauma as a major etiology of maxillofacial injuries and planning for preventive strategies. Of the 795 fractures of the maxillofacial skeleton and 86 concomitant injuries from 542 patients, Road traffic accident (RTA) (56.8%) was the most common etiologic factor, followed by falls (22.3%) and fights (18.5%). The age range was from 3 to 75 years (mean-34.7 years) with a peak incidence in the third decade with a male-to-female ratio of 3.7:1. Mandible 615 (77%) was the most common location followed by middle third 180 (23%). Majority of the patients were treated by open reduction and internal fixation (70.6%). Head injury was associated in 16.3% of cases. The researchers also emphasized on the establishment of regionalized, efficient, and focused trauma centres in various parts of the country particularly for acute trauma. Also, the laws regarding the precautions such as use of seat belts, driving as per the prescribed speed limits, and obeying traffic rules must be observed strictly to reduce the incidence of RTA.[13]

A maxillofacial trauma patient not only deals with the physical burden of the injury but also goes through various psychological issues. These range from facial disfigurement to post-traumatic stress disorders accompanied by anxiety and depression. In such cases, the psychological needs of patients with acquired facial trauma are unique. It has been noted that symptoms of depression, anxiety, and hostility were more likely to be reported by patients with maxillofacial trauma when compared to a normal control group for a period of up to 1 year post trauma.[12] The adaption to the normal life post trauma is influenced by medical, social, financial and psychological variables and it is difficult to predict the prognosis and the course of adaption in most of the cases.

Patients with facial trauma also report lower quality of life leading to substance abuse, stigmatization, stress disorders, dejection and lower overall satisfaction with life.[14]Health-related quality of life (HR QoL) of patients with facial trauma was recorded and it was compared with that of healthy controls. A total of 126 patients with facial injuries and 126 healthy controls were recruited for the study for the study. The individuals were measured on WHO Quality of Life Questionnaire and depression was measured with the Hospital Anxiety and Depression Scale (HADS). Scores in all domains of the WHO QoL-Bref (physical, psychological, social relations, and environment) were considerably reduced in injured patients compared with controls. During follow up the researchers found improvements only in the domains of physical health and environment, but not in psychological health. There was a significant reduction in the HR QoL domain of social relationships with time. The regression equation for all four QoL domains as predictors was significantly related to depression scores throughout the study period. Patients with facial injuries are at risk of poor QoL after trauma. There was a high incidence of depression throughout the follow-up period, and poor QoL at baseline predicted depression during follow-up.[15]

Another study conducted at Kerman University of Medical Sciences, Iran reported depression and anxiety disorders in patients with maxillofacial trauma. In the study, a cohort of 50 subjects were selected from the patients with maxillofacial traumas and a control group of 50 subjects with no maxillofacial trauma were recruited. Hospital Anxiety and Depression Scale (HADS) and Oral Health Impact (OHIP-14) questionnaires were used.14% of the subjects were rated as depressed under HADS depression scale, with another 10% borderline cases. However, from the control group only 4% were depressed and 2% of borderline case. The results showed that patients with maxillofacial traumas had higher rates of depression and anxiety, with significant differences between the cohort group and the control group (P=0.01). The results showed a significant relation between depression severity and confounding factors. The mean of OHIP-14 parameters were 35.51 ±5.2 and 22.3±2.4 in cohort and control groups, respectively, with statistically significant differences (P=0.01).[16]

Patients with all forms of acquired facial disfigurement have many concerns in common, which include challenges in social functioning, body image adaptation and the possibility for psychological dysfunction.

One study compared plastic surgery patients undergoing treatment for facial cancer with patients undergoing reconstruction for scarring resulting from traumatic injury. Facial cancer patients reported lower levels of depression, anxiety, social concern and concern about their appearance as compared to the facial trauma patients.[17]

CONCLUSION

The results of the study show it is very important to provide psychiatric support for all the patients with maxillofacial traumas. Doctors can enhance patients' rehabilitation by keeping themselves updated with the clinical literature on the psychosocial adaptation of patients with acquired facial trauma. It is also vital to follow-up with patients on how they are coping with the social, emotional and psychological changes post trauma care. One should counsel the patients to undergo cognitive-behaviour therapy to address such difficulties, using both formal and self-help methods.

The healthcare provider must ensure that their patients attain the highest level of psychosocial rehabilitation by developing a consistent and trusting relationship with a mental health professional. Clinicians should emphasize this important consideration and also explain it to the patients' relatives who play a major role in rehabilitation of the patient.

Ethical Clearance: Taken from the Institutional ethics committee

Source of Funding: Self funded

Conflict of Interest: Nil

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Maxillofacial Injuries and Its Implications on Economic Burden in Trauma Victims.

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ABSTRACT

Aim: The objective of this study was to assess the Economic burden on the patients with maxillofacial injuries.

Materials and Method: After obtaining institutional ethical clearance, a prospective approach was taken to identify patients admitted with maxillofacial injuries from June 2017 to February 2018. Information related to the nature and severity of injury and treatment were recorded along with the total treatment cost and duration of hospitalization. Maxillofacial injury severity score (MFISS) and facial injury severity scale (FISS) were used to score the maxillofacial injury. To assess the economic burden, the MFISS and FISS scores were correlated with economic burden markers namely cost and duration of hospitalization.

Results: A total of 129 patients with maxillofacial injuries were identified (115 males, 14 females; mean age = 35.14 years). 104 patients (80.62%) were involved in Road Traffic Accidents and only 58 patients (44.96%) were covered under medical insurance. The mean MFISS and FISS scores were 13.62 (standard deviation [SD] = 9.53; range = 3-48) and 2.70 (SD = 1.935; range = 1-10), respectively. The mean expenditure and length of stay in the hospital of the patients were INR 36643.42 (SD = 46165.817; range INR 1657-253948) and 5.5 days (SD = 6.741; range 0-34 days) respectively. Spearman's correlation between the MFISS and FISS scores and the cost and duration of hospitalization, revealed statistically significant correlations (MFISS vs. cost - R = 0.398, P < 0.01; MFISS vs. duration - R = 0.477, P < 0.01; FISS vs. cost - R = 0.429, P < 0.01; FISS vs. duration - R = 0.433, P < 0.01).

Keywords: *Maxillofacial injury, trauma, economic burden, MFISS, FISS*

INTRODUCTION

The facial skeleton protects the brain; houses and protects the sense organs of sight, smell, and taste. It provides a framework for the facial muscles to attach onto and help in eating, breathing, facial expressions and speech.[1] The Frontal bone, Maxilla, Zygoma, Nasal bones and Mandible are the important bones forming the basic structure of the face.[2]Maxillofacial trauma is any physical injury to the face, which may involve the soft tissue injuries such as cuts, burns and bruises, or fractures of the facial bones such as the fractures of the jaw and nasal bone, as well as eye injuries.The effect of maxillofacial injuries result in interruption of various critical functions of the head and neck region, such as, visual acuity, olfaction, auditory perception, speech, breathing, and eating, which are exceptionally vital for an ordinary day to day living of a person.[3]This can lead to mental agony in the patients after injury. Mental morbidities are one of the complexities following road traffic accidents and maxillofacial injury.[4]

Emergency physicians and surgical specialists in various specialties like Oral and maxillofacial surgery,

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ENT, Neuro surgery, Ophthalmology and Plastic surgery are required to work harmoniously in order to manage multiple trauma victims which accounts for more than 50% .[5]Because of the lack of awareness regarding medical insurance and poor social medical coverage, a major portion of the expenses of the medical services used is borne by the patients' themselves.[6] Studies have demonstrated that patients with maxillofacial injuries experience the ill effects of severe anxiety issues. In spite of well-known worldwide familiarity with these issues, there is as yet lacking information on mental anxiety in cases of maxillofacial injury.[7]It is vital to consider that for each death there are numerous survivors who are left with permanent impairing injuries. And the extent of trauma care for these injuries influences the working populace, such that, death or disability diminishes work and their spending capacity.[8]

The World Health Organization (WHO) reports that about 1.25 million people die annually on the world's roads, with 20–50 million sustaining non-fatal injuries.[9] According to Indian Society for Trauma and Acute Care, India Loses approximately 2-2.5% of its GDP to only Road Traffic Injuries. Transport related Injuries constitutes 22.8% of all trauma cases. Majority of 77.2% accounts for other forms of trauma such as, falls, occupational trauma, intentional self-harm, assault, burns and drowning, natural disaster, terrorist attacks. Every 2 minutes, a trauma-related death occurs in India.[10]Many researchers have published the rate and treatment of facial trauma, all the same, the real cost of dealing with these injuries are not as often as possible revealed.[11] In light of the fact, the doctor's choice on the method of treating a patient impact up to 35% of aggregate treatment cost.[12]

The dominant part of treatment costs comprises of the supposed hospitalization costs which include expenses of accommodation, surgery, and drugs which in turn surges with the duration of treatment. When we consider advantages of open treatment procedures, speedy recuperation and higher personal satisfaction weigh down the high expenses incurred in treatment. The study endeavours to evaluate the financial burden incurred post injury. It also explores other options to overcome difficulties so as to make affordable care accessible to the underprivileged.

METHODOLOGY

A cross-sectional study with all cases of maxillofacial injury visiting the trauma center from June 2017 to February 2018 were included. Patients below the age of 18 years, brought in dead patients and patients not willing to participate were excluded from the study. The study included 129 participants treated for maxillofacial injuries by Department of Oral and Maxillofacial Surgery. Data collection was done in relation to social demographics, etiology of injury and the fracture area of maxillofacial region. Clinical information pertaining to the maxillofacial injury and treatment modality of the patient was obtained from the medical records department of the hospital. The pattern of facial injury was determined according to the fractures of frontal bone, mandible, and mid face in relation to the different etiological factors. Patients were scored depending on the nature of their maxillofacial injuries using Maxillofacial Injury Severity Score (MFISS) [13] and Facial Injury Severity Score (FISS) [14].

For the study, the mandible was divided into condylar, coronoid, ramus, body, symphysis, and dento-alveolar regions. In the middle-third of the face, injuries were recorded as Le Fort, I, II, and III types, zygomatic complex, nasal bones, naso-orbito-ethmoidal complex and dento-alveolar fractures. The frontal sinus and orbital rim were recorded for injuries of the upper face. Etiological factors were classified as road traffic accidents, slip and fall, assault, occupational hazards and sports injuries. For breaking down the financial burden, information on cost and duration of hospitalization was obtained. Cost of hospitalization- The total financial expense incurred by the patient for treatment of the maxillofacial injury which includes pre-treatment investigations, surgical procedures, and post treatment medication, consumables and therapy.

Duration of hospitalization: The number of days from admission until discharge of the patient was taken into account.

Details of hospitalization and treatment procedures, including the nature of treatment, treatment cost (in Indian Rupees [INR]), duration of hospitalization (in days), payment method and medical insurance coverage was obtained from the finance department of the hospital. These variables will be analysed to determine most common gender, age, etiology, fracture site and payment type. The data obtained was then analysed using SPSS on various scales and measures.

RESULTS

A total of 129 patients fulfilling the inclusion criteria were identified. There were 115 male patients and 14 female patients with a mean age of 35.14 years (range = 18-86 years). Road traffic accidents (RTA) were the largest cause of maxillofacial injuries (104 cases, 80.62%), followed by falls (15 cases, 11.63%), interpersonal assaults and sports injuries (16 cases, 12.4%) and industrial accidents (4 cases, 3.1%). (Table 1) The mean MFISS and FISS scores were 13.62 (standard deviation [SD] = 9.53; range = 3-48) and 2.70 (SD = 1.935; range 1-10) respectively. While the mean cost of hospitalization of the patients was INR 36643.42 (SD = 46165.817; range INR 1657-253948), the mean duration of hospitalization was 5.5 days (SD = 6.741; range 0-34 days). (Table 3)

Agreement between the scores and the markers of economic burden were evaluated using Bland-Altman plots (Graphs 1-4). With 58 patients (44.96%) under medical insurance coverage, of the remaining patients, 59 (45.74%) paid for their own medical expense, patient's family paid for 8 (6.2%) of them, while 4 patients (3.1%) were sponsored by their employers.(Table 1)Statistical analysis using Spearman's correlation between the FISS and MFISS scores and the independent variables of cost and duration of hospitalization revealed statistically significant correlations. The FISS scores of the patients showed a positive correlation with the cost ($R = 0.429$, $P < 0.01$) and duration ($R = 0.433$, $P < 0.01$) of hospitalization. Similarly, the MFISS scores of the patients showed a positive correlation with the cost of hospitalization ($R = 0.398$, $P < 0.01$) and duration of hospitalization ($R = 0.477$, $P < 0.01$) (Figs 1-4).

Table 1: Socio-demographic characteristics of respondents

Characteristics	Frequency (%)
Age (years):	
18-30	60 (46.52%)
31-45	42 (32.55%)
46-60	21 (16.28%)
Above 60	6 (4.65%)
Gender:	
Male	115 (89.15%)
Female	14 (10.85%)

Conted…

Medical expenses:	
Self	59 (45.74%)
Family	8 (6.2%)
Employer	4 (3.1%)
Insurance	58 (44.96%)
-Medicare	9 (6.98%)
-Manipal Arogya Suraksha	28 (21.7%)
-Manipal Sampoorna Suraksha	4 (3.1%)
-Mukhyamantri Santwana Harish Scheme	12 (9.3%)
-ESI; Corporate TPA	7 (5.4%)
-Charitable trust (Shankar fund; Dr. Hegde fund) (*In addition to other payment methods)	5* (3.88%)

Table 1: The above table shows 60 respondents fall in the age group of 18 to 30 years and only 6 respondents in elderly category, with M: F ratio of 8.9: 1. 44.96% had access to medical insurance whereas 45.74% paid out of pocket.

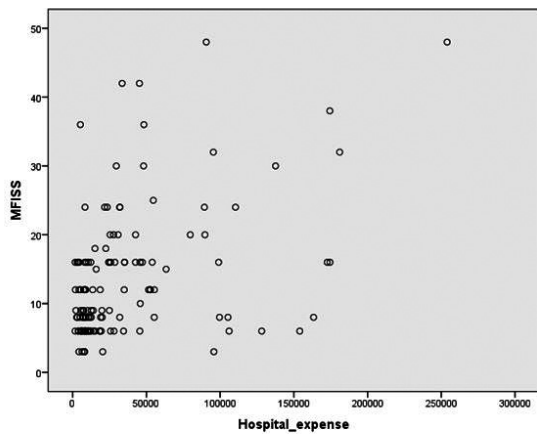
Table 2: Injury and treatment characteristics of respondents

Characteristics	Frequency (%)
Etiology:	
RTA	104 (80.62%)
Slip and Fall	15 (11.63%)
Assault	5 (3.88%)
Occupational injuries	4 (3.1%)
Sports injuries	1 (0.77%)
Fracture site	
Frontal	6 (4.66%)
Mid-face	68 (52.71%)
Mandible	20 (15.5%)
Frontal + Mid-face	5 (3.88%)
Frontal + Mandible	1 (0.77%)
Mid-face + Mandible	27 (20.93%)
Frontal + Mid-face + Mandible	2 (1.55%)
Treatment Procedure	
Open reduction/Surgical	47 (36.4%)
Closed reduction/Non-surgical	82 (63.6%)

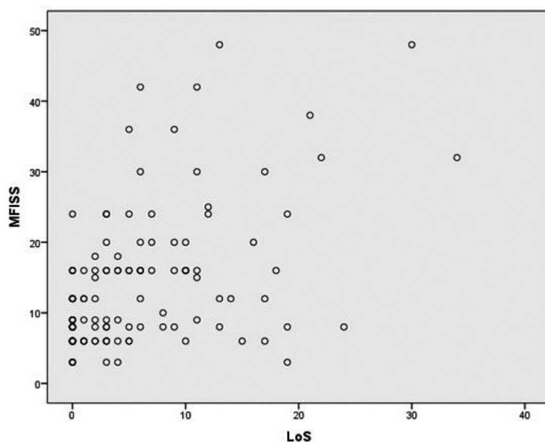
Table 2: RTAs accounted for 80.62% of cause of trauma and Mid-face was the most affected constituting 52.71% of respondents followed by mid-face and mandible at 20.93%.

Table 3: Range scores for Hospital expense, Length of stay, FISS, MFISS among the participants

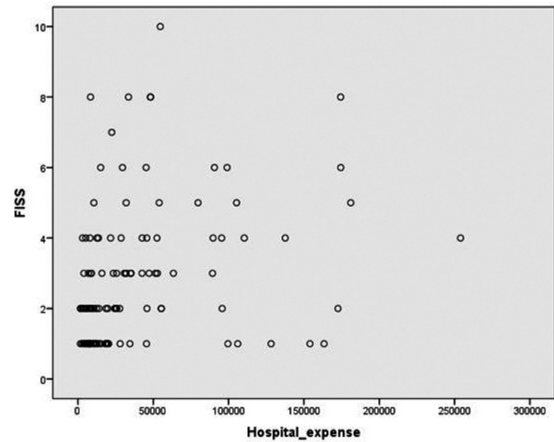
	Minimum	Maximum	Mean	Std. Deviation
Hospital Expense	1657	253948	36643.42	46165.817
Length of Stay	0	34	5.50	6.741
FISS	1	10	2.70	1.935
MFISS	3	48	13.62	9.530



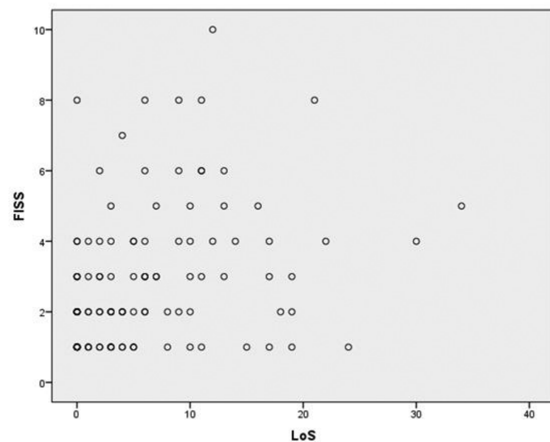
Graph 1: Bland-Altman plot showing the correlation between Maxillofacial Injury Severity Score (MFISS) and the Hospital expense. Rho value – 0.398 (weak positive correlation)



Graph 2: Bland-Altman plot showing the correlation between Maxillofacial Injury Severity Score (MFISS) and the hospital length of stay. Rho value – 0.477 (weak positive correlation)



Graph 3: Bland-Altman plot showing the correlation between Facial Injury Severity Scale (FISS) and the Hospital expense. Rho value – 0.429 (weak positive correlation)



Graph 4: Bland-Altman plot showing the correlation between Facial Injury Severity Scale (FISS) and the hospital length of stay. Rho value – 0.433 (weak positive correlation)

DISCUSSION

The injury severity measurement is a widely discussed topic and commonly executed approach. It is a very useful in determining the possible prognosis, treatment outcomes in trauma patients, and also to assess the cost of injuries post trauma.[13]The available scoring systems does not focus solely on the maxillofacial region and in few circumstances the importance of such injuries have been undermined. The development of trauma specific scoring system can aid the clinician in classifying and prompt assessment of such injuries.

The Maxillofacial Injury Severity Score (MFISS) proposed by Zhang et al. limits the evaluation of injuries to the maxillofacial region setting aside of other bodily

injuries that may be present in the patient. It made use of the Abbreviated Injury Scale (AIS). MFISS is designed for selecting the three highest maxillofacial injury severity scores according to the AIS-90 standard and then combine them with the ISSs for three maxillofacial functional parameters: malocclusion (MO), limited mouth opening (LMO) and facial deformity (FD). MFISS being a derivative of AIS, inherits the problems in evaluation of comminution. Another drawback being the functional parameters cannot be recorded in retrospect.[14]

Facial Injury Severity Score (FISS) on the other hand, includes the classification of laceration of the facial soft tissue and that of bone. Here, the facial bones are divided into the upper, middle, and lower thirds, with an addition of 1 item for facial laceration. However, because of insufficient description of the classification of bones, it cannot be used to distinguish displaced and comminuted fractures.[15]In a study reported by Ramalingam S, the treatment expenses borne by the patients as a result of traumatic injuries was analysed retrospectively in a small subset of the South Indian population. It was interesting to note, only 17.9% of the studied patients had access to medical insurance, and the remaining patients managed their medical expenses out of pocket. The author found a direct relationship between the length of hospitalization and the burden of expenditure.Furthermore, a positive correlation was found between the MFISS score and the duration of hospitalization ($R = 0.828$, $P < 0.01$), and that with the cost of treatment ($R = 0.862$, $P < 0.01$).[6]

In another study by Chen et al. to select a scoring system which will be suitable for the scoring of maxillofacial trauma by comparing four commonly used scoring systems. For this study, twenty-eight subjects who had experienced maxillofacial trauma were recruited as the cohort. Four commonly used systems were selected: New Injury Severity Score (NISS), Facial Injury Severity Scale (FISS), Maxillofacial Injury Severity Score (MFISS), and Maxillofacial Injury Severity Score (MISS). Each patient was graded using these 4 systems. An expert scoring table was created, using their experience at the trauma centre. The injuries of these 28 patients was graded by 35 experts in maxillofacial surgery, using the expert scoring table according to their clinical experience. A normal distribution was demonstrated by the results of the 4 scoring systems and expert score. A significant difference ($P < .01$) was also noted. Pearson correlation coefficient between the MFISS and expert score was the greatest (0.801). They also found the correlation coefficient between the NISS, FISS, and MISS and the expert score to be 0.714, 0.699, and 0.729, respectively. In comparison with the other 3 scoring systems, the correlation and agreement between the MFISS and expert score was greater. Their finding suggested that the MFISS is more suitable for scoring maxillofacial injuries.[16]

CONCLUSION

The practice of assessment of maxillofacial trauma has come a long way. Availability of trauma specific scoring systems can aid clinicians in evaluating and assessing cases of high severity with gross comminution.[13] From the present study, using MFISS and FISS we can not only predict indicators of maxillofacial injury severity, but also use the scores as indicators of the economic burden to the patient as a result of maxillofacial injury. The study involved only a small subset of the population. A multi-centre study would be helpful to obtain a bigger picture of the injured population.

Ethical Clearance: Taken from the Institutional ethics committee

Source of Funding: Self funded.

Conflict of Interest: Nil.

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Study of the Impact of Quality of Patient Care on Discharge against Medical Advice Patients in a Tertiary Care hospital

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ABSTRACT

A cross sectional study was conducted with a sample size of 200.Among the 200 cases of DAMA, 7.5% of cases were in the age range of 15–25 years, 11% were in the age range of 26–30 years, 19% were in the age range of 36–45 years,16.5% were in the age range of 46–55 years, 20% were in the age range of 56-65 years.26% were above the age of 65 years.35.5% of patients who took discharge against medical advice were illiterate (n = 200), followed by 28.5% with secondary education. The least number was distributed among pre-degree and graduation (5%, 14%). The peak DAMA rate was seen among dependent participants(43.5%),followed by the self-employed (36%) and private employees(15%).The least was noted among government employees(5.5%). 68% of the cases were diagnosed with acute illness and 32% were diagnosed with chronic illness. DAMA cases were considered from 11 units of in-patient service such as Medicine, Gastrology, Neuro Surgery,Neurology,Pulmonary Medicine, Obstetrics and Gynaecology, Orthopaedic Surgery,Oncology and Cardiology. The reasons for DAMA can be considered under two categories: patient related factors and hospital related factors. Patient related factors include the following: Wanting to go to another hospital (77.5%), financial burden (53%), no improvement in condition (45%),distance from hospital (43.5%),unsatisfied with treatment (43.5%),worsening of symptoms (18.5%),family issues (9.5%),re–admission (7.5%), influenced by other patients (1%) and language barrier (0.5%). Medical conditions included addiction to alcohol (2%) and decision to go for alternative treatment (2%). The hospital related factors were: Expensive hospital stay (60%), ineffective care (28.5%), inefficient staff (27%), unnecessary diagnostic procedures (25.5%), long waiting time (18%),neglected by hospital staff (16%), uncomfortable hospital stay (11.5%), crowded hospital (4%), inadequate facilities (3.5%), improper communication by staff and strict hospital policies(3%). The third objective was to assess the impact of the quality of patient care on discharge against medical advice patients in a tertiary care hospital. The study result shows that Quality related issues do have a significant impact on DAMA. The quality related issues consist of the following sub areas: Wanted to go to other hospital (77.5%), no improvement in patient condition (45%), unsatisfied with treatment (44.5%), inefficient staff (27%),ineffective care (20.5%),worsening of symptoms (18.5%), neglected by hospital staff (16%) and uncomfortable hospital stay (11.5%).

Keywords: *Discharge against medical advice; Quality of patient care*

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INTRODUCTION

DAMA (Discharge against medical advice) is when a patient leaves a hospital against the advice of their doctor.There are wide spread legal and ethical

concerns that competent patients are entitled to decline recommended treatment.[1]In general,patients discharged AMA (against medical advice) have an increased risk of hospital readmission,potentially death.[1]

Although common hospital practice for an AMA discharge involves the patient being asked to sign a form stating that he or she is aware that they are leaving the facility AMA, releasing the hospital from liability,the hospital is generally not legally required to do so. Rather,the legal and ethical requirement is that the authorised healthcare professional has an informed consent discussion with the patient regarding the DAMA.This discussion which includes the disclosure of the risks,benefits and alternatives to hospitalization must be in a manner and language that the patient understands. It should be documented in the patient's chart. While most practitioners believe that the AMA discharge form is needed to limit liability on the part of medical facility in case there are complications,critics call this an invalid assumption that may in fact lead to coercive practices that do not support patients.[1]

Prior to discharging a patient against medical advice,the physician should be convinced that the patient has given an informed refusal and had an opportunity to ask questions. The physician must determine and document that the patient is functionally competent.[2]Leaving the hospital against the physician's advice may expose the patent to the risk of an inadequately treated medical problem and result in a need for readmission.[3]Understanding why patients choose to leave the hospital AMA has obvious importance because of the potential to identify those at higher risk and therefor intervene earlier to prevent excess morbidity,mortality,and healthcare costs.[3]A high DAMA rate could be an indicator of poor healthcare quality.

Patients with Asthma who were DAMA had a four times higher risk of readmission to the emergency department within thirty days and a three times higher risk of readmission to the hospital within thirty days. Ayed found that DAMA cases in general medicine have a seven times higher chance of getting readmitted within 15 days.40% of them had a risk of death or repeat admission for myocardial infarction or unstable angina within two years of discharge.[3] Both payers and physicians tend to interpret a shorter length of stay as a favourable outcome because of lower short-term costs and reduced exposure to the potential risks of a hospital stay. Furthermore, evidence is accumulating to indicate that many hospital stays last longer than the period of acute illness,with uncertain,if any,additional benefit over shorter stays.[4]

The identification of demographic factors associated with discharge against medical advice might help health care administrators to predict such occurrences,but they might not be particularly helpful for clinicians or patients. Patients need to be interviewed to find out what motivates them to leave in the face of medical advice.[4]Many patients do not trust medical care providers,because of their experiences with inadequate progress in their condition,improper treatment and poor attitudes of health care providers toward the poor. This lack of trust interferes with communication regarding the diagnoses, prognoses and appropriate treatment.[4]Direct communication of the reasons for continuing the hospital stay,involvement of patients in decision making,specific advice about treatment and empathy with the difficulties associated with being in hospital are associated with a decrease in discharges against medical advice.[5]

DAMA occurs in both inpatient wards and emergency departments. The majority of studies on DAMA have been done on inpatients. The phenomenon of DAMA is worldwide and is not limited to the developing world[5]. It is prevalent in both rural and urban settings. However,research in this area has generally focused on large urban hospitals and on specific patient groups, such as general medicine and psychiatric patients. Reports of DAMA incidence vary widely,from >20% in large urban hospitals,especially among alcoholics,drug abusers and psychiatric patients,to <4% for medical admissions and <1% in small rural hospitals.[6]

Patients with a significant probability of leaving the hospital against medical advice can often be identified on the basis of their medical histories or on the basis of their behaviour while in the hospital. Such behaviour can be mentioned in the nursing notes.[6] The factors influencing DAMA fall within two broad categories: patient variables– socio-demographic characteristics,diagnosis,treatment history, behaviour; and attitudes toward treatment–and provider variables–hospital setting and structure,staffing patterns,admission and discharge policies,and physicians' clinical style and experience. Regarding patients' demographic data, results have been diverse and sometimes conflicting.However,certain trends have emerged : Younger age,male gender,absence of insurance,low socio-economic status,history of alcohol and drug abuse,history

of psychiatric illness,inadequate social support,lack of a primary care physician and a past history of DAMA all have been reported as risk factors for DAMA.[7] Other factors that can lead to DAMA are: a punitive or threatening atmosphere in the inpatient unit,difficulties in the doctor-patient relationship,inadequate unit staffing patterns and a perceived lack of progress in patient care.[7,8,9]

Aim: To study the impact of quality of patient care on discharge against medical patients in a tertiary care teaching hospital.

OBJECTIVES

1. To study the cases of Discharge against medical advice.
2. To ascertain the reasons for Discharge against medical advice.
3. To assess the impact of quality of patient care on Discharge against medical advice patients.

METHOD AND METHODOLOGY

Research Approach: Cross sectional study

Research Design: Cross sectional study design.

Study Period: June 2016 to May 2017.

Data Collection Period: October 2016 to April 2017.

Study Setting: Kasturba hospital, Manipal.

Study Population: Discharge against medical advice patients.

Sample Size: 200.

Sampling Technique: Purposive sampling.

Inclusion Criteria: Discharge against medical advice cases during the study period.

Exclusion Criteria: Cases of death,out patients

Study Tool: Structured questionnaire.

RESULT

The data is organised in five sections

Section 1: Frequency distribution of demographic variables with regard to the DAMA patients.

Section 2: Frequency distribution of responses to the questionnaire.

Section 3: Identification of various reasons for choosing DAMA.

Section 4: Association of demographic variables with the reasons for DAMA

Section 5: Association of healthcare quality related reasons with DAMA.

Total number of discharges and DAMAs for the period of seven months from October 2016 to April 2017 was 40,000 and 525 respectively.

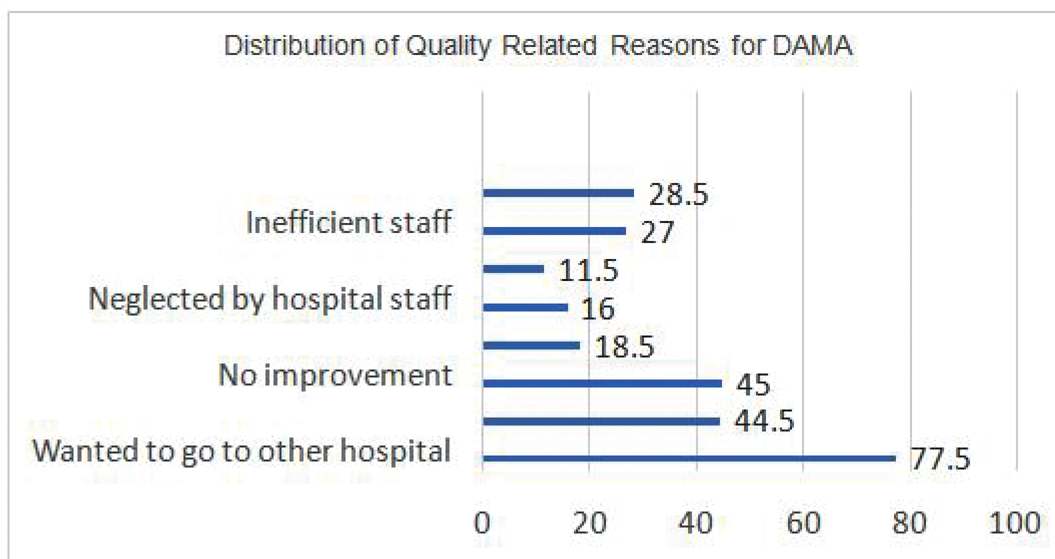

Figure 1:Distribution of Quality Related Reasons for DAMA

Table 1: Association between demographic variables and reasons for DAMA

Variable	X^2 Value	P-Value	Significance
Education* Financial Burden	39.537	0.001	√
Education* Expensive Hospital Stay	35.995	0.003	√
Occupation* Financial Burden	22.600	0.031	√
Occupation* symptoms are aggravated	17.415	0.043	√
Occupation* no improvement	21.373	0.011	√
Occupation* expensive hospital stay	21.280	0.046	√
Diagnosis*no improvement	8.282	0.041	√

Table 2: Association of diagnoses with no satisfaction with treatment, wanting to change hospitals,inefficient staff, unnecessary tests, long waiting time, uncomfortable hospital stay, neglected by hospital staff

Variable	X^2 Value	P-Value	Significance
Diagnosis* No satisfaction with treatment	11.306	0.010	√
Diagnosis* Wanting to change hospitals	14.695	0.012	√
Diagnosis* Inefficient staff	12.500	0.014	√
Diagnosis* Unnecessary tests	27.995	0.000	√
Diagnosis* Long waiting time	18.970	0.001	√
Diagnosis* Uncomfortable hospital environment	19.738	0.001	√
Diagnosis* Neglected by hospital staff	26.467	0.000	√

Table 3: Association of length of stay and speciality with financial burden, inadequate facilities, inefficient staff, hospital crowd, family problems and aggregative symptoms.

Variable	X^2 Value	P-Value	Significance
Length of stay* Financial burden	9.990	0.041	√
Length of stay* inadequate facilities	11.505	0.021	√
Length of stay* inefficient staff	9.948	0.041	√
Length of stay* Hospital crowd	9.5948	0.048	√
Speciality* Family problems	15.575	0.011	√
Speciality* Financial burden	88.689	0.000	√
Speciality* Aggregative symptoms	58.034	0.002	√

Table 4: Association between speciality and hospital related reasons for DAMA

Variable	X^2 Value	P-Value	Significance
Speciality* No improvement in condition	49.735	0.013	√
Speciality* Unsatisfied with treatment	45.538	0.034	√
Speciality* Want to go to another hospital	87.590	0.001	√
Speciality* Ineffective care	56.522	0.043	√
Speciality* Hospital crowd	56.261	0.046	√
Speciality* Expensive hospital stay	83.274	0.000	√
Speciality* Unnecessary tests	26.840	0.003	√
Speciality* Long waiting time	64.843	0.008	√
Speciality* Uncomfortable hospital environment	80.681	0.000	√

DISCUSSION

The reported incidence of LAMA shows great variation depending upon the patient population and the type of treatment setting. It ranges between more than 20% in large urban hospitals,especially among alcoholics, drug abusers and psychiatric patients, to less than 4% for medical admission and less than 1% in small rural hospitals and medical wards. Underreporting is a reality. LAMA studies in children are scanty.[6,10]

Multifactorial reasons for DAMA are dissatisfaction with the care,expectations of a shorter stay not being fulfilled,the need to take care of personal,family or financial affairs,patients feeling better,patients not improving,patients not receiving adequate nursing/ medical care,preference for another hospital,beliefs that the condition was terminal,dislike of the hospital environment,not wanting to be used for learning/teaching purposes,and financial burden. Complications of DAMA include worsening of health status,occurrence of chronic diseases from acute stage,and death of patients. Skilful communication, flexible routines,policies and procedures,negotiable management options,good clinical care and thorough documentation constitute the corner stones of dealing with the problem of DAMA.[11]

Moyse observed that DAMA accounted for 5.6% of total admissions. The main reason for DAMA was related to patient factors(43.9%),with hospital environment and medical staff being reported as reasons by 41.2% and 35.2% respectively. The majority of patients(65.9%) reported not being informed about the complications of their decision.[12]

A prospective study on DAMA was conducted at Federal Staff Medical Centre,Abuja,with the aim of prospectively evaluating the process of DAMA and suggesting strategies to reduce it. All consecutive patients who got DAMA from the medical centre during the study period (2013 – 2014) were included in the study.[13]

Every year in the region of Federal staff medical centre, Abuja,thousands of people leave the hospital before treating physicians recommend discharge. The phenomenon of discharge against medical advice can lead to serious clinical,ethical and legal challenges to physicians as well as the hospital.[13] Brook et al observed that the overall DAMA rate was 2.1% within the study period.66 males(44.6%) and 78 females(55.4%) were discharged against medical advice: with ages ranging from 2 hours to 85 years. The data showed that the majority of patients who have DAMA were paediatric cases(44.6%),while obstetric/gynaecological/ surgical and internal medical patients accounted for 34(24.1%),26(18.4%) and 18(12.7%).[13]

Diagnoses of DAMA by closed long bone fractures represented the highest number of DAMA(24.8).Infections,severe hypertension,severe malaria and neonatal jaundice were diagnosed in 27(19.1%),20(14.2%), 18(12.8%) and 17(12.0%) patients respectively. Other diagnoses included severe dehydration secondary to acute gastroenteritis (7.8) and complicated diabetes mellitus (5%).[13]The most commonly cited reasons for discharge against medical advice were financial constraints (32.6),dissatisfaction with management plan (7.1%),feeling of wellness(13.5%). seeking alternative therapy (17.7%),tiredness of staying in the hospital (12.1%),attending to personal or family matters (4.3%) and unspecified 12.8%).[13]

Jeffer discusses the prevalence and risk of discharge against medical advice to the quality of healthcare. AMA discharges continue to be a highly prevalent problem in healthcare,accounting for 2% of all hospital discharges. Patients discharged AMA are at a higher risk for morbidity and mortality. Patients with asthma who were discharged AMA had four times higher risk of readmission to the emergency department within 30 days(21.7% vs. 5.4%) and almost a three times higher risk of readmission to the hospital within 30 days(8.5% vs. 3.2%). In the general medicine service,patients who left AMA were 7 times more likely to be readmitted within 15 days (21% vs. 3%).Patients who left AMA had a 40% higher risk of death or readmission for myocardial infarction or unstable angina up to two years after discharge. In a review of medical records,Link et al found a 15.7% mortality rate after one year of discharge among 57 patients discharged AMA. Using a case control design, Corley and Link found 19% mortality at six months among 33 medical patients who left AMA from a Veterans Affairs institution.[14,15]Very little data is available on the estimated total cost to the health care system of unanticipated AMA discharges. Multiple studies have found that patients who leave AMA are at risk for early readmission which can result in higher healthcare costs.

The second objective was to identify the reasons for discharge against medical advice. Among the 200 cases of DAMA,7.5% of cases were in the age range of 15–25 years,11% were in the age range of 26–30 years,19% were in the age range of 36–45 years,16.5% were in the age range of 46–55 years,20% were in the age range of 56-65 years.26% were above the age of 65 years.71.5% of DAMA cases were males.28.5% were females.169 patients stayed more than 22 kilometres away from the hospital and 31 patients stayed within 22 kilometres of the hospital.

35.5% of patients who took discharge against medical advice were illiterate (n = 200), followed by 28.5% with secondary education. The least number was distributed among pre-degree and graduation (5%, 14%). The peak DAMA rate was seen among dependent participants(43.5%), followed by the self-employed(36%) and private employees (15%). The least was noted among government employees (5.5%). 68% of the cases were diagnosed with acute illness and 32% were diagnosed with chronic illness. DAMA cases were considered from 11 units of in-patient service such as Medicine, Gastrology, Neuro Surgery,Neurology, Pulmonary Medicine, Obstetrics and Gynaecology, Orthopaedic Surgery,Oncology and Cardiology.

The reasons for DAMA can be considered under two categories: patient related factors and hospital related factors. Patient related factors include the following: Wanting to go to another hospital (77.5%),financial burden (53%), no improvement in condition (45%),distance from hospital (43.5%), unsatisfied with treatment (43.5%),worsening of symptoms (18.5%), family issues (9.5%), re–admission (7.5%), influenced by other patients (1%) and language barrier (0.5%). Medical conditions included addiction to alcohol (2%) and decision to go for alternative treatment (2%).

The hospital related factors were: Expensive hospital stay (60%), ineffective care (28.5%), inefficient staff (27%), unnecessary diagnostic procedures (25.5%), long waiting time (18%), neglected by hospital staff (16%), uncomfortable hospital stay (11.5%), crowded hospital (4%), inadequate facilities (3.5%), improper communication by staff and strict hospital policies (3%).

The third objective was to assess the impact of the quality of patient care on discharge against medical advice patients in a tertiary care hospital. The study result shows that Quality related issues do have a significant impact on DAMA. The quality related issues consist of the following sub areas: Wanted to go to other hospital (77.5%), no improvement in patient condition (45%), unsatisfied with treatment (44.5%), inefficient staff (27%), ineffective care (20.5%), worsening of symptoms (18.5%), neglected by hospital staff (16%) and uncomfortable hospital stay (11.5%). Inferential statistical analysis shows a significant association between the demographic variables like education and financial burden and expensive hospital stay ($p<0.05$).

Ethical Clearance: Taken from Institutional ethics committee

Source of Funding: Self funded

Conflict of Interest: Nil

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Body Mass Index and Suicide

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ABSTRACT

Background: In recent years a growing body of evidence have suggested an association of Body Mass Index with suicide. Most researches favoured inverse linear relationship between the two i.e. suicide decreases with increase in body mass index. The current research aims to find out mean body mass index score difference between suicide and non-suicide groups and to examine the association between body mass index and suicide in Indian scenario.

Method: Case-control study was conducted in the Department of Forensic Medicine and Toxicology, Gandhi Medical College, Bhopal. 171 study sample (cases N = 121, controls N = 50) brought for medicolegal autopsy were selected. Height and weight measured, body mass index calculated and categorised. Data were analysed using R version 3.3.3.

Conclusion: Victims of suicide had lower mean body mass index compared to control ($p < 0.001$). The study resulted in inverse linear relation between body mass index and suicide between BMI < 18.5 kg/m^2 to 24.99 kg/m^2. Association between BMI and suicide is inverse but not strong in overweight.

Keywords: *Body Mass Index, Suicide, Autopsy, Manner of death.*

INTRODUCTION

Body Mass Index[1] (BMI) is an anthropometric index of obesity based on weight and height, defined as weight in kilograms divided by height in meters square (kg/m^2). BMI, as a measure of relative obesity, has flaws most importantly the index cannot distinguish between heaviness due to adiposity, muscularity, or edema.[2] Despite this flaw, BMI has great merit that the measurements can be made easily with a fair degree of accuracy. These advantages are widely utilized in epidemiology, and in individual patient assessment. Current classification system of obesity is based on BMI.[3]

Suicide is the act of deliberately killing oneself. [4] It is described in International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) as Intentional self-harm (X60-X84). [5] In year 2015, worldwide, about 8,00,000 people committed suicide. [6] In India, during the same period, 1,33,623 persons committed suicide.[7]

Anthropometric indices of obesity as predictor of suicide was first studied by Paffenbarger and Asnes (1966).[8] In recent years a number of studies have reported the association of BMI and suicide, with generally similar results–a stepwise lower risk of completed suicide with heavier BMI, throughout the normal, overweight, and obese ranges (i.e., from 18.5 to ≥ 30 kg/m^2). Cumulatively the studies suggest an association is not by chance alone. [8-13] In a few studies no association could be found.[14-16]

Most of the studies relating BMI to suicide were conducted in the Western countries. The objective of the current study is to examine the difference between mean BMI score between cases (suicide group) and controls (non-suicide group) and to find out association, if any, between BMI with the suicide in a postmortem study in Indian scenario.

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METHOD

The case-control study was conducted in the Department of Forensic Medicine, Gandhi Medical College, Bhopal (M.P.) during the period September, 2014 to November, 2015. Study samples (N = 171) were deceased brought by police for medicolegal autopsy. Cases (N = 121) were those who commited suicide whereas controls (N = 50) had manner of death other than suicide.

History of the incidence was obtained from inquest papers, hospital records and from available relatives. Death-to-postmortem interval was estimated from hospital records, inquest papers, and history. In cases where information differs between inquest papers and history by relatives, the time when the deceased was last seen alive was used as a proxy for time since death. Length (vortex-to-heel) and weight of the deceased were taken in supine position, after removing clothes and articles. Weight was measured on digital weighing scale with accuracy upto 0.020 kg. Deceased body length was taken by placing two vertical aluminum square tubes, one at head end and another at heel. The horizontal distance between the two aluminum tubes were measured using another metallic tube mounted with measuring tape (accuracy upto 0.01 meter). Weight and length were measured up to two decimal places. BMI was calculated using the following formula. BMI obtained was categorized according to standard weight status categories (Table 1).

$$\text{BMI (in kg/m}^2\text{)} = \text{Weight (in kg)}/(\text{Height (in meter)}^2)$$

Known cases of suicide brought for medicolegal autopsy; both genders, male and female; and samples with age between 15 to 60 years were included in the study. Exclusion criterias were decomposed or mutilated bodies; duration of hospitalization more than 24 hours, death-to-postmortem interval more than 24 hours, clinical history of ascites, renal disease or cardiovascular disease and, in case of females, history of or postmortem finding of pregnancy.

Statistical analysis were performed using R version 3.3.3 after removing the identification data. A two-tailed p-value < 0.05 was considered statistically significant.

Table 1: The International Classification of adult underweight, overweight and obesity according to BMI

Classification		BMI (kg/m²)	
		Principal cut-off points	**Additional cut-off points**
Underweight		< 18.50	
	Severe thinness		< 16.00
	Moderate thinness		16.00 - 16.99
	Mild thinness		17.00 - 18.49
Normal range		18.50 - 24.99	18.50 - 22.99
			23.00 - 24.99
Overweight		≥ 25.00	
	Pre-obese	25.00 - 29.99	25.00 - 27.49
			27.50 - 29.99
Obese		≥ 30.00	
	Obese class I	30.00 - 34.99	30.00 - 32.49
			32.50 - 34.99
	Obese class II	35.00 - 39.99	35.00 - 37.49
			37.50 - 39.99
	Obese class III	≥ 40.00	

Table 2: Distribution of study population according to BMI

BMI categories	Study Sample							Total
	Case			Control				
	N	Ncol%	Nrow%	N	Ncol%	Nrow%	N	Ncol%
Underweight	29	24%	94%	2	4%	6%	31	18.13%
Normal	81	67%	69%	37	74%	31%	118	69%
Overweight	11	9%	50%	11	22%	50%	22	12.87%
Total	121	100%	70.76%	50	100%	29.24%	171	100%

Table 3: Descriptive Statistics

Study Sample	BMI Category	N	BMI (Mean ± SD) (kg/m^2)
Complete sample		171	21.24 ± 2.92
Case		121	20.39 ± 2.63
	Underweight	29	17.37 ± 0.77
	Normal	81	20.67 ± 1.35
	Overweight	11	26.32 ± 1.04
Control		50	23.27 ± 2.58
	Underweight	2	18.32 ± 0.01
	Normal	37	22.43 ± 1.59
	Overweight	11	27.02 ± 0.83

Table 4: Comparison of Group Means

Groups	t (df)	p-value	95% CI
Case vs. Control	t(169) = -6.55	< 0.001	-3.75, -2.01
Underweight (Case vs. Control)	t(28.26) = -6.67	< 0.001	-1.24, -0.66
Normal (Case vs. Control)	t(116) = -6.21	< 0.001	-2.32, -1.12
Overweight (Case vs. Control)	t(20) = -1.75	0.096	-1.54, 0.14
Case (Underweight vs. Normal)	t(87.06) = -15.99	< 0.001	-3.71, -2.89
Case (Normal vs. Overweight)	t(90) = -13.35	< 0.001	-6.49, -4.81
Case (Underweight vs. Overweight)	t(38) = -29.88	< 0.001	-9.55, -8.34
Control (Underweight vs. Normal)	t(36.1) = -15.75	< 0.001	-4.64, -3.58
Control (Normal vs. Overweight)	t(32.58) = -12.67	< 0.001	-5.33, -3.85
Control (Underweight vs. Overweight)	t(10.03) = -34.56	< 0.001	-9.26, -8.14

Table 5: Analysis of linear trend between BMI and suicide

BMI category	Case	Control	Odds Ratio	X^2	p-value
Underweight	29	2	1.00	13.46	< 0.001
Normal	81	37	0.15		
Overweight	11	11	0.07		

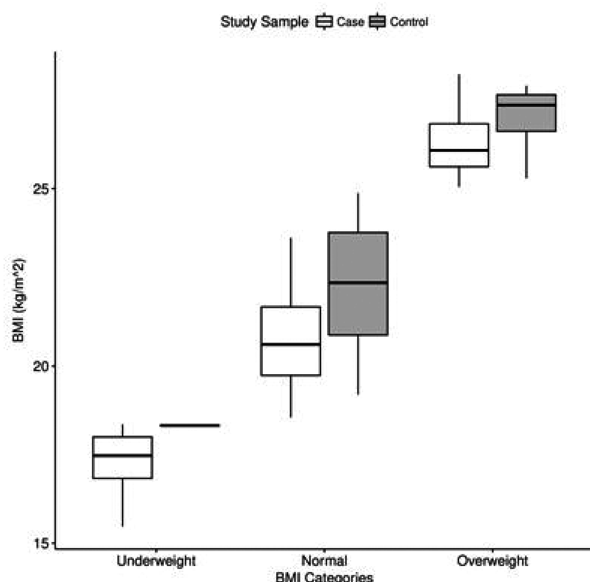

Figure 1: Difference of Mean between Cases and Controls by BMI categories

RESULTS

Study sample (N = 171) comprises of 70.76% cases and 29.24% controls. Normal BMI category (18.50 – 24.99 kg/m^2) forms 69% of the study population (N = 118). Underweight (18.13%, N = 31) and overweight (12.87%, N = 22) forms the rest. No study sample, either case or control, with BMI ≥ 30 kg/m^2 was found during the study period.

Significant difference (t (169) = -6.55, p < 0.001, 95% CI: -3.75, -2.01) in mean BMI score between cases (20.39 ± 2.63 kg/m^2) and controls (23.27 ± 2.58 kg/m^2) suggests, overall, BMI does have an effect on manner of death. Difference in mean BMI between cases and controls in underweight and in normal BMI categories were also significant (p < 0.001). In overweight, comparison of mean between case (26.32 ± 1.04 kg/m^2) and control (27.02 ± 0.83 kg/m^2) was not significant (p > 0.05). (Figure 1)

BMI (underweight vs. normal) differs significantly between suicide and control samples (X^2(1, N = 149) = 7.88, p < 0.001). Significant difference was also observed for BMI (underweight vs. overweight) between cases and controls (X^2(1, N = 53) = 13.13, p < 0.001). In contrast, BMI (normal vs. overweight) do not differ significantly between cases and controls (p > 0.05).

Linear trend between BMI and suicide show that, overall, death by suicide decreases with increase in BMI (X^2= 13.46, p < 0.001). The odds ratio compared with BMI < 18.50 kg/m^2 were 0.15 and 0.07 for BMI 18.50–24.99 kg/m^2 and BMI 25.00–29.99 kg/m^2 respectively.

DISCUSSION

This case-control study was conducted on 171 postmortem samples (121 suicide and 50 control) to explore the mean BMI score difference between cases and controls; and to explore the association between BMI and suicide.

In the current study the cause of small sample size is stringent inclusion and exclusion criteria, so the BMI is least affected by antemortem pre-existing disease and/or by postmortem changes. The present study is the first study, to the best of our knowledge, to relate obesity to suicide in Indian setting.

Samples in the current study belong to both genders, age from 15 to 60-years and both married and unmarried. As suicide is observed in both genders, this study included both male and female; this is in contrast with the studies where study participants were male only. [9,10] Most of the researches were done in age > 18 years old population, except for the study conducted in 11 Caribbean Islands [15] which included age group 15–100 years in the study. The present study included cases between 15 to 18 years, provided they fulfill selection criteria, keeping with the finding of National crime record bureau (NCRB). According to NRCB in 2015, 7% of suicides occurred in the age group below 18 years. [7] On the other hand, samples over age > 60 years were excluded from the study, because in older age group many possible disease confounders may be present which may affect the results of the study.

In the study BMI ≥ 30 kg/m^2 were not found fulfilling the selection criteria. Hence, the study was restricted to underweight, normal and overweight BMI categories. The study resulted in a significant difference in mean BMI score between cases (20.39 ± 2.63 kg/m^2) and controls (23.27 ± 2.58 kg/m^2), p < 0.001. The finding is consistent with other studies. In this study comparison of mean of overweight subgroup between case (26.32 ± 1.04 kg/m^2) and control (27.02 ± 0.83 kg/m^2) was not significant (p > 0.05). These results suggest that overall, BMI does have an effect on manner of death.

The current study shows suicide decreases with increase in BMI in underweight, normal and overweight

BMI categories. Odds ratio between BMI groups compared to underweight were 0.15 and 0.07 for normal and overweight groups respectively (= 13.46, p < 0.001). This suggest decrease in suicide with increase in BMI from Underweight to Overweight. The study suggests an inverse linear tendency between BMI and suicide. This inverse linear relation between BMI and suicide is supported by studies despite racial and geographical differences.[9-12,17]

In contrast to present study a prospective cohort of 1.1 million adults resulted in nearly equal adjusted hazard ratios for completed suicide for BMI values < 18.5 (0.99 (95% CI: 0.72, 1.37)) compared with a BMI of 18.5-22.9 kg/m^2. [13] Study on cohort of Taiwanese people resulted in an increased risk of suicide in both underweight and extremely obese subjects which is different from our finding. There was a non-linear, J-shaped association between BMI and suicide risk (p for the quadratic term = 0.033). Compared with individuals whose BMI was 18.5–22.9 kg/m^2, adjusted hazard ratios for those with a BMI < 18.5 kg/m^2 or ≥ 35 kg/m^2 were 1.56 (95% CI: 1.07, 2.28) and 3.62 (95% CI: 1.59, 8.22), respectively.[18]

On the other hand, ecological study in the Caribbean Islands[15], National Mortality Follow-back Survey data[14], and South Australian autopsy cohort [16] have found no association.

CONCLUSION

The study resulted in significant difference in mean BMI score between cases (suicide) and controls (non-suicide) (p < 0.001) suggesting BMI does affect manner of death. Overall, suicide decreases with increase in BMI specifically in underweight and normal BMI category. Association between BMI and suicide in overweight is inverse but not strong.

Stringent inclusion and exclusion criterias were main strength of the study, though it resulted in small sample size. Such strict criterion were necessary to ensure the BMI measurement is least affected by antemortem pre-existing disease and/or by postmortem changes. Information on any incident psychiatric disorders or suicide attempts suffered by study samples was not obtained. Nevertheless, there is no clear indication that the presence of such disorders at baseline greatly influenced any of our assessments of BMI-suicide associations. [9] This study has limitations too, most importly single measurement of BMI and study cohort is a selected population of medico-legal cases referred by police for medicolegal autopsy.

Study with longitudinally design and a larger sample size may provide additional insight into the issue. Healthy diet, regular exercise, regulation over sale of insecticides and pesticides, and establishment of help centers for the person who are at the moment of psychological conflict or crisis, are among other recommendations of this study.

Ethical Clearance: Taken from Institutional Ethics Committee, Gandhi Medical College, Bhopal

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A Study on the Association Between Extradural Hemorrhage and Skull Fractures in Head Injury

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ABSTRACT

Fatal Intracranial haemorrhages have always been a major cause of mortality especially in traumatic head injuries. With the exponential growth in motor traffic and drastic changes in lifestyles, trauma especially involving the head has been a saddening reality in today's advanced urban life. This study involving 235 cases of deaths due to intracranial haemorrhages of varying aetiologies, specifically focuses on the propensity of association between Extradural Haemorrhage and skull fractures. It has been revealed in this study that of the various types of haemorrhages involving the brain, Extradural Haemorrhage is the least common, accounting for a meagre 3.8% (9cases) of the total number of cases. A total of 111 cases involved in the study manifested with skull fractures on the whole. Eight out of the aforementioned nine cases (88.8%) with Extradural Haemorrhage showed associated skull fractures. It therefore supports the observations made by several previous researchers that Extradural Haemorrhages are almost always associated with a fracture of the skull with exceptions that has mostly to do with age of the victims.

Keywords: *Extradural Haemorrhage, Skull fracture, Intracranial Haemorrhages.*

INTRODUCTION

Intracranial haemorrhage can be caused due to traumatic brain/ head injury or due to natural causes. Traumatic causes being road traffic accidents fall from height, railway incidents, assaults and other accidents. Natural causes being strokes, tumours and bleeding disorders to name a few. Fatal intracranial haemorrhages cause one million deaths in India annually. Regardless of severity of the head injury, there is always a possibility that intracranial haemorrhages may arise. According to Bullock and Teasedale two thirds of patients presenting in coma had intracranial haematoma. These may be present at the time of injury, or develop secondarily or expand later on[1].

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Most cases of Extra Dural Haemorrhage (EDH) are associated with skull fractures and lie immediately below the fracture at the site of impact. It consists of an ovoid mass of clotted blood that lies in between the skull and the duramater. It is uncommon and present in only 5 to 15 % of fatal head injuries and 85%of them are associated with fractures[2, 3]. In one study by Rowbotham, these cases represented about 3 to 5% of any large series of acute cerebral trauma[4]. Their incidence amongst head injuries in the post-mortem rooms is somewhat lower, since many are cured by surgical intervention[5]. Extradural haemorrhage is almost always due to trauma, chief exception being blood dyscrasias of infancy[6].

Extradural bleeding commonly occurs in the presence of a skull fracture that causes the dura to separate from the bone, causing tears in the blood vessels (mostly the middle meningeal artery) and sinuses. In individuals with more elastic skulls, particularly children, skull deformation separates the dura and skull and causes an extradural haematoma without a skull fracture being present. Rare case reports with extradural haematomas without skull fracture have been reported in adults below 30 years of age[7]. Although a skull

fracture is a prerequisite, the haematoma occurs only in about 20 percent of all skull fractures. And in relative correlation, 85% of extra dural haemorrhages are found to be associated with fractures[8]. The commonest area of occurrence of an extradural haematoma is the sides of the head on the convexity or the lateral aspect of the cerebral hemispheres. Around 70% of extradural haemorrhages occur in tempero-parietal area corresponding to an overlying fracture of the squamous temporal bone.[3]

This study endeavours to evaluate the propensity of an association between extradural haemorrhage and skull fractures and to put it into perspective against available evidence on the same.

MATERIALS AND METHOD

235 cases of deaths due to fatal intracranial haemorrhages brought to the mortuary wing of Government Medical College, Thiruvananthapram for autopsy over a time span of eight months were utilized for the purpose of this study. Objective findings including types of intracranial haemorrhages and skull fractures, entered in the post-mortem certificates recorded during autopsies were collected, and the data thus collected was analyzed using SPSS software.

RESULTS

235 cases of Fatal Intracranial haemorrhage victims autopsied in the Department of Forensic Medicine, Government Medical College Thiruvananthapuram were analyzed and studied.

Age and sex incidence: The maximum number of victims of fatal Intracranial haemorrhages were in 51to 60 year age group(47), closely followed by age group 71 to 80 years(45) and the minimum number of victims were in 21 to 30year age group (1), there were only 2 victims below 10 years. There were 10 victims in age group of 11 to 20 years, 33 in 31 to 40 group, 38 in 41 to 50 years, 47 in 51 to 60years, 38 in 61 to 70, 14 in 81 to 90, 7 in 91 to 100 age groups.

Table 1: Age incidences in victims of Intracranial Haemorrhages (N = 235)

Age in years	Frequency	Percent
0-10 years	2	0.8
11-20	10	4.6
21-30	1	0.4
31-40	33	14.3
41-50	38	16.0
51-60	47	19.8
61-70	38	16.0
71-80	45	19.0
81-90	14	5.9
91-100	7	3.0
Total	235	100.0

Conted…

Sex incidence of victims: out of 235 cases of fatal intracranial haemorrhage, 186 victims were males and 49 were females.

Table 2: Showing Causes for Intracranial Hemorrhages (N = 235)

Cause of injury	Frequency	Percent
RTA	150	63.7
Fall	31	13.1
Railway occurrence	16	6.8
Natural	15	6.3
Assault	8	3.4
Other occurrences	13	5.5
Not known	2	0.8
Total	235	100.0

Types of intracranial hemorrhages: Among the cases of Intracranial haemorrhages, extradural haemorrhages(EDH) was seen in 9 cases (3.8%), subdural haemorrhages were seen in 173 cases(73.6%), sub arachnoid haemorrhages were seen in 228(97.02%), intra parenchymal haemorrhages were seen in 19 cases(8.08%), and intraventricular haemorrhages were seen in 28cases (11.9%).

Table 3: showing types of intracranial haemorrhages

Intracranial haemorrhage	n	%
Extradural	9	3.8
Subdural	173	73.6
Subarachnoid	228	97.02
Intraparenchymal	19	8.08
Intraventricular	28	11.9

Table 4: showing the incidence of skull fractures in cases of intracranial haemorrhages (N = 235)

Skull fracture	Frequency	Percent
Present	111	47.2
Absent	124	52.7
Total	235	100.0

Proportion of extradural haemorrhages associated with fractures of skull: Among the 9 cases of extradural haemorrhages, 88.8% of cases were associated with fracture and 11.2% cases revealed no fractures.

Table 5: showing proportion of Extradural Haemorrhages associated with fractures of skull

Extra dural Haemorrhages	n	%
With fractures	8	88.8
Without fracture	1	11.2
Total	9	100

DISCUSSION

The objective of the study was to find out the proportion of cases with Extra dural Haemorrhages associated with skull fracture.

Age and Sex incidence: In the present study, among the 235 cases of Intra Cranial Haemorrhages the maximum incidence was in sixth decade with 47 victims. This observation did not correlate with studies of Raja Ram[9] and Rajeev[10] where the maximum age incidence was in fourth and fifth decade respectively. The difference in this incidence could be due to the changes in patterns of deaths over a period of time due to increased life expectancy, changes in life style and modes of transport and also due to the fact that the age groups from 30 to 60 years are the main bread winners, and ply more frequently on the roads. The minimum incidence was in third decade. This was not in agreement with the study by Rajeev and Rajaram, which could be explained as these particular age groups were found to be using high-end bikes with better safety and sophisticated balance features compared to other age groups, and if they happen to meet with an accident, they tend to recover earlier given their better state of health.

Sex Incidence: The majority of the victims in the present study were males (79.3%) followed by females (20.7%), which is in complete agreement with all the studies, where male involvement was definitely higher than females. This observation could be due to increased use and exposure to vehicles and occupation by males in our society. Males are also the main bread winners, especially in lower and middle socio-economic strata.

Skull fracture: Fractures of skull were seen only in 47.2% of the cases in the present study. This was not in agreement with the studies of Rajeev (64%), Rajaram(73%) and Vijayakumar(57%)[11].The reason for the increase in incidence of intracranial haemorrhages without skull fractures may be due to the increase in high velocity accidents where the mechanisms of injury are due to acceleration-deceleration shear strains rather than the effects of a direct impact.

In the present study the Extra Dural Haemorrhage had the least incidence of 3.8%, which was in agreement with the observations of Rowbotham who stated that EDH was uncommon and accounted for only 3 to 5% of cases of any large series of cerebral trauma[4]. There was only one case of extradural hematoma in the present study which had occurred without accompanying skull fracture. This was a case of a 14year old boy who showed bilateral frontal EDH. The above observation agrees with the fact that younger and elastic skulls can present with EDH without fracture although it's a rare occurrence. It is also consistent with the observation made by Galbraith[7]. The aforementioned case also showed bilateral Extra dural Haematoma. Hence, this observation agrees with that of Mckissock et al who stated that bilateral EDH was a very rare occurrence.[12]

In the present study, there were 47.2% instances of skull fractures, but only3.4% of them had extra dural haemorrhages. This agrees with the opinion of Lindenberg, who stated that even though a skull fracture is a prerequisite, only less than 20% of skull fractures are associated with an Extra dural Haematoma[8].

CONCLUSIONS

1. The maximum age incidence for sustaining intracranial haemorrhages including Extradural Hemorrhage in general was in the 6thdecade (19.8%).
2. Males constituted majority of the victims (79.3%) in the present study in deaths due to intra cranial haemorrhages.

3. The commonest intracranial Haemorrhage was Sub arachnoid haemorrhage (97%), followed by Sub dural haemorrhage (73.6% of the cases), Intraventricular haemorrhage (11.9%), Intraparenchymal haemorrhage (8.1% of cases), the least common being the incidence of Extradural haemorrhage, (3.8 %.)
4. Among the cases of Extradural haemorrhages, 88.8% of cases were associated with skull fracture and in11.2% of cases they were not.

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

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A Rare Case of Suicide by Multiple Gunshot Wounds to the Head

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ABSTRACT

Firearm injuries represent a significant topic of forensic pathology. The literature in this regard is innumerable, and can seem to have extensively covered the topic of this paper. However, the biological reality and the unpredictability of the concrete cases, continue and will always continue to present unusual circumstances that are worth examining for forensic pathologists. In this case report, we performed a comparative analysis between a particular case and the scientific literature. The case in question concerns suicide by single-shot short firearm, in which the subject shot himself three times on two sides of the head, without affecting the brain during its self-suppressive intent. Cases similar to this are always cause for reasonable doubt, which can only be solved with the contribution of forensic pathology and in-depth research.

Keywords: *forensic science, multiple gunshot wounds to the head, suicide, ability to act, firearms, suicide, gunshot injury*

INTRODUCTION

According to the data from the Italian Institute of Statistics (ISTAT) on total suicide rates in 2014, the percentage of suicide by gunshot wounds was 11.3%. Firearm injuries with suicidal purpose are therefore a significant component of the total medical-legal cases[1-3]. Ordinarily, it is commonly believed that use of a firearm is an immediate and painless way of achieving suicide. However, suicide with multiple gunshots is mentioned in the literature, although quite rare, it occurs when there is a non-immediate onset of subject's incapacitation[4,5]. The authors submitted a rare case of suicide with three self-inflicted gunshot wounds to the head.

Case Report: A 75-year-old man was found dead in his home. Through the information reported by the family members, the victim's psychological profile was characterized by various overlapping medical problems that would have caused the onset of deep depression, enhanced by the news of having to undergo permanent dialysis and another surgery to create an arteriovenous fistula. Investigators also learned from the victim's son that his father had already stated in the past the will to act insane if he had not been self-contained. At the crime scene investigation, the corpse was found supine on the bed, with the right arm flexed on his chest and the left positioned on the bedside table, his head was facing the roof and the lower half limb was protruding from the bed (figure 1). A "STAR" brand handgun was found on the nightstand near his left hand; also, a 7.65 caliber bullet and a case were found nearby on the floor. Unused bullets of the same size were also found in the kitchen, with a letter from the victim. The corpse was wearing a white-colored long-sleeved jersey and blue pants heavily covered in blood, two plastic sheets and numerous towels were placed on the bed beneath the body. The puddle of blood, at the time of the inspection, extended from the left shoulder of the jersey to the entire right side of the chest, and a lot of blood was found on the trousers. Blood splatters were found in other parts of the house: in the bathroom on the sink, on the bedroom closet, and near the doorjambs. A scratch caused by one of the bullets and small blood stains were also found on the wall behind the bed.

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Autopsy Findings: Twenty-four hours after the crime-scene inspection, the autopsy examination was performed according to the guidelines of the Italian Group of Forensic Pathology (GIPF) in case of death due to gunshot wounds[6]. The presence of a star-shaped entry hole with frayed edges was found on the left mandibular angle with the involvement of the ear lobe, from which there was a deep hole starting from the underlying planes and terminating behind the left ocular bulb with traumatic left eye enucleation (figures 2, 3). There were also two additional entry holes, both located on the right jaw and covered with a bloody gauze (figure 4, 5). The medial hole was in the mandibular body and the lateral hole was near the corner of the mandible. The two sites were observed using a probe; the medial entry hole had a superficial interface that resulted in a maximum 2.8 cm semicanalicular-shaped exit wound. At the opening of the oral cavity, there was extensive ecchymosis on the mucous membrane of the entire right cheek, with the absence of continuous solutions. The lateral entrance hole was deep into the underlying tissues with a downward-upward direction, a right-to-left inclination with a posterior obliquity, ending in an exit hole irregularly oval-shaped at the level of the left eyebrow in the medial position. The cadaveric dissection was performed revealing the following findings: a bilateral infiltration of temporal bones, the integrity of the cranial vault, with congestion of the leptomeninges (figure 6). The brain presented a normal shape and size with edema, did not exhibit significant traumatic alterations except a modest subarachnoid hemorrhagic spread in the left frontal lobe (figure 7). We also observed that the basal vessels and neurocranial bones were intact. By prolonging the scalp up to the nasion, chipping of bone tissue from the left orbit medial angle was observed. The enucleation of remaining tissue of the left eye showed the dislocation and fracture of all periorbital bones. Nothing worth noting was observed at the chest level, while at the abdominal level the organs appeared pale, the spleen was shrunken and there was a slight presence of hypostasis.

Toxicological Findings: Biological samples (femoral blood, urine, bile, brain and liver) were collected to perform toxicological analyses during the autopsy. Enzyme immunoassays of bile and urine were performed. GC/MS of bile, blood and urine did not show any presence of drug-related peaks or antipsychotic drugs. The blood alcohol content was 0.05 g/L.

Figure 1: the corpse was found supine on the bed, with right arm flexed on his chest and the left positioned on the bedside table, his head was facing the roof and the lower half limb was protruding from the bed. A scratch caused by one of the bullets and small blood stains were also found on the wall behind the bed

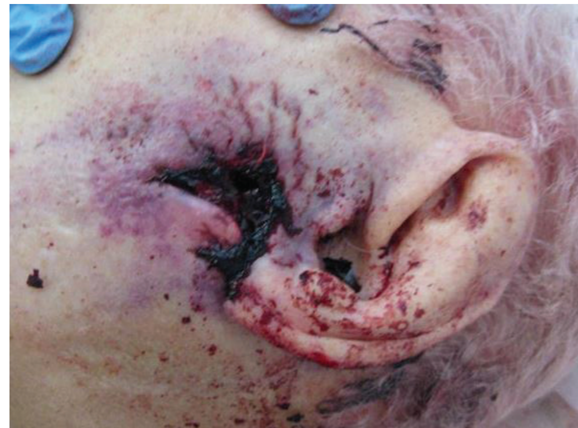

Figure 2; Figure 3: at the left mandibular angle, there was the presence of a star-shaped entry hole with frayed edges with the involvement of the ear lobe, from which there was a deep hole starting from the underlying planes and terminating behind the left ocular bulb with traumatic left eye enucleation

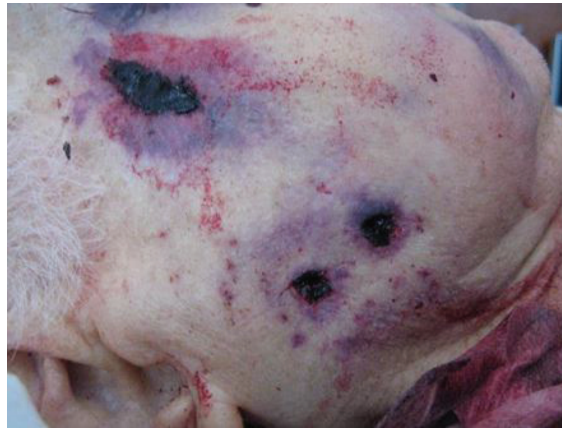

Figure 4; Figure 5: two additional entry holes, both located on the right jaw

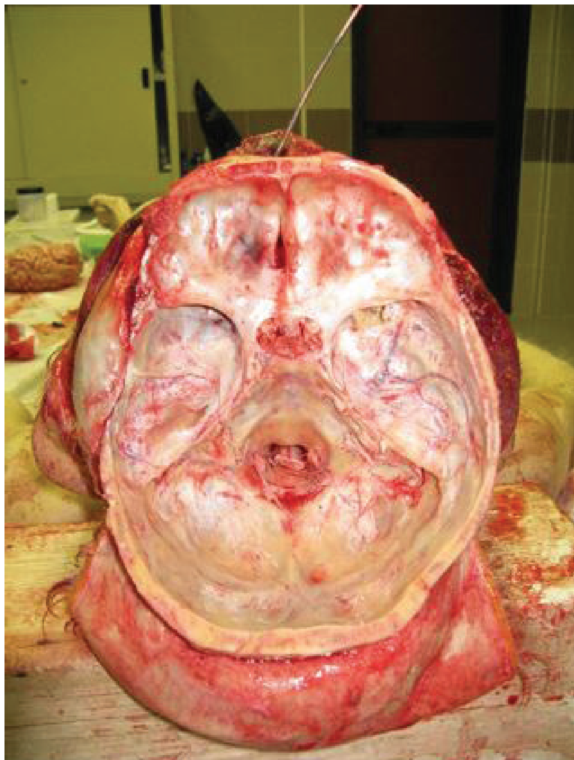

Figure 6: no fractures of the cranial bones were found

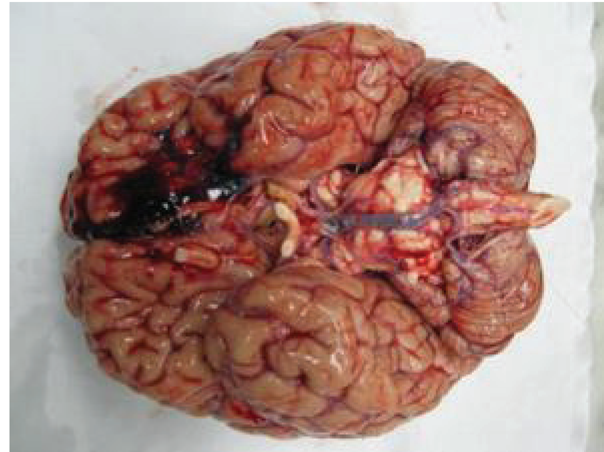

Figure 7: the brain presented a normal shape and size with edema, did not exhibit significant traumatic alterations except a modest subarachnoid hemorrhagic spread at the level of the left frontal lobe.

DISCUSSION

Suicide by firearms represents a significant topic of forensic pathology, but it rarely involves multiple self-inflicted gunshots. The occurrence of suicide by multiple wounds (gunshots or sharp force injuries) is usually linked to a psychiatric illness[7]. The frequency varies between 1% and 8% of all suicides with firearms, based on the nationality of the sample being analyzed [8-13]. These percentages also have a high degree of variability in relation to permissive laws on firearm possession, also because they include suicidal events with gunshots to different parts of the body not just to the head. Specifically, compared with the results found in the literature, the location and number of victim's self-inflicted blows to the head without causing immediate death, essentially represent the peculiarity of this case. In fact, the subject was able to move around the various rooms of the apartment after the first two shots, even roughly medicating the two entry holes with gauze, before the last shot was fired, which was likely responsible for the loss of consciousness. This fact is indicative, at least initially, of slow blood loss, probably less than 25% of the total volume, which became significant with the third blow responsible for the rapid incapacitation of the subject until death[5]. The subject's extended survival is mainly attributable to the sagittal position of gun during the shot. Johnson et al. report that it is statistically evident that the sagittal direction of shots with an entry hole near the jaw are associated with minor fatalities, since the bullet hitting

the bone structure of the splanchnocranium disperses a substantial part of its kinetic energy before entering the brain. The subject examined in this case didn't have any traumatic direct lesion to the brain, because the first two gunshots did not injured the neurocranium, while the last gunshot caused a hemorrhagic suffusion of the left frontal lobe, due to indirectly propagating the kinetic energy through bone structures[14,15]. Therefore, considering the findings from the inspection and autopsy, the cause of death was attributed to an hemorrhagic shock due to heavy blood loss consequent to three gunshot wounds, two of them did not damage the neurocranial membrane of the splanchnocranium, or cause lesions of particularly vascularized regions. The most reliable reconstruction hypothesizes that when the subject shot himself the first time he was holding the handgun with his right hand, the bullet entered the right mandibular region resulting in a deep hole into the subcutaneous underlying tissues, with a downward-upward direction, a slight tilt from right to left and slightly oblique back to front, which produced a semicanalicular-shaped lesion of the zygomaticotemporal process. After the first self-inflicted wound, the subject gripped the handgun once again with his right hand and shot himself for a second time on the right mandibular angle, the bullet perforated the splanchnocranium and exited medially from the contralateral eyebrow. Finally, the subject shot himself for the last time holding the handgun with his left hand, penetrating the left jaw corner and ending at the level of his left eye. The characteristics of the entry wounds indicate that the right-side shots were fired at close range, but not at a contact distance, while the contralateral hole, due to its star-shaped appearance and large dimensions, is compatible with a much closer firing distance, almost in contact with the skin.

CONCLUSION

Suicide by multiple gunshot wounds is a plausible conclusion, especially in cases where the subject's incapacitation is not immediate. However, in the literature it is now established that a significant percentage of subjects do not die and do not undergo immediate incapacitation even after more than two gunshots at a cranial level. In these cases, it is important to exclude a homicidal hypothesis through an in-depth analysis both in the examination and in the psychological history of the victim. However, a definite conclusion can only be reached by performing an autopsy, which allows for a clear understanding of the connection between the environmental findings and the actual disabling ability of self-inflicted lesions that caused the fatality.

Conflict of Interest: The authors have no conflicts of interest to declare.

Ethical Clearance: Informed consent was obtained from legal guardian for uses of the case materials for research purposes and publication findings.

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A Study to Estimate the Reliability of “Moritz Rule of Thumb-Method A and Method B” Method of Estimation of Time Since Death in Tropical Climate of Central India

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ABSTRACT

Background: There are numerous methods available for estimation of time since death (TSD) in early post-mortem interval. But, precise determination of TSD is always a big challenge. There are some methods which can be employed for precise determination of TSD, but those have been used in temperate climatic region, such as Henssge nomogram method and Moritz formula. This paper is a humble trial to test the reliability of Moritz formula in tropical climate of central India.

Methodology: A cross sectional study was carried out on 173 randomly selected cadavers which were brought for autopsy in department of Forensic Medicine & Toxicology, Gandhi medical college, Bhopal. After collecting routine data like age, gender, height, weight etc. following data were also collected – ambient room temperature, rectal temperature, known TSD, determined TSD by Moritz formula. Data were analysed by using SPSS software.

Conclusion: Moritz rule of thumb–method A and method B is a reliable method for determination of TSD in 24 hour time frame and in all time slots except that Moritz-A rule cannot be used in 0-6 hour time slot, both in <23 ºC & >23 ºC ambient temperatures in the present study circumstances.

Keywords: *Algor Mortis, Time since Death, rectal temperature, ambient temperature, Moritz rule of thumb.*

INTRODUCTION

Estimation of time since death is one of the most important objectives of postmortem examination. Exact time of death cannot be determined, except in very rare case, where wrist watch of the victim stopped due to drowning, the blow of a weapon or fall from height[5]. Time since death can be determined by physical and biochemical methods. Physical methods are rigor mortis, livor mortis, algor mortis, adipocere, mummification, and progress of decomposition. Biochemical methods constitute changes in blood, serum, cerebrospinal fluid etc. Out of all the methods employed no single method is yet capable of telling TSD precisely. Algor mortis is the cooling of cadaver, which happens due to difference of temperature between the cadaver and environment i.e. a temperature gradient develops[6]. There is heat dissipation from cadaver to environment at a certain rate, which is 1.5 degree centigrade per hour in temperate climate and 0.7 degree centigrade per hour in tropical climate[1] is called as rate of cooling. Various routes of temperature monitoring from cadaver are–rectal, infra-hepatic, tympanic membrane, cribriform plate, out of which rectal route is the ideal route for measurement of core body temperature. Rectal temperature ranges from 36.5 degree to 37.5 degree centigrade[1]. Insertion of thermometer in rectum is controversial, and cost-benefit analysis must be made, to decide if the difficulties of taking a rectal temperature are worth the small potential advantage of an earlier measurement[4]. In order to determine precise TSD there are several methods based on algor mortis

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and one of them is Moritz rule of thumb - method A and method B which have been used in temperate climatic region. This study aims to test reliability of the above mentioned method in tropical climate of central India. In 1954 Alan R. Moritz mentioned both formulae in his book "The pathology of trauma". The above mentioned methods was used by many to calculate the postmortem period. The first rule of thumb method is in degrees Fahrenheit[2] which is as follows;[3, 8]

TSD = (T-T1)/1.5

Where,

T = Rectal temperature at the time of death which taken as 37ºC or 98.6ºF by them.

T1 = Rectal temperature at time t1 in ºFahrenheit.

To convert degree Centigrade to degree Fahrenheit the formula used is -

(C x 9/5) + 32 = F

Method B is as follows:

TSD = (T-T1) + 3*

T = Rectal temperature at the time of death which taken as 37ºC or 98.6ºF by them.

T1 = Rectal temperature at time t1 in ºCentigrade.

* = often includes as compensation for possible delay in cooling, i.e. plateau.[2]

To convert degree Fahrenheit to degree Centigrade the formula used is -

(F - 32) x 5/9 = C

METHOD

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

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

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

Actual TSD (in hours) was calculated by subtracting the time of recording of rectal temperature from actual time of death. Then determination of TSD was done by formulae given by Moritz.

Data was analysed by using SPSS software.

Table 1: Comparison between known TSD and Moritz rule A & B TSD in 6 hour time slots

Time slot & number of samples	Mean time since death			P value	
	Known	Moritz A	Moritz B	Moritz A	Moritz B
0 to 6 hours, n = 41	4.15	3.61	6.02	0.326	0.000
6 to 12 hours, n = 48	9.68	6.6	8.6	0.000	0.028
12 to 18 hours, n = 56	15.27	9.07	10.54	0.000	0.000
18 to 24 hours, n = 24	20.83	8.46	10.17	0.000	0.000
0 to 24 hours, n = 173	11.75	6.94	8.83	0.000	0.000

Table 2: comparison between known TSD and Moritz rule A & B TSD in 6 hour time slots in ambient temperature <23 °C

Time slot & number of samples	Mean time since death			P value	
	Known	Moritz A	Moritz B	Moritz A	Moritz B
0 to 6 hours, n = 12	4.08	6.8	8.6	0.037	0.000
6 to 12 hours, n = 11	9.6	12	13	0.010	0.000
12 to 18 hours, n = 16	15.75	15.9	16.2	0.748	0.304
18 to 24 hours, n = 5	20	15.24	15.7	0.015	0.015
0 to 24 hours, n = 44	11.5	12.36	13.3	0.244	0.003

Table 3: comparison between known TSD and Moritz rule A & B TSD in 6 hour time slots in ambient temperature > 23 °C

Time slot & number of samples	Mean time since death			P value	
	Known	Moritz A	Moritz B	Moritz A	Moritz B
0 to 6 hours, n = 29	4.1	2.3	4.93	0.000	0.029
6 to 12 hours, n = 36	9.4	4.8	7.0	0.000	0.000
12 to 18 hours, n = 42	15.2	6.6	8.5	0.000	0.000
18 to 24 hours, n = 19	21.1	6.7	8.6	0.000	0.000
24 hours, n = 129	11.8	5.1	7.2	0.000	0.000

RESULTS

This study suggest that average rate of cooling in the study sample is 1.0°F or 0.54°C. Males cool more rapidly than females. Extreme age group have extreme rate of cooling. ARC is inversely proportional to BMI. It was observed that cooling was inversely proportional to environmental temperature, not against Newton's law of cooling per se. Hospitalized cases cool in slightly faster rate than non-hospitalized cases. Cooling is fastest when cause of death is Myocardial Infarction, followed by drowning and strangulation, then road traffic accidents. Minimum ARC is in the cases of deaths due to electrocution. It was observed that ARC was found to be slow initially and became rapid after three hours of death, then again decreased as temperature difference between corpse and environment decreases, following Sigmoid shaped curve, not as in Newton's law of cooling. In manner of death ARC is maximum in natural deaths then accidental and suicidal.

Moritz rule of thumb 'A' – It is reliable method for determination of TSD both on 24 hour time frame and 6 hour time slots except in 0-6 hours ($p = 0.326$), which were found to be statistically significant ($p < 0.05$) Table 1. In ambient temperature < 23 °C this method cannot be used to determine TSD in 24 hour time frame ($p = 0.244$) along with 12-18 hour time slot ($p = 0.748$) but it can be used in other time slots of 0-6, 6-12 & 18-24 hours which were found to statistically significant ($p < 0.05$) Table 2. In ambient temperature > 23 °C Moritz first rule can be used reliably for determining TSD both on 24 hour time frame and in all four time slots of 0-6, 6-12, 12-18 and 18-24 hours, which were found to be statistically significant ($p < 0.05$) Table 3.

Moritz rule of thumb 'B' – This method can be used reliably for determining TSD both on 24 hour time frame and in all four time slots of 0-6, 6-12, 12-18 and 18-24 hours, which were found to be statistically significant ($p < 0.05$) Table 1. In ambient temperature < 23 °C this method cannot be used to determine TSD in 12-18 hour time slot ($p = 0.304$) but it can be used in other time slots of 0-6, 6-12 & 18-24 hours and in 24 hour time which were found to statistically significant ($p < 0.05$) Table 2. In ambient temperature > 23 °C Moritz first rule can be used reliably for determining TSD both on 24 hour time frame and in all four time slots of 0-6, 6-12, 12-18 and 18-24 hours, which were found to be statistically significant ($p < 0.05$) Table 3.

DISCUSSION

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

It was evident from the results that Moritz both rules were appropriate in the present study circumstances except few conditions for which no explanatory literature was found. Although both methods have given good reliability for determination of TSD, it was also observed that method 'B' is more reliable than method 'A', and supported by Leonard Nokes in his book as he mentioned that "the rule of thumb (method B) produced the most consistent results"[2].

CONCLUSION

It can be concluded here that this study will be beneficial with respect to determination of TSD as Moritz rule of thumb A & B can applied for estimation of TSD in both types ambient temperature i.e. <23 °C & >23 °C, except in 0-6 hours in Moritz A formula. And if only < 23°C ambient temperature is considered then in 12-18 hour time slot both Moritz A & B formulae is not reliable to estimate the TSD in early postmortem interval in tropical climate of central India.

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

Source of Funding: Self

Conflict of Interest: Nil.

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Effect of Role Play Video-An Innovate Tool on Court Room Procedures to Educate Medical Graduates

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ABSTRACT

Background: There is a need to understand the concepts especially like court room procedures among the medical students as the practical experience is encountered in many medico legal cases in future as doctors. Creating an educational instructive video for promotion of understanding the concepts of forensic medicine among all budding doctors in their curriculum.

Aim and Objectives: To study the utility and assess of role play using videos in improving the knowledge and attitude of students regarding courtroom procedures in an Indian court.

Methodology: A descriptive questionnaire based study survey was done after obtaining informed consent from students. The pretest and posttest were randomized by giving a number to the students and also to avoid inter participation bias. Validation of questionnaire was then done. The video on court room procedure was done and validated with the help of forensic experts and lawyer colleagues. Statistical and comparison analysis was done.

Results: The present study about 222 second year medical students were assessed, the study showed gender and varied age distribution between 18 to 23 years. The study showed various aspects of knowledge and attitude. In knowledge component, some of the questions posed required a definitive positive or negative response. In the knowledge component, out of the total 28 questions posed, 22 questions showed highly significant changes [$p < 0.5$ significance] in the questionnaire results. In the attitude component about how a doctor behaves inside the court room, of the total 16 questions posed, 10 questions showed highly significant changes[$p< 0.5$ significance] in the questionnaire results.The study also showed various responses regarding the video and positively revealed that such an educational tool is needed and would definitely make a change in curriculum.

Keywords: *Educational tool; Court room procedures; Knowledge; Attitude; Role play videos.*

INTRODUCTION

Court room procedures are complex processes to understand. The exact situation and scenario to access these courts are difficult and the access is only through hypothetical scenes potrayed in television and in movies. Most medical curriculum lack practical exposure with respect to certain medico legal issues pertaining to the concepts of courtroom procedures, which they may face in the future as experts. There is a need for an educational tool to understand the concepts pertaining to these courtroom procedures.

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This project is an attempt to make the concepts easy and improve the understanding of students in handling forensic cases as an expert when they attend the courts. The study attempts to study the utility of role play using videos in improving the knowledge and attitude of students regarding courtroom procedures in an Indian court and to assess the use of role play video in improving the understanding of the legal system in court room procedure.

MATERIAL AND METHOD

Setting: Department of Forensic Medicine, KMC, Mangaluru

Target population: 2nd MBBS Students [3rd Semester].

Sample size: All students attending the classes.

Study design: Descriptive Study

IPPTeam: Forensic experts, Lawyers, Police, Professional Students, Nonteaching professionals.

Data collection: The study initially obtained a clearance from institutional ethical committee Kasturba Medical College after the study protocol was reviewed by the scientific committee. Permission from the Dean was acquired to approach the students and for collection of data from the students inside the classroom. Questionnaire based survey was done (after obtaining informed consent) from students which included following questions (Annexure)

a. Pretest and Posttest questionnaire of student's self-assessment of improvement in learning.

b. Student feedback on utility of video in enhancing their knowledge.

Based on feedbacks and suggestions, interventions were suggested and outcome of this study was evaluated in a better manner. The questionnaires was designed in order to have common understanding among participants. The pretest and posttest were randomized by giving a number to the students and also to avoid inter participation bias. Validation of questionnaire was then done. The video on court room procedure was done and validated with the help of forensic experts in the department and lawyer colleagues from SDM Law College, Mangaluru.

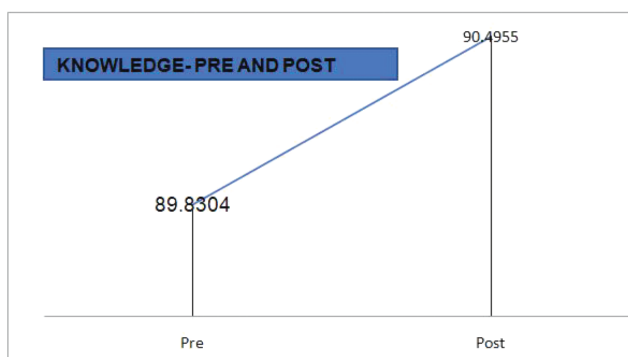
Data analysis: Statistical analysis was done on SPSS Ver. 17.0 Software. Comparison was found by applying students paired 't' test. Association was done by the chi square test and ANOVA. $P < 0.05$ was considered as significant.

RESULTS

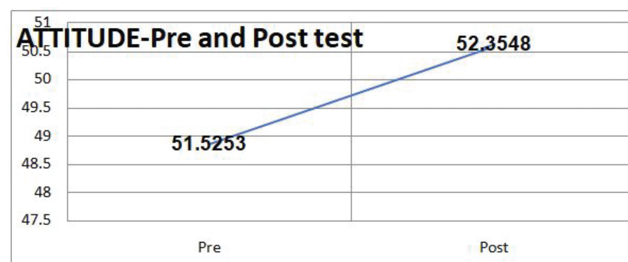
In the present study about 222 students were assessed, the study showed gender and varied age distribution between 18 to 23 years.

The study showed various aspects of knowledge and attitude. In knowledge component, some of the questions posed required a definitive positive or negative response. In the knowledge component ,out of the total 28 questions posed ,22 questions showed highly significant changes[$p < 0.5$ significance] in the questionnaire results .In the remaining 6 questions [Q.9,10,13,18,19,23] ,no significant changes were seen in pretest and post test results . In the attitude component about how a doctor behaves inside the court room, of the total 16 questions posed, 10 questions showed highly significant changes[$p< 0.5$ significance] in the questionnaire results. The remaining 6 questions [Q.2, 6, 9, 14, 15, 16] did not show significant changes in pretest and post test results.

The comparison of mean knowledge and attitude showed significant changes as depicted in the graphs below [Graph.1,2and 3].



Graph. 1: Showing the pre and post-test comparison knowledge results regarding the court room procedures

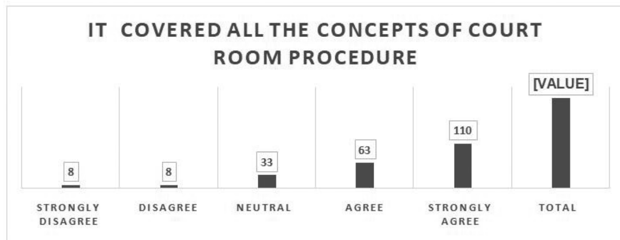


Graph. 2: Showing the pre- and post-test comparison in the attitude inside the court room

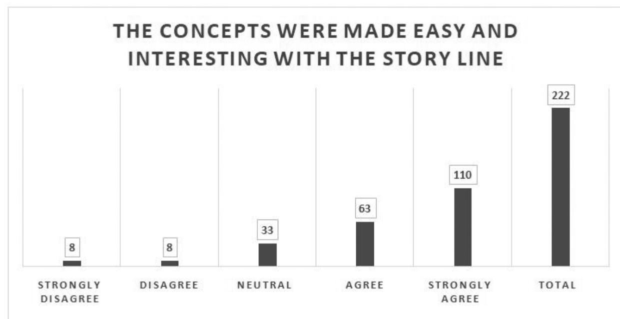
	PRE N = 224	POST N = 224	PAIRED DIFFERENCES		t	p
			MEAN	STANDARD DEVIATION		
KNOWLEDGE	89.8304	90.4955	0.6652	14.27153	0.698	<0.486
ATTITUDE	51.5253	52.3548	0.8295	11.08734	1.102	<0.272

Graph 3: Pre and Posttest Comparing knowledge and attitude among the study population

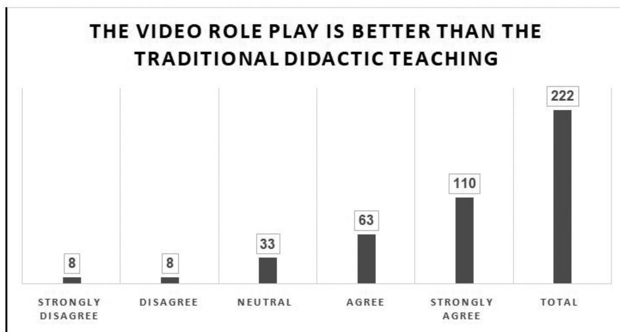
The study also analyzed the various aspects of video and its component and the uses of demonstration of video the results and depicted in the graphs [Graph.4,5,6] below.



Graph 4: Depicting response regarding video covering concepts among the study population

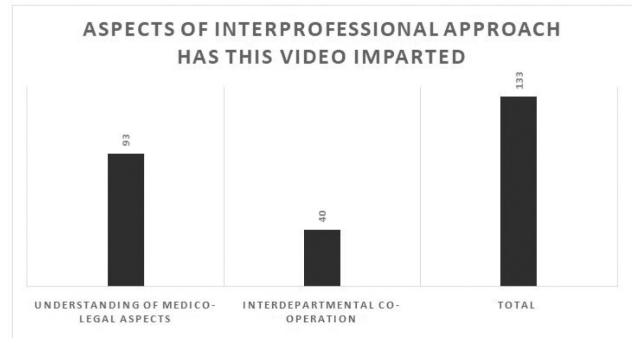


Graph 5: Depicting video response regarding made the concepts interesting with story line among the study population



Graph 6: Depicting video response regarding is better than traditional lectures

The study population were also analyzed to give their feedback about the role play video depicted in the following graphs [Graph. 7].



Graph 7: Depicting response regarding interprofessional approach in the role play video by the study group

DISCUSSION

Fadde, P et al[1] studies showed the usage of an interactive video in coaching a situation for an intellectual basis of developing teacher's self-reflection. To help trainee educators and to support the comment in the classroom regarding the teaching videos, two approach in interactive videos were designed. The first method was the trainee teachers to write their remarks when observing the short clips of video along with the experts done by video coding, based on qualitative research methods. This is compared with the remarks done by the experts before seeing and coding the succeeding video clip. Written explanations were involved by the experts in the second method of video viewing while in the first method, viewing the same video clips without writing down their interpretations were used after video coding. The written classroom report of posttest, showed the video observing group performed better than the video coding group and significantly better than a no-video control set. The above mentioned study portrayed the importance of use of video clips as an effective tool for understanding the various concepts which is at par with the results of the present study, however with the limitations

Calandra, B et al[2] research is concerning the effective use of improvement on teacher's reflection and also encouraging video editing of apprentice teachers' reflective practice[3]. The study used a qualitative study

design to observe two guided reflection activities for both the group of research trainees. The primary group were quizzed immediately with a coach after training their lesson and captured about critical things that occurred in the meeting. The subsequent group had no questioning, but to capture their programs on digital video, edit their video for two critical events, and replicate in written form using the same rubric as the earlier group. This found that students who developed video vignettes produced effective and more multidimensional reflections. The study was a significant footstep to facilitating learner teachers' development. The present study is however studied on the effectiveness of teaching concepts among the students and also on futuristic value and thereby improving their approach in some cases especially in attending courts.

Hannafin et al[4] studied the effect of how a digital video is been used to capture and evaluate a wide range of classroom teaching practices[5,6]. However these submissions are informal in nature and considered either risk- free or risk-neutral by teachers. The study done can be analyzed and assessed by" others" to determine the presence and/or quality of specific teaching practices. This becomes an emphasis on teacher's accountability, standards-based teaching, documentation of teacher progress, and performance evidence has spawned interest in these video related study. The present study was based on inter professional approach and based on views from all stakeholders and then delivered to students to create interest, educate and also to understand the concepts and attitude in court room procedures.

The outcomes of this study would be an improvement in understanding of concepts in dealing with court room procedures by students or creation an innovate tool of making role play education videos for departmental educational use. To make students become better experts while giving evidence in court or may be included in ethical course/curriculum in future. However there are limitations like the student and other stake holder's participation may not be active or making a video and coming up with a good story [Script] may be very difficult and then to make students to enact on the basis of script and most often funding agencies and time constrains are the major one.

CONCLUSION

This study is carried out to know an effective tool in assessing and to gauge the knowledge and attitude regarding the court room procedures amidst the second year MBBS graduates. The existing knowledge and attitude level between students were calculated using pretest as most of these concepts were delivered in the didactic lectures. Emerging in the improvement in the delivery of medical curriculum as an innovative interesting tool i.e. role play video, was selected to make the students understand the complex concepts like court room procedures. The results were fruitful and positive as it showed that this method of delivery can definitely help in the better understanding of the concepts and approach in such complex topics. This can be also included as a regular curriculum in subjects like forensic medicine to make the subject more interesting as it helps in knowledge assimilation. This method can be strongly recommended in training such concepts in medical curriculum. Periodic updating and revision of the techniques need to be done by seminars and workshops involving all the stakeholders to make it more effective and interesting so that there is a better tool in education on forensic or any medical concepts.

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Profile of Mortalities due to Alcohol and Drug Consumption in Road and Rail Traffic Accidents in Mangaluru, a Coastal City of Karnataka, India

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ABSTRACT

Objective: Several studies have demonstrated that driving under influence of alcohol and psychoactive drugs increases the risk of fatal accidents & hence increased mortality rates. This paper presents a retrospective study of Road & Rail traffic accidents in Mangaluru.

Method: Over a six-year period (2010-2015), a total of 5226 autopsies were conducted at Govt. Wenlock Hospital, Mangaluru out of which 1261 were Vehicular accidents (1117 - Road, 144 - Rail) .Various parameters were looked in these cases such as age groups, gender, type of Vehicle involved, Victim status, time of day, day of the week (weekdays/weekend), Season, type of intoxication, accident site etc.

Results: 15.85% (n = 177) of all the Road Traffic Deaths & 9.72% (n=14) of all Rail deaths occurred as a consequence of either alcohol (16.83%, n=188/191) or drug overdose (n=3). 42.93% of victims belonged to 56 and above age group. Most commonly the e the vehicle which were involved in accident were motorcycles (around 51.83% cases).

Conclusions: The results of this study reveals a strong positive association between the presence of alcohol and psychoactive drugs in road & rail traffic accident victims. The matter of grave concern is increasing trend of drunken driving leading to fatal accidents among adolescent age-groups especially in motorcycle vehicles.

Keywords: *Road Traffic Accident, Rail traffic Accidents, Alcohol, Psychoactive drugs, Mangaluru, mortality.*

INTRODUCTION

Increasing incidence of Road & Rail Traffic Accidents (RTAs) in recent decade is becoming 'hidden epidemics' across the world posing a threat to public health & national economy. It has been projected that Road Traffic Injuries will be the second most common cause of disability – adjusted life year loss in developing countries by the year 2020[1]. According to the World Report on Road Traffic Injury Prevention[2]traffic accidents account for about 3000 daily fatalities worldwide. This requires urgent attention especially in the context of developing countries such as India, which reports highest proportion of deaths due to RTAs in South East Asia[1]

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According to official statistics, a total of 4, 45,468 'Traffic Accidents' were reported during the year 2008 in India comprising 4,15,855 'Road Accidents', 2,134 'Rail-Road Accidents' and 27,479 'Other Railway Accidents' (NCRB, 2009). In 2009, 4.22 lakh road traffic incidents and 1.27 lakh road traffic fatalities were reported[3]. These numbers translate into one road accident every minute and one road accident death every four minutes.

Mangaluru is very apt for the study because it's one of the largest coastal cosmopolitan city in South India with booming increase in vehicular traffic since past decade after declaration as Special Economic Zone (SEZ) in 2007. Four National Highways pass through the city which increases the burden on roads & Railways with added cargo traffic from the Mangalore Port. The city's landscape is characterized by rolling and hilly terrain along with 6 months of monsoon season which makes the roads prone to RTAs. The city has 2 major railway stations whose tracks pass through the interior of the city making it vulnerable for travelers and unattended wanderers[4].

Inspite of the high burden of RTAs in the country, there is paucity of systematic information on the statistics of most common contributory factors like alcohol intake & abuse of psychotropic drugs like benzodiazepines, barbiturates, cocaine, cannabis, opiate-like drugs such as heroin, methadone, morphine, amphetamines and other CNS stimulants. The growing trend of drunken driving leading to fatalities is clearly directed by this study that says Alcohol accounted for 11% to 60% of RTA fatalities[5, 6].

The existing studies done on RTAs are just based on accident rate based on diffused parameters, results of which cannot be used to devise any prevention or protective guidelines to reduce mortality rates due to RTAs. The results of this proper multi-parametric study will yield appropriate intervention strategies to combat this 'Hidden epidemic'.

Several studies have demonstrated that alcohol and psychoactive drug consumption are important risk factors underlying fatal accidents. The main objective of this study was to find prevalence rates of alcohol and psychotropic drugs in fatalities of rail and road-traffic accidents in Mangaluru, a coastal district of South India.

This study was aimed to have an overall picture of the occurrence of these substances in the victims by toxicological screenings. Through this study, analysis of different parameters which increases & decreases the frequency of mortalities & hence devise an effective strategy to reduce the mortality rates.

MATERIAL AND METHOD

Study design: A retrospective study conducted on incidences of Rail & Road traffic accidents under alcohol and drug intake leading to their deaths.

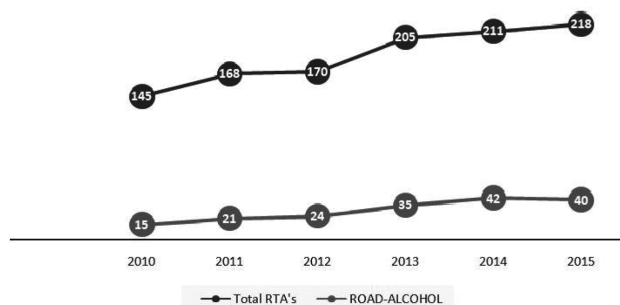
Study sample and Inclusion Criteria: The study enrolled only those cases who succumbed to death due to alcohol & drug abuse leading to Rail or Road traffic accident, as suggested in Police Intimation Letter 141(1 ,2) .Those cases with history of natural death, poisoning, murder, firearms, drowning, electrocution, poisoning and health disorders were excluded from this study.

It was a time bound study from 2010-2015. The study was done only from the records of the dead bodies meeting the inclusion criteria among those received at District Mortuary, Government Wenlock Hospital Mortuary working in conjunction with Department of Forensic Medicine and Toxicology, KMC Mangalore.

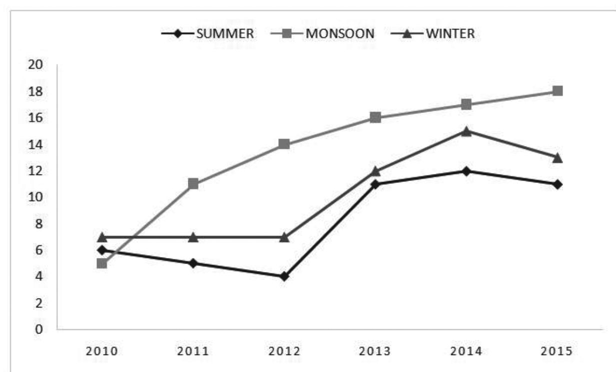
Road Traffic Accident data records were sourced from Autopsies done by forensic experts in Department of Forensic Medicine and Toxicology, KMC Mangalore. The various parameters that were looked in the study were age groups, gender, type of Vehicle involved, Victim status, time of day, day of the week (weekdays/ weekend),Season, type of intoxication, accident site etc.

A person is said to be under the influence of alcohol when blood alcohol concentration is more than 0.03% or 30 mg/100 ml of blood, according to the Road Traffic Act (1997). During Autopsy, Blood and Visceral organ sample were collected in a sterile container with preservatives and was sent by Medicolegal consultant for determination of BAC and Toxicological screening to Regional Forensic Science Laboratory (RFSL), Mangaluru for reports indicating presence of Alcohol and illegal psychoactive drugs concentration above prescribed limit.

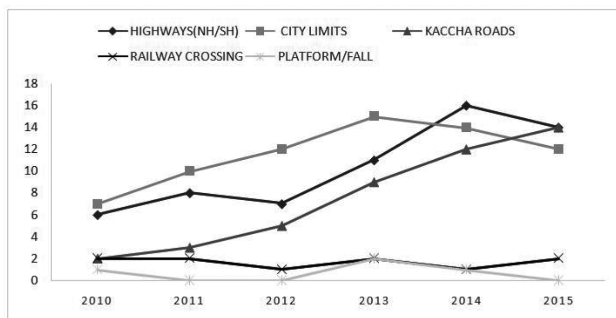
Statistical Analysis: Data analysis was done using SPSS (Statistical package for Social Science) version 11.5 .A statistical significance was considered at p-value <0.05. Multiple Regression method was used to establish the relationship between Road Traffic Accidents with various parameters and there co-relation with alcohol & psychotropic drug intake.



Graph 1: Total RTAs & RTA under Alcohol influence v/s Years



Graph 2: Seasonal pattern of Accidents



Graph 3: Frequency of RTAs at different Accident sites v/s Years

RESULTS

A total of 5226 autopsies were conducted during 6 year period of 2010-2015, out of which 1261 were Vehicular accidents (1117 Road & 144 were Rail Traffic Accidents). Out of these 15.85% (n = 177) of all the Road Traffic Deaths & 9.72% (n=14) of all Rail deaths occurred as a consequence of either alcohol (16.83%, n=188/191) or drug overdose (n=3, 2 cases of Cannabis and 1 Benzodiazepine drug consumption). Graph 1.

All these cases were limited to males, of which maximum i.e. 42.93% victims were of 56 and above years of age-group closely followed by 26-55 age group which had 33.5% deaths. Such cases in Adolescents (16-25 age group) had markedly increased over the years from 3 deaths in 2010 to 13 deaths in 2015.

Vehicular pattern showed a major share of 51.83% (n = 99) motorcycles, 18.85% Light-motor Vehicles. There were 14 cases of deaths under alcohol influence involving railways.

Almost 34.55% (n = 66) of deceased were pedestrians, who after alcohol or drug abuse were wandering around on road-sides & were fatally hit by vehicles. In 26.7 % cases the vehicle driver was drunk above legal limits which led to fatal accident. 14 cases were reported either due to rail run over/fall on tracks or crush between rail & platform. In 21.47% cases the victim was a pillion rider who succumbed to death following bike accident.

About 49.74% (n = 95) incidences occurred during night time (9pm-6am) & 31.41% (n = 60) were reported during morning hours (6am -12 pm). 65.45% cases were reported during weekdays, while 34.55 % cases occurred during weekends, which have considerably grown over the years.

Monsoon season peaked the accident rates with 42.4% (n = 81) cases, moderate & summer seasons with 61 and 49 cases respectively. Graph 2.

Maximum fatal accidents occurred within the city limits i.e. 36.65% (n = 70), then 32.46% on National & State Highways, 23.56% (n = 45)along kaccha roads, while 10 along railway crossing & 4 along tracks in case of Railway Accidents during 6 year study period. Graph 3.

DISCUSSION

This 6 year retrospective study of Road & Rail traffic accidents has shown a strong positive association between use of alcohol and its culpability to high mortality rates. Of particular interest is the increasing trend of drunken driving leading to fatal accidents among adolescent age-groups. We could not find many studies on RTA mortality rate under Alcohol & Drug influence along with the parameters under our study so elaborate review of the statistics & there findings could not be compared. Few studies similar to our setup were a 1 year (2003-2004) study on 350 RTA victim was done

by Patil et al in Maharashtra which reported that out of 129 vehicle drivers, 38 (29.5%) were under influence of alcohol. A total of 129 drivers were involved out of which there were 79 (61.2%) motorized two-wheeler drivers [7]. Alcohol was found to be very important factor in mortality in studies done during 1999-2006 and 2001-2004 on pedestrians of Slovenia & South Africa was 42.4% and 58% respectively[8, 9]. A study conducted on 1,047 fatally injured victims in the UK showed the widespread use of alcohol and drugs. Alcohol was detected in 68% of all victims. Illegal drugs were detected in 85% of the cases. Cannabinoids were found to be the most commonly detected drug[8].In Sweden, toxicological analysis of blood samples from 1,403 drivers involved in fatal accidents were analyzed for alcohol and drugs, revealed that alcohol above the legal limit for driving (> 0.2g/L) was detected in 22% of the drivers, while drugs were found to be present in 253 cases (19%)[10].A study in Tamil Nadu by Ruma et al reported 16.5 % RTA victims who attended tertiary care hospital gave history of Alcohol consumption 6 hours prior to Accident[11]. A similar study reported by Jha N et al had reported a similar finding (16.8%).

A new rising trend of driving under influence of alcohol in motorcycle riders as well as pillion riders is a matter of grave concern. Frequency of such accidents are expectedly maximum during night hours but early morning accidents due to hangover has been emerging rapidly. Over-drinking at weekends is gradually rising over the last few years. Statistics show that city limits and highways are most accident prone areas as they allow higher speed movements which is fatal in case of drunk victims.

Railways accidents mostly occurred due to lack of boundary all along the tracks around inhabited areas, which gives an easy access to drunk people. The above statistics only includes the accident victims who succumbed to death, there are larger number of victims who acquire various vital or non-vital injuries which can adversely affect their daily life-style and have a bad impact on their future life.

Suggestions: Stronger vigilance by traffic personnel against substance abuse by deploying Sobriety checkpoints which can allow police to briefly stop vehicles at specific locations to see if the driver is impaired using breath alcohol analyzer, if police has a reason to suspect the driver is intoxicated. Such activities should be done especially during nights & weekends which shows higher accident rates and hence increased mortality. Special efforts should be done to educate the community especially adolescent and adult age-group by organizing awareness programs regarding hazards of drunken-driving. Safeguarding of Railway premises specially tracks and deploying protection at level crossing to ensure accident free zone. Administrative license revocation or suspension laws to be put in force to allow police to take away the license of a driver who tests at or above the legal BAC limit or who refuses testing. Mass media campaigns to spread messages about the physical dangers and legal consequences of drunk driving. They are useful to persuade people not to drink and drive and encourages them to keep other drivers from doing so.

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Ethical Clearance: Institutional Ethical clearance taken

Conflict of Interest: Nil

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Psychological Well-Being as a Mediator Between Psychological Contract Breach and Organisation Citizenship Behaviour

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ABSTRACT

This paper is an attempt to study the negative impact of Psychological Contract Breach on Organisational Citizenship Behaviour in India and to explore the mediating effect of Psychological well-being of employees. It's classic argument between the social exchange theory and the self-determination theory. A regression analysis is used to study the variables. The results confirm that positive organisational behaviours suppress the influence of psychological contract breach.

Keywords: *Psychological contract breach, organisation citizenship Behaviour, Psychological Well Being, Positive organisational behaviour*

INTRODUCTION

The need for retaining quality employees is highly imperative to an organisation [1]. Though the IT sector in India seems to be offering a competitive remuneration and a host of other benefits, employees are often seen sulking at the state of affairs. According to a survey done in 2014, at least 50% of the employees in India Inc. were found dissatisfied due to ineffective leadership (Times Jobs.com – study)

A. Psychological Contract Breach: When employees accept a job contract from any organisation, besides the written exchange of promises, both the employer and the employee tend to develop implicit obligations mutually. Primarily, the psychological contract refers such mutual expectations between the employer and the employee [2]. There exists an unwritten set of mutual expectations which operates at all times between every employee of an organisation and the organisation. It is a non-static and reciprocal deal which adds on over time and is often related with the social aspect of an individual [3] Several dimensions of an employment relationship are not formally written [4] The professional expectation of employees have undergone a paradigm shift [5] which demands them to be more adaptive and raises the problem of attracting and retaining effective workforce. A traditional career progression is no more attractive for the employees [6]

Psychological Contract Breaches have been estimated to be occurring in organisations ranging from 25% [7] to more than 90%[8]

B. Organisational Citizenship Behaviour: The genesis of this concept dates back to 1977. According to Organ(1988) when an individual puts in more than his / her formal demands of job description and makes extra voluntary effort i.e., the effort not included in the official reward system, his / her such behaviour is termed as OCB. Accomplishment of more responsibilities which goes beyond the call of duty is OCB [8] it is an individual behaviour playing a dominant role in the efficiency and effectiveness of an organisation [9].

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C. Psychological Contract Behaviour and Organisational Citizenship Behaviour: When the employees find that the behaviour of the employer does not match with his expectations, naturally he is drawn towards disappointment which mounts depending on the level of his expectations. The first attitudinal change observed among such employees is job dissatisfaction[10] Research has attributed PCB as a criteria for reduced job satisfaction [11] On perceiving a PCB, employees are unwilling for voluntary tasks and exhibit reduced desire to remain in the organisation [12]. Though the negative waves created by PCBs are well established over the years [13] the aftermath created or the way in which its responses are moulded has not been thoroughly explored.

D. Psychological Well Being: Happy employees are generally healthier, have better inter personal relationships, perform better at work[14] which benefits the organisations and the society at large. The capacity of PWB reflects in living a meaningful life. It involves perceived progressing in the face of mounting challenges of life and still following meaningful goals and establishing quality relationship with others [15][16][17]

PWB is not simply experiencing more pleasure than pain; instead, it involves a striving for perfection and realisation of one's true potential [15]. Individuals are regarded as being in a state of psychological well-being if they have a high degree of satisfaction with themselves and if they occasionally experience unpleasant emotions[18]

Existing research advocates that positive work practises influence the Psychological well-being of an individual [19][20]. The mounting literature on positive psychology and/or positive organisational behaviour [21] also supports the finding that positive psychological state of an individual constructively effects attitudes towards the organisation.

F. Psychological Well-Being as a mediator between PCB and OCB: Perceived support of superiors can strengthen the positive relation between breach and violation, and the negative relations between breach or violation and supervisor-rated employee behaviours [22]. Fair treatment by group members communicates symbolic messages about the relationship between the organization and the employee, and has implications for whether employees can take pride in their organizational membership.[23]

OBJECTIVES

1. To study the influence of Psychological Contract Breach on Organisational Citizenship Behaviour
2. To investigate the mediating effect of Psychological well-being in PCB – OCB relationship.

NEED FOR THE STUDY

A majority of psychological contract studies are based in American, European or western contexts [24][25][26] Very few psychological contract studies have been conducted in collectivist or non-western contexts [27][28]. However, studies examining the role of individual variables on psychological contract breach are rather insufficient [29]. Psychological Contract Breaches have been estimated to be occurring in organisations ranging from 25% to 90% [30]

Conceptual Framework: The psychological contract literature has amassed a huge expanse of research about the impact of perceived psychological contract breach on outcomes of organizational concern, such as poor citizenship behaviour, [31][32] Psychological contract breach relates negatively to work performance[33].

Based on the above literature, this study proposes Hypothesis 1 as follows:

Hypothesis 1: The degree of employees' perception of breaches of psychological contracts is negatively related to organizational citizenship behaviour.

Research works in the social sciences have shown that authenticity leads to healthy psychological functioning [34] which leads to a number of positive psychological outcomes. Studies have also exposed that deficiency of authenticity can lead to negatively affected psychological health [35]

Extant research suggests that positive work experiences influence the psychological well-being of individuals in an organisation [19][20][21]. Growing literature on positive psychology and/or positive organizational behaviour [21] also supports the finding that positive psychological state of an individual positively influences their relative attitudes towards the organization.

Based on the above literature, this study proposes that Authentic Leadership style will have an impact on Psychological well-being of the employees and their

organizational citizenship behaviour. Hypothesis H4, and H5 are put forward accordingly.

Hypothesis 2: the level of Psychological Well-Being relates positively to the level of Organisational Citizenship Behaviour.

Hypothesis 3: the degree of psychological Contract breach is negatively related to Psychological Well-Being.

The goal of this study is to examine the mediating effect of POB in suppressing the negative effect caused by PCB on OCB. Specifically, the components of POB, the one representing the employees – Psychological well-being proposed by Carol Ryff (2002) is considered. Hence the following hypothesis.

Hypothesis 4: POB will suppress the influence of PCB on OCB.

Hypothesis 4A: PWB will reduce the influence of PCB on OCB.

PATH MODEL

The Path Model depicting the association between the latent variables:

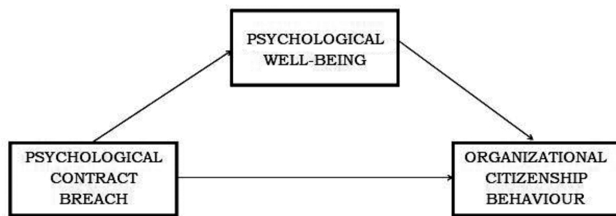

Figure 1: Path Model

RESEARCH METHODOLOGY

Nature of Data: Employees, 500 in number belonging to IT companies in Chennai were approached for Survey. The employees who responded were asked to refer their friends and colleagues in the organisation, and hence it is a Non-probability Snow-Ball sampling.. About 88% (*n* = 442) of the participants returned the questionnaires.

Research Measures:

Psychological Contract Breach (25 items) was measured using six-point scale, adapted from Robinson and Morrison. Reliability and Validity was found to be CR (Composite Reliability) = 0.748, AVE (Average Variance Extracted) = 0.499, MSV (Mean Shared Squared Variance) = 0.630, ASV (Average Shared Variance) = 0.489.

Organisational Citizenship Behaviour was measured using the twenty-item scale developed by Suzy Fox and Paul E Spector (2011). Reliability and Validity was found to be CR (Composite Reliability) = 0.812, AVE (Average Variance Extracted) = 0.468, MSV (Mean Shared Squared Variance) = 0.630, ASV (Average Shared Variance) = 0.589.

Psychological Well-Being was measured using the twenty one-item scale developed by Carol Ryff (1995). Reliability and Validity was found to be CR (Composite Reliability) = 0.831, AVE (Average Variance Extracted) = 0.621, MSV (Mean Shared Squared Variance) = 0.569, ASV (Average Shared Variance) = 0.533. In keeping with prior studies age, gender, tenure and educational level of respondents were treated as control variables.

Table 1: Model fit indices

CONSTRUCTS	$\chi2$	$\chi2$/ df	GFI	AGFI	CFI	RMSEA
PCB	373.884	2.898	0.912	0.884	0.906	0.066
OCB	393.987	2.592	0.924	0.895	0.892	0.060
PWB	530.596	3.032	0.900	0.868	0.906	0.068
	P = 0.000					

ANALYSIS & FINDINGS

Descriptive Statistics

Table 2: Correlation between Variables

	Cumulative Mean	Std. Deviation	PCB	OCB	PWB
PCB	3.16	0.29	1.00		
OCB	3.31	0.11	-.54	1.00	
PWB	4.06	0.27	-.52	.59	1.00

Hypothesis Test Results

Table 3: Regression analysis for hypothesis testing

Hypothesis	Variables	Unstandardised Coefficients		Standardised Coefficients	t	Sig	Remarks
		B	SE	B			
H1	PCB→OCB	-0.620	0.041	-0.586	-15.183	.000	Accepted
H2	PWB→OCB	0.487	0.032	0.592	15.391	.000	Accepted
H3	PCB→PWB	-0.655	0.052	-0.516	-12.608	.000	Accepted

Mediation Study

A mediator is involved in contributing for the influence of the independent variable on the dependent variable. To test the mediator Psychological Well-Being, the *tests* suggested by Baron & Kenny 1986 was followed and the SEM procedures were applied using the maximum likelihood estimation algorithm. It has been previously argued that in the area of mediation analysis, when conditions of CFA are met, and when models have incorporated latent variables, SEM bids a better substitute to tradition regression tests of mediation. However, here, conceptually the procedure of testing mediation using SEM is analogous to Baron and Kenny's (1986) approach.

The relationship (total effect) pertinent between PCB and OCB has been tested to be significant (Table 4). Under ideal conditions, when all variables to the relationship between PCB and OCB are controlled, the mediating effect of the mediator is found to suppress the influence of PCB and OCB but this significant and indirect effect (Table 5) does not nullify the influence of PCB and OCB. Hence, it is concluded that the mediator PWB *partially mediates* the influence of PCB on OCB. Thereby hypothesis 4 along with 4A is accepted.

Table 4: Regression between dependant & independent variable Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	104.168	2.546		40.907	.000
PCB	-.617	.041	-.586	-15.183	.000

a. Dependent Variable: OCB

Table 5: Regression between dependant, independent & mediator variables Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1.	(Constant)	58.179	4.368		13.320	.000
	PWB	.356	.032	.438	11.249	.000
	PCB	-.389	.040	-.381	-9.772	.000

a. Dependent Variable: OCB

DISCUSSION

The often quoted theory that supports and explains the relationship between Psychological Contract Breach and Organisational outcomes is the social exchange theory [37] and the reciprocity norm [37]. According to the social exchange theory, if the organisation fulfils the employee's psychological contracts, the organisation is said to have reached its goal. This reaction of taking revenge or giving back the negativity is acknowledged by the reciprocity norm[37]. The perception of PCB is a subjective phenomenon [36]

We build on the research of Deci & Ryan (2000) Self-determination theory is a macro theory that defines the intrinsic and varied extrinsic sources of motivation and describes the relative roles of both the motivators. Though the initial work on SDT dates back to 1970s, only the past decade witnessed mushrooming of research in this theory. SDT is an umbrella which holds six mini theories. One among them is the **Relationships Motivation Theory (RMT),** *the sixth mini-theory,* is concerned with the development and maintenance of close personal relationships such as best friends and romantic partners as well, since belonging to groups, is one of the three basic psychological needs.

The last three mini theories namely Basic Psychological Needs theory, Goal Contents Theory and the **Relationships Motivation Theory explain the role of Psychological well-being in suppressing the negativity of Psychological contract breach.**

LIMITATIONS

One of the potential limitations of this study is that it has used only one construct of Positive Organisational Behaviour. The constructs being very sensitive, most of the respondents were coaxed to participate. Though the accuracy is ensured, the interpretation of the results could not completely rule out the possible influence of non-independence bias.

Ethical Clearance: Not Applicable

Source of Funding: Self

Conflict of Interest: NIL

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Pattern of Poisoning Cases at a Tertiary Health Care Centre– A Cross Sectional Study.

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ABSTRACT

Introduction and Objectives: Poisons are responsible for more than 3 million cases worldwide annually, India being among the highest contributor. Thus, this study identifies burden of poisoning cases at regional level and helps formulate preventive measures.

Materials and Method: Prospective, hospital based cross sectional study conducted at KLE's Dr Prabhakar Kore Hospital and MRC, with autopsy unit, Belagavi - for 1 year. Data collected using pretested proforma and analyzed.

Results: Total 306 poisoning cases, out of which, 35 cases (11.4%) expired. Highest being pesticide poisoning – 150 cases (49%) and 20 deaths (57.2%). Age group 21 - 30 years was most commonly involved. Male : female ratio - 1.51 : 1 for total cases and 1.69 : 1 for total deaths. Most cases and deaths were suicidal - 67.1% and 80% respectively, common cause being alleged family problems (34.1%). Majority cases were farmers (24.8%). Mortality high in cases coming within 5 hours (19.3%). Majority cases belonged to grade 1 (36.3%) Poison severity score.

Conclusion: Poison management centres should be started at rural places, proper education and mental strength should be imparted to the population to curb intentional cases.

Keywords: *Poison, Poison Severity Score, Pesticide poisoning, Belagavi.*

INTRODUCTION

Poisoning cases, both accidental and intentional (homicidal/suicidal), are a significant contributor to mortality and morbidity throughout the world[1].

Poisoning cases and deaths due to poisoning are on a rise over the years despite of the advanced knowledge and newer techniques available for management. According to WHO, more than 3 million acute poisoning cases with more than 2,20,000 deaths occur annually worldwide. Of these cases, 90% of fatal poisoning occur in developing countries particularly among agricultural workers[1,2].

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According to an estimate, number of poisoning cases in India was 39254 in 1991 and risen to an alarming level of 60809 cases in 1995[3], making our country one of the highest incidence of poisoning in the world. It is estimated that more than 50,000 die every year from toxic exposure[4].

Mortality from poisoning varies from country to country depending upon type of poisons encountered, extent of awareness about poisoning, availability of treatment facilities and presence or absence of qualified personnel. In developed countries rate of mortality from poisoning is as low as 1–2%, but in India it varies from shocking 15–35%[5].

In spite of such alarming levels of mortality and morbidity, no statistics are available in India regarding incidence of poisoning at home or at hospital. This may be due to lack of data at central level as most of the cases are not reported. The known cases are just as the tip of the iceberg.

Considering the above points, the objective of this study is to report promptly the pattern and incidence of poisoning cases at a regional level (like district level in this study) and point out the changing patterns of poisoning regarding various parameters and draw attention to various efforts which can be made to reduce the number of poisoning cases.

AIMS AND OBJECTIVES

1. To study pattern of poisoning cases coming to a tertiary health care centre.
2. To study the relation between poisoning cases and influencing factors.
3. To know the burden of poisoning cases in our tertiary care centre.

REVIEW OF LITERATURE

Poison is any substance (solid, liquid or gas), which if introduced into the living body, or brought in contact with any part thereof, will produce ill effects or death, by its constitutional or local effects or both[1].

History of poisons and poisoning dates back several thousand years and is spread through different parts of the world, including ancient Indian shastras, Egyptian Papyri, Sumerians, Babylonian, Hebrew and Greek records[1].

To determine the annual rate of poisoning-related Accident & Emergency Department visits at Sultan Qaboos University Hospital in Oman, a prospective observational study was conducted over 4 years (1996-1999). 204 poisoning-related Accident & Emergency Department visits were recorded corresponding to an average annual rate of 1.8/1000 Accident & Emergency Department visits. Therapeutic agents were most commonly involved (50% of all cases). Accidental poisoning in toddlers was most commonly caused by drugs. Intentional poisoning in adults involved mainly therapeutic agents (50%), particularly analgesics, followed by industrial and environmental agents (25%). Animal poisoning (14%) was most commonly encountered in adult males. Traditional remedies constituted 7% of all poisoning cases. A total of 148 patients (73%) were admitted for 1 to 175 days[6].

It is a retrospective study conducted during Jan 2009-Jan 2012 in Annapoorana Medical College & Hospitals, Salem, Tamil Nadu, to find out the Profile of poisoning cases in a Tertiary care Hospital, Tamil Nadu 150 cases of acute poisoning in adults due to drugs and chemicals were included, 148 cases were of intentional poisoning and two cases were of accidental poisoning. In all the cases the route of exposure was oral. Males (92 cases) outnumbered females (58 cases) and 101 cases were married. Peak occurrence was in the age group of 21-30 years (47 cases). Occupation wise poisoning was commonly found among male laborers (18.66%) and farmers (13.33%) followed by house wives (28%) and students (16.66%). 147 cases (98%) were Hindus. More cases were reported during summer season (36%) and day time (80%). Organophosphorus was the commonest agent (58.66%). Associated co-morbid conditions were found in 16 cases[7].

A prospective study of poisoning cases (excluding animal bites) brought to the Civil Hospital Ahmadabad, from 1st October 2006 to 30th September 2007. Total 366 cases of acute poisoning were recorded over a period of one year. Of these 70.8% were males and 29.2% female. The majority (45.08%) cases were from age group of 21-30 years.71.6% cases were from rural area. Commonest type of poison was pesticide in 33.9% cases, followed by household chemicals 26.8%, in 74.6% cases cause of poisoning was intentional. Fatality in pesticide poisoning was 25.8%[8].

In a retrospective and prospective study conducted at JSS Medical College, Mysuru, Case records of poisoning cases from January 2005 till January 2008 were reviewed retrospectively and prospectively from January 2008 to September 2009, with objective of assessing the prevalence and mortality incidence rate, A total of 1045 poisoning related admissions were identified, Among them, 68.40% of cases were due to intentional poisoning and 31.60% were due to accidental poisoning. Of the poisoning related admissions, 84.4% of patients recovered, whereas in 7.6% of cases condition did not improve. Mortality rate was observed 4%. Intentional poisoning was observed more in male population (60.2%) in the age group of 18-29 years. Accidental poisoning was seen more in children in the age group of 1-3 years. Incidence of overall poisoning cases were high due to pesticides (39.5%) followed by medicines (26.1%), household products (22.1%), environmental poisoning (12.1%) and heavy metals (0.2%)[9].

MATERIALS AND METHOD

This study is a cross sectional study, conducted at KLES's Dr Prabhakar Kore Hospital and MRC, attached with autopsy block, Belagavi, for a period of one year from January 1, 2014 to December 31, 2014. Data was collected from patients of poisoning cases visiting casualty/wards, poison detection centre reports, their medical records, laboratory reports, autopsy reports and regional Forensic science laboratory reports in fatal cases, by universal sampling method. Informed and written consent was obtained and a preformed, pretested proforma was used to collect the required information.

FINDINGS AND RESULTS

A total of 306 poisoning cases came to the tertiary centre during the study period, out of which, 35 cases (11.4%) expired. Majority of the cases and deaths were literates - 53.3%.

Table 1: Distribution of poisoning cases and deaths on the basis of type of poison

Sl. No.	Type Of Poison	Cases		Deaths	
		Total	Percentage	Total	Percentage
1.	Pesticides	150	49%	20	57.2%
2.	Bites	73	23.9%	05	14.2%
3.	Pharmaceutical Drugs	38	12.4%	02	5.7%
4.	Alcohol + Pesticides	18	5.9%	03	8.6%
5.	Hydrocarbons	06	2%	01	2.9%
6.	Cyanides	05	1.6%	03	8.5%
7.	Unknown	05	1.6%	01	2.9%
8.	Food Poisons	04	1.3%	00	00%
9.	Alcohol	03	0.9%	00	00%
10.	Corrosive Acids	02	0.7%	00	00%
11.	Cerebral Deliriants	02	0.7%	00	00%
Total		306	100%	35	100%

Maximum number of cases and deaths involved pesticide poisoning – 150 cases (49%) and 20 deaths (57.2%) respectively followed by poisoning due to animal bites – 73 cases (23.9%) and 5 deaths (14.2%).

Table 2: Age wise distribution of cases and deaths due to poisoning

Age Group (In Years)	Admitted Cases		Deaths	
	Total	Percentage	Total	Percentage
<10	16	5.2%	03	8.6%
11 – 20	61	20.1%	06	17.2%
21 – 30	117	38.2%	11	31.4%
31 – 40	45	14.7%	04	11.4%
41 – 50	31	10.1%	04	11.4%
51 – 60	25	8.2%	02	5.7%
61 – 70	07	2.3%	02	5.7%
71 – 80	04	1.3%	03	8.6%
> 80	00	00%	00	00%
Total	306	100%	35	100%

Maximum number of cases and deaths were seen in the age group between 21 - 30 years, 117 cases (38.2 %) and 11 deaths (31.4 %) respectively.

Table 3: Distribution of cases and deaths due to poisoning in relation to manner of poisoning

Maner of Poisoning	Admitted Cases		Deaths	
	Total	Percentage	Total	Percentage
Suicidal	205	67%	28	80%
Accidental	99	32.4%	16	17.1%
Homicidal	2	0.6%	01	2.9%

Most of the cases and deaths were suicidal - 67.1% and 80% respectively with maximum cases related to alleged family problems-34.1% leading to poisoning.

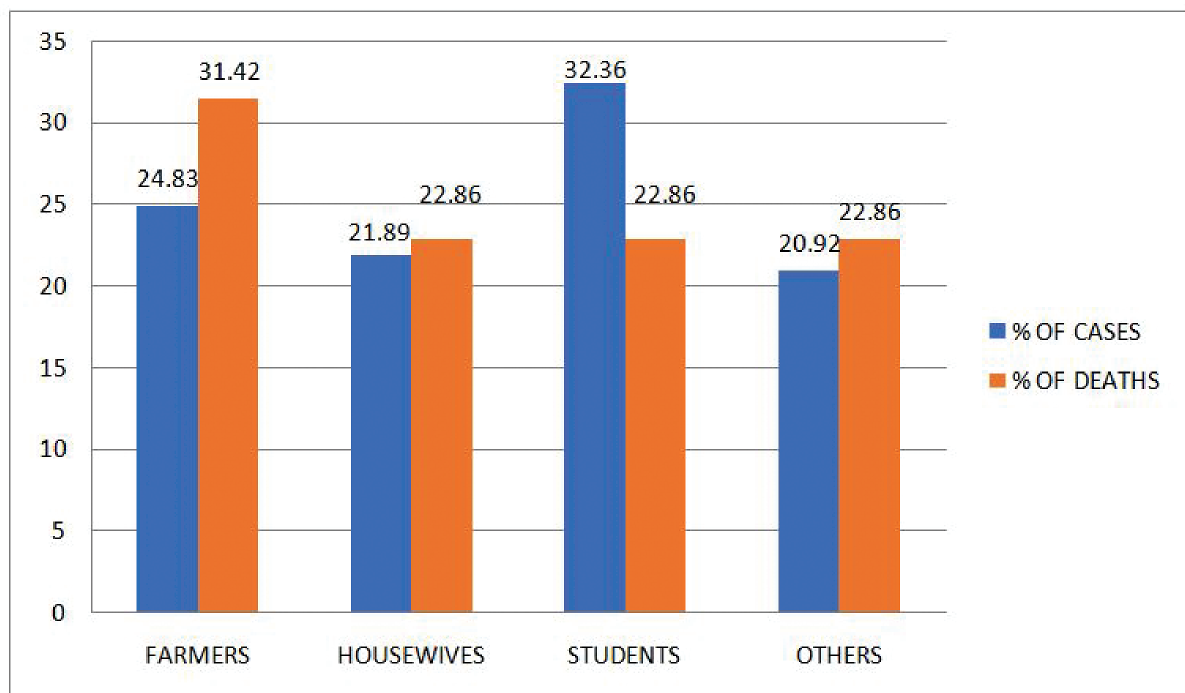
Table 4: Distribution of poisoning cases and deaths in relation to mode of poisoning

Mode of Poison	Admitted Cases		Deaths	
	Total	Percentage	Total	Percentage
Oral	22	74.2%	29	82.9%
Injection	76	24.8%	06	17.1%
Inhalation	03	1%	00	0%
Total	**306**		**35**	

Most common mode of poisoning was oral - 74.2% of cases and 82.9% of deaths followed by injection–24.8% of cases and 17.1% of deaths.

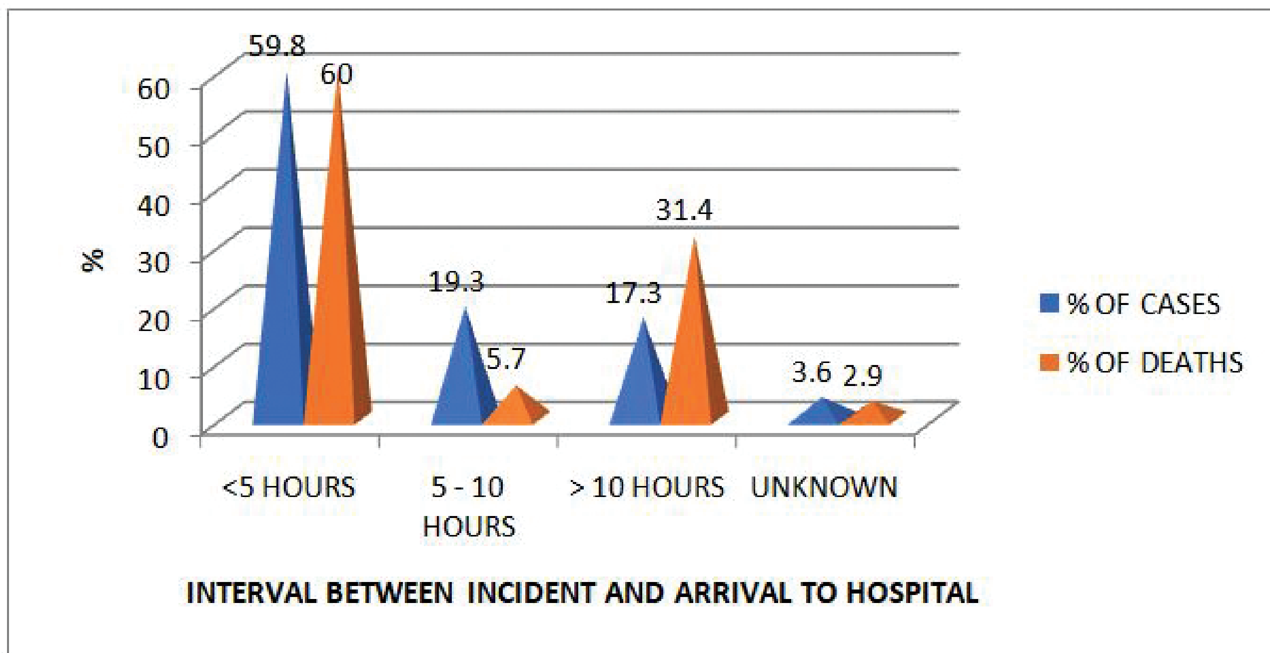
Maximum number of cases and deaths involved males, 184 cases (60.1%) and 22 deaths (62.9%) respectively. Male : female ratio being 1.51 : 1 for total cases and 1.69 : 1 for total deaths.

Maximum cases were seen in the month of June (11.8%) and maximum deaths in January and October (14.2% each). Maximum cases and deaths were seen in winter season 34.6% and 48.6% respectively, followed by rainy season (34.3% of cases and deaths).



Graph 1: Distribution of Cases and Deaths Related to Occupation

Most of the cases were students (32.36%), farmers being the most common occupation involved (24.83%). Most deaths were seen in farmers (31.42%).



Graph 2: Distribution of Poisoning Cases and Deaths Based on Time Interval between Incident and Arrival to Hospital

59.8% of cases came to the tertiary centre within 5 hours of poisoning incident.

Mortality was high in cases coming within 5 hours - 19.3%, followed by cases coming after 10 hours of incident – 17.3%.

210 cases (68.6%) were referred to tertiary centre out of which 22 cases (65.67% of total deaths) expired. Rest 96 cases came directly to the tertiary centre out of which 12 cases (34.3% of total deaths) expired.

Majority of cases belonged to grade 1 – 111 cases (36.3%) of Poison severity score, followed by Grade 2 – 101 cases (33%), Grade 0 – 59 cases (19.3%) and Grade 3 – 35 cases (11.4%) respectively.

DISCUSSION

During the present study period of 1 year from January 1, 2014 to December 31, 2014, a total of 306 poisoning cases were admitted to KLES's Dr Prabhakar Kore Hospital and MRC, Belagavi. Out of these, maximum number of cases were due to pesticides – 150 cases (49%).This result is similar to the results conducted at Annapoorna Medical College and Hospitals, Salem, Tamil Nadu with 58.66%[7], JSS Medical College, Mysuru, with 39.5%[9]. In contrast, study at Qaboos University Hospital in Oman shows theraupatic agents were more commonly involved[6]. These differences can be attributed to a number of factors like – India being a developing country depends a lot on agriculture, making pesticides easily available at many homes.

In the present study, out of 306 cases, 35 cases expired which is an overall mortality rate of 11.4%. Studies at JSS Medical College, Mysuru[9] shows mortality of 4% and Civil Hospital, Ahmadabad shows mortality of 25.8%[8]. Age group most commonly involved in this study was between 21 – 30 years, which is similar to study conducted at Annapoorna Medical College and Hospital, Salem, Tamil Nadu[7], at Civil Hospital, Ahmadabad[8], at JSS Medical college, Mysuru[9], at Karad[10] and Bengaluru[11]. Male population is most commonly involved in this study with 60.1% cases and 62.9% deaths due to poisoning, male to female ratio being 1.51:1 for admitted cases and 1.69:1 for deaths, which was the same in other studies with varying percentages. In this study 67% of cases were suicidal, which was again similar to other studies. Triggering factors responsible for these intentional poisoning was studied upon in this study which revealed – maximum cases (34.1%) were due to family related problems. This point was not dealt with in any other study. In this study 53.3% of cases involved literate population, students were involved in 32.3% of cases. These results show that

literate male youngsters are more commonly involved with poisoning cases, which may be due to the fact that males are dominant and bread earning half of a family so is exposed to more stress causing to take such extreme steps in life.

Maximum cases in this study were seen in winter season (34.6%), this result is different in contrast to study conducted at Annapoorna Medical College and Hospital, Salem, Tamil Nadu – where maximum cases were seen in summer season (36%)[7]. In this study 59.8% of cases came to tertiary care within 5 hours of exposure and 68.6% of cases were referred from other hospitals. According to Poison Severity Score–maximum cases belonged to grade 1 (36.3%). No other studies have mentioned about these aspects. Mortality and morbidity increases as the time interval increases.

CONCLUSION

The study clearly shows pesticides are the most common means of poisoning owing to the fact that pesticides are easily available and can cause severe morbidity, leading to deaths. The most saddening fact is that most of the cases involve literate group of people, in the age group between 21–30 years, it's the youth who are committing large number of suicides due to various triggering factors. This shows that poisoning is more of a mental issue to manage and preventive strategies should be formulated accordingly.

The long standing problems of farmers still continues, as they continue to commit suicide due to financial problems and weather problems, which is a tough burden to resolve and requires combined efforts from the government and doctors to reduce this burden. Accidental cases in fields due to animal and insect bites are also increasing due to improper protective measures and lack of proper knowledge which has to be curbed. Industrial poisoning incidents are low compared to other causes. Homicidal cases are rare with only two cases being reported in the whole year.

The study also shows that many cases are being referred from other smaller health centers and hospitals, which are leading to delays in early diagnosis and adequate management. With the introduction of poison detection centre it is helpful to diagnose the poison early and give proper care. Such centers should be increased so that proper care is given over a larger area and delays are reduced.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: The ethical clearance was obtained by JNMC Institutional Ethics Committee on Human Subjects Research – Jawaharlal Nehru Medical College, Belagavi.

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An Analysis of Pattern of Fatal Head Injuries in Road Traffic Accidents

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ABSTRACT

One of the common regional injuries an individual can sustain in Road Traffic Accidents is head injury. Head and face is the region which is more susceptible and requires an immediate care and treatment. The fatality rate is high even with intense treatment. Law making agencies has been continuously trying to enforce the rules of wearing helmets both in riders and pillion in two wheelers. Considering the same, this study was done in eastern part of Bangalore, an IT hub and a rapidly developing area with increase in vehicular movements. The study concluded that incidence was common among age group of 21-30 years with male predominance and among two wheel riders. Laceration is most common external injury followed by abrasion. Fissure fractures are most common type of Fracture, and sub dural haemorrhage is seen in majority of cases.

Keywords: *Road Traffic Accidents, Head Injuries, Fatality, Subdural Hemorrhage.*

INTRODUCTION

Traumatic brain injury (TBI) is a significant public health problem leading to mortality, morbidity, and socioeconomic losses in India. The majority (60%) of TBI cases are a result of road traffic accidents (RTA).[1] Head injury is a morbid state where there are gross or subtle structural changes in scalp vault and or the content of the skull. The application of blunt force may result in injury to the skull and its contents.[2] As per History head trauma did not take long to be realized by human, the head has always been seen by both assailant and defender as a region of particular vulnerability, where an incapacitating blow might most effectively be landed. This is well attested by the creation of protective helmet (iron hat) worn by the warriors far back in the antiquity and now as well, at war and at peace, while at work and in variety of sport- connected activities. It is learnt from heroic poems of Greek and Roman literature that the cranial wounds of antiquity did not differ a great deal in their lethal or disabling effects from the cranial wounds of our times; the change that had been seen over ages is method of injury both accidental and intentional assault, basic reason for change is continuous upgrading of "force".[3]

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AIMS AND OBJECTIVES OF THE STUDY

1. To know the pattern of fatal head injuries in relation to age, sex, type of road user, place of death.
2. To know the pattern of fatal head injuries in relation to cause of head injury.

MATERIALS AND METHODOLOGY

Data was collected from the medico legal autopsy reports and from inquest forms of fatal head injuries

related to road traffic accident for a period of 5 years from September 2006 to August 2011 which were autopsied in Vydehi Hospital Mortuary. A proforma was prepared accordingly to collect the data based on the deceased's particulars, with complete external and internal examination of those involved in fatal head injuries of RTA cases. The particulars of deceased in the form of age, sex, type of road user, types of injuries, types of Fracture , Haemorrhages and cause of Death, were studied based on autopsy reports, inquest forms, information from relatives. Those cases that are not included in this study are

1. Decomposed cases with fatal head injuries, where the interpretation of injuries is not possible due to extensive decomposition.
2. Unknown cases where, the history and details are not available.
3. Intracranial hemorrhages, infarctions, lesions as a result of natural diseases.
4. Extensive burns involving head, where there is difficulty in interpretation of injuries.

OBSERVATIONS AND RESULTS

Data was collected in 184 cases with various objectives. Among 184 cases of head injuries 123 cases were those of RTA. Age of incidence broadly grouped into ten years range and Youngest case noted was that of 1 ½ years and oldest noted was 78years.Highest incidence of 42%cases was noticed in age group of 21 to 30years (Table-1). On considering sex profile 11% cases were those of females and 89% was that of male (Table-2). In road traffic accidents when data was analyzed among the type of road users, two wheeler motor vehicle occupants were maximum, which accounted for 58% cases, 37% were pedestrians, 3 % were four wheeler and 2% were other types of road users like bicycle riders (Table-3). The incidents indicate four wheeler occupants were well protected compared to other type of road users.

123cases that is 67% of cases external injuries were noticed in all the cases involving scalp and face. Most common injuries that was noticed was laceration in 51% cases followed by abrasion in 33%cases (Table-5). On considering types of fracture sustained to skull most common being fissured in 50% cases followed by comminuted fracture in 34% cases (Table-6).

On considering the bones involved facial bone is commonly involved in 11% cases in 13% cases there was involvement of facial and all vault bones (Table-7). Base of skull commonly involved middle cranial fossa fracture is involved in 17% cases, anterior cranial fossa in 10% cases combination of all fossa in1case (Table-8).Meningeal involvement commonly is subdural haemorrhage that is in 63%cases, subarachnoid haemorrhage is seen in 57% cases (Table-9). On considering injuries to brain contusion was commonly noticed in 20%cases, followed by laceration and contusion (Table-10). Parietal lobe of brain is commonly involved followed by frontal bone(Table-11). Cause of death was shock and haemorrhage is most cases followed by coma, then there are other causes which includes instantaneous, respiratory failure, cerebral oedema, infection, brain stem dysfunction (Table-12).

Table 1: Age Distribution

Age of incidence	Number of cases %
1-10years	3
11-20years	11
21-30years	43
31-40years	13
41-50years	12
51-60years	08
61-70years	07
71-80years	3

Table 2: Sex Distribution

Sex profile	Number of cases %
Male	89
Female	11

Table 3: Type of Road Users

Type of road users	Number of cases %
Two wheelers	58
Pedestrians	37
Four wheeler	03
others	02

Table 4: Place of Death

Place of death	Number of cases %
Spot death	63
On the way to hospital	13
In hospital	23

Table 5: Type of Injury

Scalp and face	Number of cases %
abrasion	33
contusion	04
laceration	51
Crush injury to head	04
Healing wound	02
Suture wound	06

Table 6: Type of Skull Fractures

Type of fracture	Number of cases %
comminuted	34
Fissure	50
Depressed	11
Diastitic	02
Hinge	02
Fissure + Depressed	01

Table 7: Skull Bones Involved

Bones involved	Number of cases %
Facial	11.4
Temporal	8.1
Parietal	8.1
Frontal	8.9
Occipital	7.3
All the above bones	13

Table 8: Involvement of Base of Skull

Base of skull involvement	Number of cases %
Anterior cranial fossa(ACF)	9.7
Middle cranial fossa(MCF)	17
Posterior cranial fossa(PCF)	7
ACF + MCF	7
PCF + ACF	7
MCF + PCF	1.6
ACF + MCF + PCF	0.8

Table 9: Meningeal Involvement

Meningeal involvement	Number of cases %
Extra dural	9.7
Subdural	63.4
Subarachnoid	57.7
Intra ventricular	0.8

Table 10: Internal Brain Injury

Injury to brain	Number of cases %
Contusion	19.5
Laceration	17.8
Oedema	17.8
Drained out	10.5

Table 11: Areas of Brain Involved

Areas of brain involved	Number of cases %
Frontal	13
Temporal	12.1
Parietal	14.6
Occipital	5.7
Diffuse	8.9

Table 12: Cause of Death

Cause of death	Number of cases %
Shock and haemorrhage	54.4
Coma	22.7
others	22.7

DISCUSSION

This study was done to analyse the head injuries and it was found that the Road Traffic Accidents were the most common manner for sustenance of head injuries followed by others like homicidal and suicidal. Incidences of Head injuries due to RTA constitute about 67% which can be compared to a study which had also shown maximum of RTA cases where it constitute 40% of cases.[4] Incidences were common in two wheelers (57%), followed by pedestrians(36%) and then four wheelers (2.4%) and others (2.4%) which are similar with the study of Jawaharlal Nehru Medical college and hospital, but in contrast with other where the incidence of pedestrian are common followed by two wheeler and others.[5, 6] The male predominance in current study and also age of occurrence of RTA being common in 20 to 30 years is consistent with the other studies[4-7]. The study can also be compared with another study done in Indore were incidences are common in male in third decade.[8] Among the injuries to face and the head, similar results were drawn in a study where scalp laceration was noticed as the most common injury.[7] In the present study on

considering skull fracture of the vault, it had showed the linear/ fissure fracture were the commonest accounting for 50% of cases followed by comminuted fracture in 33% of cases, this can be compared with a study done in Jaipur where they concluded linear fracture is common followed by basilar fracture and then comminuted fracture.[9]

On considering the anatomical location of the skull fracture present study had showed involvement of all bones in majority of cases followed by involvement of facial bones which is then followed by frontal involvement, in contrast to Chandigarh based study which had showed parietotemporal area being common followed by parietal area.[7] The common meningeal haemorrhage in current study is subdural followed by subarachnoid haemorrhage, this is consistent with a previous study where the subdural haemorrhage is commonest followed by subarachnoid haemorrhage.[10] Aligarh based study had showed that cerebral oedema is common followed by contusion, in contrast current study had showed the contusion is common followed by cerebral oedema and then laceration, few cases also showed complete expulsion of brain matter. The present study has also showed the parietal lobe involvement of brain common followed by frontal lobe involvement. Common cause of death that had been given in most of cases is shock and haemorrhage, followed by coma as a result of injury sustained.

CONCLUSION

Four wheeler involvements were very less which shows that it is a much safer mode of transportation. Most of cases are of spot death without receiving any treatment which will shows the importance of immediate and preliminary treatment.

Ethical Clearance: Institute Ethics Committee.

Conflict of Interests: Nil

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Antibody Detection (IgG, IgM) of both HSV-1 and VZV in Serum and Saliva of Bell's Palsy Patients Recovered by Low Level Laser Therapy

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ABSTRACT

Bell's palsy (BP) is the commonest form of facial palsy. It often starts with pain behind the ear, with impairment of taste sensation. One-hundred and twenty (120) subjects were participated in this study; they were divided into two groups: Group one: Eighty (80) Bell's palsy patients included in this study. These patients were treated by LLLT. Diagnosis of patients with Bell's palsy based on House- Brachmann Scale (HBS, 1996); this diagnosis was done by neuromedicine / neurosurgery specialists, and group two: Forty (40) healthy control subjects (volunteers) with no signs and symptoms of any systemic diseases, with matched ages and genders with BP patients. There was a highly significant reduction in serum HSV-1 IgG level after LLLT ($p<0.001$). No significant differences were observed before and after LLLT regarding salivary HSV-1 IgG level, serum HSV-1 IgM level and salivary HSV-1 IgM level. A highly significant decline in serum VZV IgG level was observed after LLLT ($p<0.001$). No significant differences were observed before and after LLLT regarding salivary VZV IgG level, serum VZV IgM level and salivary VZV IgM level.

Keywords: *Bell's palsy, HHV-6, PCR.*

INTRODUCTION

Idiopathic facial palsy or Bell's palsy (BP) is peripheral facial paralysis with unknown occurrence; affecting the facial nerve, which supplies all facial muscles also supplied the salivary and lacrimal glands, as well as limited sensory fibers in the anterior 2/3 of the tongue for taste function fibers in the anterior 2/3 of the tongue for taste function [1]. Hato *et al.,* 2007 [2] showed BP is happen in unilateral side of the face, also is no sexual predilection. It has been described in the patients of all ages groups, with peak incidence showed in the 40 years old of age [3]. It is likely happens between the ages of fifteen and forty- five years. At the same time BP showed wide spread in women of the adolescence stage and in their twenties age ranges. The prevalence occurs similar in both genders of their thirties, with increasing incidence after the age of forty years [4]. Elliott, (2006) [5] concluded that the Bell palsy was the lower motor neuron lesion or disease, happen as a complicated disorder in the neuromuscular facial part with unknown etiology which affects the facial nerve or seventh cranial nerve, causing ipsilateral facial paralysis or paresis in the facial expression muscles. The paralysis in the Bell's palsy will resemble the facial paralysis happens in head injury. The pathophysiology can be explained as an inflammatory condition affecting the facial nerve that leading to axonal demyelination and disturbance of the blood supply to the facial nerve, the pathological process of bell's palsy including the muscles of the facial appearance, salivary glands as well as sensory fibers that supply taste sensation and it will occur in the lacrimal glands leading to excessive lacrimation (excessive tearing) or dryness (excessive dry mouth). Roob *et al*., (1999) [6] showed both etiology and pathogenic mechanism of idiopathic facial palsy have not yet been understood despite extensive research. Immunological reactions, viral infections, genetic and ischemia theories have been postulated. Tomishima *et al.,* (2001) [7] showed that the viral reactivation happens through a reduction of the immune activity which could be triggered by metabolic alterations surgical or dental

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procedures immune suppression, or event under stress. Light amplification by stimulated emission of radiation (laser) is one of the most important treatment modalities. Diode or low-level laser therapy (LLLT) is suggested to have bio- stimulating and analgesic effects through direct irradiation without causing thermal response.

MATERIALS AND METHOD

One-hundred and twenty (120) subjects were participated in this study; they were divided into two groups:

Group one: Eighty (80) Bell's palsy patients included in this study. These patients were treated by LLLT. Diagnosis of patients with Bell's palsy based on House-Brachmann Scale (HBS, 1996); this diagnosis was done by neuromedicine / neurosurgery specialists.

Group two: Forty (40) healthy control subjects (volunteers) with no signs and symptoms of any systemic diseases, with matched ages and genders with BP patients. All samples collection was done in Babylon Health Directorate; specifically Merjan Medical City, Babylon Center of Physical Therapy and Rehabilitation and Al-Hilla Teaching Hospital during the period from May 2017 to March 2018, while the laboratory work was done in the College of Sciences Laboratories / Babylon University / Consultation office . The age ranges of those patients were (20- 70) years old. All subjects were examined clinically (extra and intra - orally). Each subject fulfilled a case sheet and approved consent was taken from each subject to participation in this study. The HSB were assessed for all patients in the 1st visit before the treatment as well as after (6 – 7) weeks after of the treatment [8].

Samples collection: Blood and saliva were collected from each subject at a fixed daily time i.e. 8-11 a.m. These samples were collected at early diagnosis and after treatment.

Blood sample: About 6 ml of venous blood sample was aspirated from anticubital vein from each individual, using disposable syringes with 21 gauge stainless steel needle. The whole blood transferred into sterile polyethylene tubes. Samples were allowed to clot for 30 minutes before centrifugation at 3000 rpm for 10 minutes then the supernatant serum was aspirated and transferred into an Eppendorf tubes and frozen at – 20 ◦C for subsequent analysis. Heamolyzed samples were discarded.

Saliva sample: About 3- 4 ml of unstimulated (resting) whole saliva was collected. An individual was asked to rinse his / her mouth thoroughly with water to allow removal of debris. The first mouth – full of saliva was discarded to allow clearance of water, and then the patients were asked to spit all the saliva into a plastic polyethylene tube. The collected saliva was centrifuged at 3000 rpm for 10 minutes; the clear supernatants was aspirated and frozen at - 20◦C until assayed. The ELISA kit with Competitive- ELISA technique was applied. Diluted patient serum and saliva were added to wells coated with purified antigen.HSV-1 or VZV (IgG / IgM) specific antibody, it was bind to the antigen. All unbound materials were washed away and the enzyme conjugate was added to bind to antigen- antibody complex. Excess enzyme conjugate was washed off and substrate was added. The plate was incubated to allow the hydrolysis of the substrate by the enzyme. The color intensity generated was proportional to the amount of IgG specific antibody in the sample.

Table 1: List of materials used in analysis of patient's samples with Bell's palsy

Name of Material	Batch number	Place of production
HSV 1/IgG ELISA kit	H1029G	Calbiotech (U.S.A)
HSV 1/IgM ELISA kit	H1030M	Calbiotech (U.S.A)
VZV/IgG ELISA kit	VZ081G	Calbiotech (U.S.A)
VZV/IgM ELISA kit	VZ082M	Calbiotech (U.S.A)

Table 2: Ages and genders distribution between BP patients and healthy control subjects

Age/Year	Bell's palsy Patients (No. 80)	Control Subjects (No. 40)	p-value
Range	20 - 70	20 - 70	1.0
Mean ± S.D	43.6 ± 15.6	45.4 ± 15.9	0.5 ^{NS}
Female	34 (42%)	16 (40%)	0.7
Males	46 (57%)	24 (60%)	
Males/females ratio	1:3	1:5	0.4 ^{NS}

Table 3: Distribution of serum and salivary (HSV-1, IgG,IgM / VZV, IgG, IgM) measures of BP patients before and after LLLT

Variable	Before mean ± SD	After mean ± SD	Paired t-test	P- value
HSV-1 IgG serum µg/µl	2.5 ± 0.8	0.9 ± 0.7	8.1	<0.001 S
HSV-1 IgG saliva µg/µl	0.5 ± 0.4	0.6 ± 0.3	0.8	0.4 NS
HSV-1IgM serum µg/µl	0.8 ± 0.3	0.7 ± 0.2	1.03	0.3 NS
HSV-1 IgM saliva µg/µl	0.5 ± 0.4	0.7 ± 1.4	0.7	0.4 NS
VZV IgG serum µg/µl	2.5 ± 0.9	0.8 ± 0.7	9.1	<0.001 S
VZV IgG saliva µg/µl	0.4 ± 0.3	0.3 ± 0.1	1.4	0.1 NS
VZV IgM serum µg/µl	0.2 ± 0.09	0.2 ± 0.1	0.9	0.3 NS
VZV IgM saliva µg/µl	0.08 ± 0.08	0.06 ± 0.02	1.2	0.2 NS

RESULTS AND DISCUSSION

The age range of patients with Bell's palsy was (20- 70) years, the mean ± S.D for patients with Bell's palsy were (43.6 ± 15.6). For the healthy control subjects the age range was (20 -70) years with mean ± S.D was (45.4± 15.9). Statistical analysis using t – test showed no significant differences between the age of patients and control subjects as shown in table 1**.** There was a highly significant reduction in serum HSV-1 IgG level after LLLT ($p<0.001$). No significant differences were observed before and after LLLT regarding salivary HSV-1 IgG level, serum HSV-1 IgM level and salivary HSV-1 IgM level. A highly significant decline in serum VZV IgG level was observed after LLLT ($p<0.001$). No significant differences were observed before and after LLLT regarding salivary VZV IgG level, serum VZV IgM level and salivary VZV IgM level. All these findings as shown in tables 2. The results in this study noted no significant differences were observed before and after LLLT regarding serum HSV-1 IgM level and salivary HSV-1 IgM level, as shown in table 3. A highly significant decline in serum VZV IgG level was observed after LLLT ($p<0.001$). No significant differences were observed before and after LLLT regarding salivary VZV IgG level ($P<0.1$), as shown in table 3. No significant differences were observed before and after LLLT regarding serum VZV IgM level was (0.3) and salivary VZV IgM level was (0.2), as shown in table 3. The ideas of this study as fallow the results of [9]; they showed that Bell's palsy is a disease without gender or seasonal predilection. It's equally affected men and women regarding age distribution. The highest occurrence of Bell's palsy is reported to be between 15- 45 years of age. This disease is less common in patients under the age of 15 and above the age of 60. Eviston *et al.,* (2015) [10] agreed with this study; they also showed that patients with Bell's palsy are not interested in age, gender and seasonal variations. Peitersen, 2002 and Greco *et al.,* 2012 [11, 12] stated that the precise etiology of BP remains unclear, although autoimmunity, viral infection and ischemic mechanisms are considered to play an important aspect in this disease. BP has occurrence in pregnant women, diabetic patients, patients with a recent extraction of tooth, those with influenza, also with cold and other respiratory illness more than other groups of population Peitersen , (2002) [11] has showed a poor prognosis in third trimester of pregnancy and in puerperium and diabetics. Shmorgun *et al.,* 2002 concluded that etiology of Bell's palsy remains unknown, but the diabetes mellitus, hypertension, pregnancy, pre-eclampsia, viral infections, hereditary factors, vascular ischemia and autoimmunity reported as probable causes of Bell's palsy. More specific, HSV-1, VZV reactivation, with subsequent inflammation with entrapment of the facial nerve in the narrow labyrinthine segment, proposed to explain nerve injury mechanism [13]. An increasing the antibody detection levels; could be associated with an early collection of Bell's palsy samples [14], these considerations were not matched with Kawaguchi *et al.,* 2007 [15] that showed herpes simplex-type 1viruses shedding in both serum and saliva were delayed in some sample of patients, probably due to host immunity. Herpes simplex type -1 reactivation is not always accompanied by an antibody response, the lack of IgM and the presence of IgG in patients with Bell's palsy shedding HSV-1 in both serum and saliva may still pointer of HSV-1 reactivation [15]. Finally, HSV-1 may be the most accepted explanation of Bell's palsy occurrence. The presence of IgG and lack of IgM in patients shedding HSV-1 in saliva, serum may still indicate a reactivation of HSV-1; these ideas near the present study. Mitchell *et al.,* (2003) [16] Rouse and Kaistha, 2006, stated the latency and reactivation of viruses has occurred more rapidly firstly HSV-1 and secondly VZV. Santos *et al.,* 2010

[17] showed the reactivation of VZV which was observed without cutaneous vesicles, in serum and saliva of Bell's palsy samples. These results were not matched with [18] in which IgG / VZV was lower than these above findings. More specific, HSV-1, VZV reactivation, with subsequent inflammation with entrapment of the facial nerve in the narrow labyrinthine segment, proposed to explain nerve injury mechanism [18]. To the best of our knowledge, this was first study revealed IgM / VZV in serum and saliva of patients with Bell's palsy, so there are no other references to compared with.

CONCLUSION

Both α- herpes viruses (HSV-1 & VZV) are associated with common, self-resolving diseases of the skin or mucosa, and occasionally establish a persistent latent infection of neuronal nuclei in the sensory ganglia innervating the peripheral site of infection, and these viruses may reactivate and recurrent disease will result in the face of existing immunity.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of oral diagnosis, College of Dentistry, University of Baghdad, Baghdad city, Iraq and all experiments were carried out in accordance with approved guidelines.

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Demographic Profile of Pattern of Railway Injuries in Warangal Municipal Limits, A. P.

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ABSTRACT

Accident is an unexpected, unplanned occurrence which may involve injury or it may be defined as an unpremeditated event resulting in recognizable damage. Railway related injuries are not those uncommon occurrences in forensic practice. Among the varied presentation of injuries, superficial injuries along with fractures were commonly observed. Over the last 15 years many railway accidents have happened in Andhra Pradesh and in India. Following these train accidents, there has been a large amount of public debate about safety management on the Indian railways. These accidents have raised issues regarding the effectiveness of the safety management of the railway system. This paper presents a summary of the results of a preliminary systemic analysis of several rail accidents in and around Warangal City. The present study was conducted in the Department of Forensic Medicine, Warangal Medical College, Warangal, from January 2013 to June 2014 i.e., 18 months, during which the total postmortem cases were 74 occurred in the jurisdiction of the Govt. Railway Police Station, Warangal. The factors taken to enumerate the study are the incidence of deaths month wise, age and sex, marital status, scene of offence and habitat during railway accidents.

Keywords: *analysis, damage, factors, management, preliminary*

INTRODUCTION

Evolution is never ending process. Mankind has evolved from primates' eras back. The same Human is trying to develop over the yesteryears by inventing things, which have mechanical advantages. One of them are the Locomotives .Every comfort has some impending dangers within them. Similarly, the moving trains are also proving fatal.[1]

The structure and designing of the train is made so safe that it is not easily possible to sustain injuries by the train, unless there is gross negligence or willful act is made to have such injuries. The areas of the movement of train are also made safe by providing several protective measures but still deaths are occurring on the railway tracks. Several commissions are made by the Governments to look in to these factors which are unsafe for public use. In spite the people living near and around the tracks are so negligent and erratic in using the track, it is always unsafe for these people.[2]

The train tracks are used for open air defecation. They are used for disposing the waste. It becomes a playground for the children. Agriculture is done in between the tracks. Animal grazing done on the tracks. The most unfortunate part is the train tracks are used by the male prostitutes especially near the railway stations. All these activities increase the movement of the people near the track. It is always dangerous irrespective the amount of safety precautions that are adopted to prevent accidents on the track. People living near to the train tracks, find railway line as their destination when they take a decision to commit suicide. This is because of the accessibility, assured death and lonely places present on the tracks. Railway tracks becomes the place for disposing the dead bodies of the homicidal victims. This type of acts are done to conceal the crime.

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MATERIALS AND METHOD

This study has been carried out from January 2013 to June 2014 from the ethical committee of Kakatiya Medical College, Warangal, Andhra Pradesh.

The present study was conducted in the Department of Forensic Medicine, Warangal Medical College, Warangal from January 2013 to June 2014 i.e., 18 months, during which the total postmortem cases were 74 occurred in the jurisdiction of the Govt. Railway Police Station, Warangal, Andhra Pradesh.

The records maintained for each case in this department are post mortem requisition given by Investigating Officer in their inquests, treatment records from hospital if treated, history from blood relatives and friends, observation of the circumstances at the scene by visiting the scene of offence, photographs taken from the scene of offence and findings in the Post mortem Examination certificates.

The materials used are inquest Reports, inpatient Case sheets, per usual of police papers, data from district crime records bureau (DCRB), Warangal. Records from Medical Record Section of Kakatiya Medical College, Warangal, Andhra Pradesh. Post mortem Reports of all cases, Information collected from the Investigation Officer, Relatives and friends of the deceased accompanying dead bodies.

OBSERVATIONS AND RESULTS

Warangal is one city which is well connected to all parts of the country by railway line. Kazipet is one of the biggest Railway Junctions. Govt. Railway Police Station is situated in Warangal Railway station and the outpost of this Police Station is located in Kazipet. The number of accidents in the jurisdiction of these stations is also increasing day by day. The same amount of load will be reflected on to the mortuary staff working in this jurisdiction.

There are 74 deaths occurred in the jurisdiction of the Govt. Railway Police Station, Warangal. All of them are subjected to Post mortem examination in the mortuary of Kakatiya Medical College, Warangal from January 2013 to June 2014.

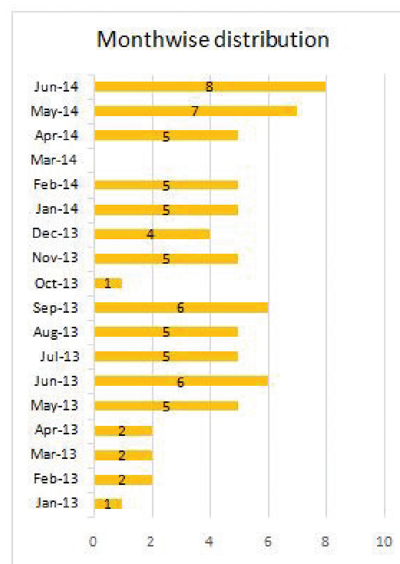

Figure 1: Month wise distribution of Railway related deaths

In this study from Figure No. 1 it can be cleared that there are 8 deaths in the month of June 2014, 7 deaths in May 2014, 6 deaths in the months of June and September 2013, 5 deaths in the months of May, July, August and November 2013, also 5 deaths in the months of January, February and April 2014. 4 deaths occurred in December 2013. 2 deaths occurred in the months of February, March and April of 2013. One death occurred in the months of January 2013 and October 2013. There are no deaths reported in the month of March 2104. The frequency of occurrence of deaths due to railway related injuries over these 18 months is not following any pattern. There are no seasonal variations observed in this period. However, the months of January to April are showing less incidence of deaths and relatively a greater number of deaths are occurring in the months May and June.

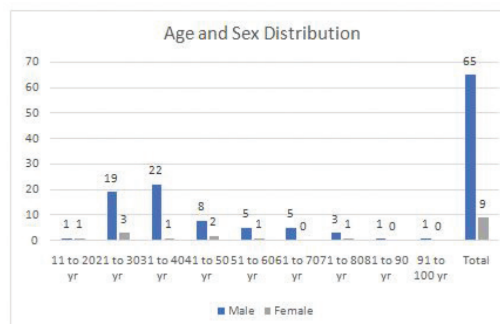

Figure 2: Age and Sex distribution

In this study on perusal of Figure No. 2, The age groups in which a greater number of deaths occurred are 21 years to 40 years, where 45 (60.81%) lives are taken by the railway. The next vulnerable age group is

41 years to 50 years where 10 (13.51%) deaths occurred. This is followed by 51 years to 60 years age group, in which 6 (8.11%) deaths occurred. In 61 years to 70 years age group 5 (6.75%) deaths, in 71 years to 80 years age group 4 (5.41%) deaths, in 11 years to 20 years age group 2 (2.70%) deaths occurred. There are one (1.35%) death in the age groups of 81 years to 90 years and 91 years to 100 years. There are no railway related deaths seen in children less than 10 years of age. Among these people males are 65 and females are 9 giving a ratio of males to females as 7.22: 1.

Table 1: Marital status of the deceased

Marital status of the deceased	Sex		Total n (%)
	Male	Female	
Unmarried	10	2	**12 *(16.22)***
Married	29	1	**30 *(40.54)***
Widowed	2	0	**2 *(2.70)***
Unknown	24	6	**30 *(40.54)***
Total n (%)	**65 *(87.84)***	**9 *(12.16)***	**74 *(100)***

Table No.1 shows that, out of 74 deaths, 30(40.54%) of the deceased are married, 12(16.22%) are unmarried and two (2.70%) are widowed. The marital status of 30 (40.54%) persons is not known as they are bought as unknown when they are subjected to Post mortem examination.

In this study, 14 (18.92%) of the total deceased there are illiterates. 16 (21.62%) of them have primary education, 9 (12.16%) have secondary education, 4 (5.41%) of them are graduates and one person (1.35%) is an Engineer in irrigation department. Remaining 30 (40.54%) persons' educational status is not available.

Table 2: Time of occurrence and Scene of Offence

Time of Occurrence	Scene of offence				Total n (%)
	On the Platform	Near Railway Station	Near Village/Town	Deserted area	
Early morning	0	0	0	1	**1 *(1.35)***
Morning	1	1	0	15	**17 *(23.0)***
Afternoon	0	0	0	9	**9 *(12.2)***
Evening	0	2	1	8	**11 *(14.85)***
Night	2	2	3	29	36 (48.6)
Total	**3 *(4.05)***	**5 *(6.75)***	**4 *(5.4)***	**62 *(83.8)***	**74 *(100)***

Table No. 2 indicates, one-person (1.35%) fell down from the moving train in the early morning hours i.e. between 4 am and 7am. 17 (23.0%) people died in the morning hours i.e. from 7 am to 12 noon. 9 (12.2%) persons died in the afternoon i.e. between 12 noon and 4 pm. 11 (14.85%) persons died in the evening hours i.e. from 4 pm to 7 pm. 36 (48.6%) persons are died in the night hours i.e. from 7 pm to 4 am.

Table 3: Habitat of the deceased

First seen dead by	Habitat				Total n (%)
	Rural	Sub-Urban	Urban	Unknown	
Known person	2	1	0	0	**3 *(4.05)***
Unknown person	0	0	0	0	**0**
Railway employee	24	9	8	30	**71 *(95.95%)***
Total	**26 *(35.14%)***	**10 *(13.51%)***	**8 *(10.81%)***	**30 *(40.54%)***	**74 *(100%)***

Table No. 3 indicates, 3 (4.05%) of them died near the platform of the railway station. 5 (6.75%) died in the vicinity of the railway station. 4 (5.40%) are found died on the track near to the village / town. Remaining 62 (83.8%) persons are found to die in the lonely and deserted places on the railway tracks.

DISCUSSION AND SUGGESTIONS

Death is one inevitable event the human life, can result from natural or unnatural means. It can be result of injuries sustained. Injuries caused by a fast-moving object can result in death. Especially trivial injuries produced by fast moving trains can result in fatality.

According to Bernoulli's Principle, when an object moves a greater velocity, it produces a low pressure in its path. Trains moving greater speed also produce a low pressure in their path and suck the objects towards them because they are placed in high pressure area and result in fatal injuries.[9] That is why a red painted area is made on the margins of the platform of Railway stations, so that people should not enter in to it when a train comes on to the platform.

In spite of the precautions and the preventive measures adopted by the Railway authorities, still many deaths are occurring on the track because of the railway related injuries.

The evidence is clearly shown in the present study by getting 74 deaths in whom railways (Trains) Produced injuries resulting in the death of persons. The annual incidence of railway related deaths is coming to 2.65% (44 deaths in the year 2013 to the total of 1661 Post mortem Examinations done), this is almost equal to the study made in Germany and much less in comparison to the rest of south east Asian countries. [3,4,5]This is because the magnitude of railway related accidents may be same throughout the world, if the track is accessible to the people, but in Warangal geographical area, the suicidal methods adopted differ from rest the habitat. In this area people are committing suicides by poisoning more than other methods.

There is no seasonal variation observed in the present study, a little increase in the incidence during summer may because people use railways more in the vacation time i.e. summer. More number of deaths is occurring in young aged persons i.e. from 21 to 40 years of age, with the mean age 34.5 year. This is less than the age group observed in America which is 39 years.[6]This shows the economic loss to the nation because of the person losing their lives in their productive age group.

The male to female ratio is 7.22. This is much higher in comparison to western countries where it ranging from 2.54 to 2.70[7,8]This can be due to selection of the method by the gender as it amounts violent deaths. Marital status cannot be taken as a parameter to read the impact of railway deaths. However, the maximum numbers of person are from married age group and many of them are married. However, many dead bodies came as unknown, hence marital status is not known at the time of autopsy.

Low socio-economic status and the illiteracy have their effects by showing increased incidence in the combination these factors, which took 14 (31.8%) lives among the 44 identified. 26 persons of the total 44 identified deceased are from rural areas. This needs a special concern that, the track needs fencing in the rural areas. 62 persons died in deserted areas, and 36 persons died in the night, which shows that, the railway track needs a vigilance to reduce these deaths.

As many as 71 dead bodies are first seen by the railway employees. This is because the deaths are witnessed by the drivers, are the gang-men or key-men making rounds on the track. Suicides are common in younger age groups and accidents are common in elderly people. More suicides occurred in the age group of 21 to 50 years and more accidents occurred in 51 to 90 years of age groups.

Suggestions:

1. All railway related deaths are invariably fatal in nature and are preventable by strict vigilance of railway staff on the track.
2. There should be proper vigilance on the railway tracks about the suspiciously moving persons on the track, by the gang men.
3. Impatient driving of the vehicle across the track should be watched out by CCTVs footages and corrected time to time

Trespassing should be penalized with heavy penalties, to discourage the movements on the track

1. Proper fencing should be made in the areas of movement of people
2. Grazing domestic animals on the railway tracks should be discouraged
3. suicidal spots on the track should identified and properly protected
4. Infrared beams should be provided to identify the movement of the people on the railway track

5. Platforms should be provided with proper height to boarding and alighting.

CONCLUSION

Most of the railway fatalities were accidental in nature and in the bread earning age group particularly among the males. The increasing number of population, overcrowding in the trains, reckless and careless behavior of the passengers, pedestrians and the train drivers towards safety norms are the constant causes of railway fatalities. The high levels of the railway fatalities make a strong case for the necessary accident control interventions. Public as well as the railway authorities must take some measures to bring down these fatalities. People must follow some easy set of laws like do not travel on footboard, do not enter or get down from running trains, do not try to cross the level crossing gate when it is closed, be alert and reduce your speed while approaching railway unmanned level crossing, never guess the speed of the train and adhere to the set norms of railway safety to curb this menace. By comparing the data of the present study of 2013 with that of the previous studies, the incidence of railway accident cases are gradually increasing in number day by day.

1. Male predominates the females, Male to female ratio is 7.22 : 1
2. The frequently involved age groups are 21 years to 40 years
3. Less incidence is seen in extremes of age groups, no death in the age group of less than 10 years
4. 30 (40.54%) of total dead bodies are unidentified at the time of conducting inquest and autopsy. 12 of them are identified in the due course of time
5. Married persons (30-40.54%) are victimized more than unmarried (12-16.22%).
6. People from low socio-economic strata, rural background are involved more in number
7. Literacy did not play significant role causation of deaths due to railway injuries
8. Night time deaths (36-48.6%) are more, followed by deaths occurring in the morning (17-23%), evening (11-14.85%) and afternoon (9-12.2%). Early morning death is only one (1.35%).
9. Very few cases of death are witnessed by the known people. Most of the dead bodies are first seen by railway employees.
10. No person in the present study is intoxicated with alcohol or drugs

Accidents (23-31.08%) are reported to be more than suicides (51-68.92%)

Ethical Clearance: This study has been carried out in the year 2013, after from the ethical committee of Kakatiya Medical College/General Hospital, Warangal.

Source of Funding: Self

Conflict of Interest: Nil

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Retrospective Study of Autopsied Firearm Fatalities Over Period of Five Years

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ABSTRACT

Present retrospective study is undertaken to observe the pattern of firearm injuries in relation with the wound characteristics, manner of death and type of firearms with their range of infliction. The study sample included seventy firearm fatalities presented to the Department of Forensic Medicine and Toxicology of Government Medical College, Jagdalpur during January 2013 to December 2017. The autopsy reports were analyzed using descriptive statistics. Maximum affected male individuals were belonged to the age group of 21-30 years. The most common site for the infliction of gunshot injury was found to be the thorax followed by the upper and lower extremities. Rifled firearm weapon was used with the distant range of fire in majority of the cases. Considering the number of injuries and their location, we interpreted the homicidal nature of death in 94.29% of all cases (n = 66).

Keywords: *Bastar, Firearm injuries, Homicide, Descriptive statistics.*

INTRODUCTION

According to the recent survey, 3.85 people died per 1,00,000 population due to gun violence during the year 2016 in the USA while India rated 0.88 during that period[1]. Increasing inter-personal conflicts, unemployment, political rivalry, religious affairs and the naxal based terrorism are contributing to it undoubtedly amongst both urban and rural Indian population. The unlicensed firearms have out-numbered the licensed ones in terms of their homicidal mode of usage[2].

The Southern region of Chattisgarh state is frequently involved in the encounter related incidences between the defense personnel and the extremists. It was reported that, 255 individuals of the various defense agencies of the state and central government have died over the period of year 2013 to 2017, in such counter fight incidences across the state[3]. Gunshot wounds have been extensively studied in forensic and other literature, with articles focusing on the types of injuries, wound locations, weapons used, weapon range, and so on[4]. Similarly, the Indian studies have demonstrated that there is variation in the epidemiological data related to the firearm deaths, which differs from place to place, across the country[5-8].

Our aim is to analyze the pattern of firearm injury cases subjected for autopsies with the intent to search for any possible measures needed to be undertaken to limit such occurrences.

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MATERIAL AND METHOD

The present study is conducted at the department of Forensic Medicine and Toxicology of Late Baliram Kashyap Memorial Government Medical College, Jagdalpur. The sample comprised of seventy known firearm related death cases amongst the total of 1971 medico-legal autopsies conducted during the period

of January 2013 to December 2017. The particulars of the cases were recorded from the autopsy reports and analyzed using descriptive statistical method.

RESULTS

Table 1: Year-wise distribution of number of deaths and victims

Year	Defense personnel	Extremists	Civilian
2013	07	02	12
2014	16	00	02
2015	13	02	00
2016	05	07	01
2017	02	00	01
Total	43	11	16

Highest number of victims belonged to the age group of 21-30 years comprised of *(male = 30; female = 03)* followed by 31-40 years *(male= 19; female= 02)*. Forty three victims were found to be from the different defense agencies, eleven from the extremists and sixteen civilians (Table-1).

Table 2: Site, Type and number of injury

Site	Entry wound (Percentage)	Exit wound (Percentage)	Glancing injury	Projectiles recovered
Head & Neck	21 (12.65%)	12 (10%)	0	0
Thorax	74 (44.58%)	47 (39.17%)	1	2
Abdomen	12 (7.23 %)	11 (9.17%)	2	1
Upper limbs	35 (21.08%)	29 (24.17%)	2	1
Lower limbs	24 (14.46%)	21 (17.5%)	4	1
Genitals	0	0	0	0

Table 3: Distribution of entry wound with regions involved

Site Victims (*n*)	Head & Neck (%)	Thorax (%)	Abdomen (%)	Upper limbs (%)	Lower limbs (%)	Genitals (%)
Defense personnel *(43)*	13 (61.90%)	44 (58.67%)	05 (35.71%)	20 (54.05%)	14 (50%)	0
Extremists *(11)*	05 (23.81%)	19 (25.33%)	08 (57.14%)	12 (32.43%)	12 (42.85%)	0
Civilians *(16)*	03 (14.29%)	12 (16%)	01 (7.14%)	05 (13.51%)	02 (7.14%)	0
Total	21	75	14	37	28	0

Thorax was the most common site for the infliction of firearm wounds with the subsequent regions included upper and lower limbs (Table-2). Major target for injury was Thorax, followed by Upper limbs, lower limbs and head-neck among the defense personnel *(n=43)*, while for the extremists *(n=11)*, it was Thorax followed by upper, lower limbs and abdomen. The civilians *(n= 16)* suffered over Thorax followed by upper limbs, Head-neck and lower limbs (Table-3).

Table 4: Range of Firearm injury

Range	Number of cases	Percentage
Contact	02	2.86 %
Close	04	5.71 %
Distant	63	90.00 %
Unknown	01	1.43 %
Total	70	100 %

Rifled firearm injuries were observed in the majority of the cases *(n= 68)* while shot gun injuries were observed in two cases. The distant range of weapon was estimated in sixty three cases (90 %). The contact shot in two and close shot within four cases (Table-4).

Table 5: Cause of death

Causes	Number of cases	Percentage
Injury to vital organs	45	64.29 %
Shock & Hemorrhage	25	35.71 %
Coma	00	0 %
Secondary infection	00	0 %
Total	70	100 %

Sixty eight individuals had survived for less than six hours after the injuries sustained. Firearm Injury to the vital organs *(n=45)* was the leading cause of death

followed by shock and hemorrhage associated with the firearm injuries *(n= 25)* to the major blood vessels, long bones and soft tissues of the thorax, upper limbs, lower limbs and abdomen (Table-5).

Based on the number, sites of injury and the circumstantial records, 90 % of all cases were the victims of encounter incidences, 4.49 % were of homicidal circumstances and 2.86 % each of the suicidal and undetermined circumstances. It was observed from the analyzed data, that the group fight was the predominant motive of crime in 63 cases while 3 homicidal cases aroused out of familial or personal conflicts (Table-6).

Table 6: Manner of death and motive of crime

Manner	Motive	Number of cases	Percentage
Encounter related	Group fight	63	90 %
Homicidal	Familial/ Enemity	03	4.29 %
	Property disputes	0	0 %
	Theft/Dacoit	0	0 %
Suicidal	Familial/ Personal	02	1.43 %
	Love affairs	0	0 %
	Money/Debt	0	0 %
	Other	0	0 %
Un-determined	Unknown	02	2.86 %

DISCUSSION

Firearm injuries to the humans have always caused significant morbidity and mortality. The incidences of gunshot wounds in civilian trauma have increased in many parts of the world, sometimes reached an epidemic level[9]. Social problems and the easy access of the non-licensed guns have contributed to it as in our country[2].

Younger male population are the most vulnerable to the mortality arising out of different propositions and circumstances such as the Northern east region, Metropolitan region or the places where, the defense agencies are deployed to limit the internal extremists violence[5-8,10,11]. Present study results are consistent with the most of the published literature in account of the constant male victims of the age group belonging to the third decade of life.

We found that the thorax (41.01%) was the most common site for gunshot injury followed by upper limbs (22.37%), lower limbs (16.61%) and head-neck (11.19%). Our study results are consistent with the findings by Thube et al[6] (Metropolitan) and Tekade et al[8] (Extremists prone region) as the thorax being the most frequently injured site in 36.9% and 32 % of the cases respectively. However, Sachan R et al[5] in their metropolitan based study, reported that the abdomen (48.4%) was the common site, followed by head-neck (27.2%), extremities (24.2%) and the thorax (18%).

Further to note that, the Thorax was the most common target for firearm injury followed by upper limbs, lower limbs and head-neck amongst the defense personnel *(n= 43)*. The thorax was the most common target for firearm injury followed by upper limbs, lower limbs and abdomen amongst the extremists *(n=11)* while the civilians *(n=14)* which were present at the encounter sites suffered most over thorax then followed by upper limbs, head-neck and lower limbs. It can be attributable to the fact that immediate or rapid incapacitation is being sought to destabilize or possibly to cause death of the victim by targeting such regions of the body which involve vital organs[12].

Based on the wound characteristics and clothes examination findings, we observed rifled firearm injuries in 97.14% *(n= 68)* of victims with the distant range of fire in 93% *(n= 63)*. The rifled firearm injuries were inflicted from the distant range in forty one defense personnel, eleven extremists and eleven civilians at the encounter sites. Unlike these results, the researchers found, smooth bored firearm injuries in 53.3 % (n=80) and rifled firearm injuries in 30% *(n=45)* cases amongst their total of 150 victims[8]. Though, the earlier study by Tekade et al[8] was carried out at the same centre, it can be attributed to the fact that there was the difference in study period of both studies and there was significant decline in number of fatalities when compared to the past and present study.

It is the well known fact that the rifled weapons have more lethality in their action and the distance doesn't pose any difficulty when fired at the specific sites over the body. Therefore, the wounds over thorax, head or abdomen are more lethal as they involve vital organs and the sufferers cannot survive long without any

immediate medical attention. We found that the Injury to the vital organs such as lungs, heart, brain, liver, spleen and intestines was the leading cause of death (64.29%) followed by the shock and hemorrhage (35.71%) due to the injuries over major blood vessels, long bones and soft tissues.

Correspondingly, we could interpreted the encounter related manner of death in 94.29% *(n = 63)* of the cases as per the number of injuries, their location and police history. Three cases represented the homicidal while the two were from the suicidal circumstances. This finding was not consistent with the study by Tekade P et al[8], where they reported 33.6% *(n= 50)* of cases belonged to homicidal nature aroused out of property disputes and subsequent 23.3% *(n= 35)* of cases out of group fights.

In concordance with the Police history and the post mortem findings, majority of the victims (97.14%) could not survived for more than 6 hours after the violent injuries. It becomes very difficult to provide immediate medical services to the survivors of violent firearm injuries. However, every possible resuscitative procedure and immediate hospitalization should be attempted.

CONCLUSION

It can be concluded from the present study that, most of the deaths from firearm injuries in the Bastar region of Chattisgarh state are the results of the encounters between the defense personnel and the extremists. The appropriate safety measures can be adopted by the defense personnel to protect the Chest, abdomen and extremities from the rifled firearm injuries in an order to limit the morbidity and the mortality. It is noticed that the number of fatalities due to firearm injuries occurring in these circumstances are declined to some extent over a period.

Conflicts of Interest: Nil

Sources of Funding: Nil

Ethical Clearance: The study adhered to the ethical guidelines.

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The Development of a Web Portal for an Assisted Reproduction Center in South India and an Analysis of its Efficacy

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ABSTRACT

Introduction: Telemedicine is the need of the hour to keep pace with developments in the healthcare industry. Easy and better access to facilities facilitates customer retention. Online consultations facilitate hassle free patient–doctor communication, in sharp contrast with the common sight of long waiting queues for doctors. Objective: To develop and analyse the efficacy of a web portal for an assisted reproduction center at a tertiary care hospital in South India.

Method: This study was conducted between November 2017 and April 2018. An initial study was conducted to analyse the need for online consultations at this center. Based on this study and considering the future requirements of e consultation in Kasturba hospital, a web portal was developed. Upon the completion and implementation of the web portal, patients who registered for the web portal services were administered a feedback questionnaire on the efficacy of the web portal. This questionnaire had to be filled out by the patients when they logged out of their web portal account. The questionnaire responses were analysed to assess the acceptance level of patients to online consultation and the working efficiency of the web portal.

Results: Patients who registered with the web portal found it user friendly. They found it easy to access all information on the portal. The positive feedback and suggestions from patients suggest that the patient portal was wilfully accepted by them.

Keywords: *Telemedicine, Online consultation, E-health, E-consultation, patient portal, web portal.*

INTRODUCTION

Telemedicine is the need of the hour to keep pace with developments in the healthcare industry. Easy and better access to facilities facilitates customer retention. Online consultations facilitate hassle free patient–doctor communication, in sharp contrast with the common sight of long waiting queues for doctors. In an era of consumer driven healthcare, where patients browse healthcare information on the Internet, graphically appealing, informative and patient centred websites can attract their attention.[1]

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Patients seek better communication with their physicians. A fully functional website with patient portal solutions will not only facilitate enhanced patient-to-provider relationships but also enable hassle free patient- physician communication.[1] The patient portal is a secure, interactive, web based communication solution that provides a platform for online interaction between doctors and patients. The availability of a patient portal can influence the patient's choice of healthcare provider.[1]

A recent trend in eHealth is delivering health care services online. Online health services like E-consultations have become increasingly popular.

These online health services can reduce both waiting time and travel expenditure. Online consultations can improve the operational efficiency and effectiveness of and equitable access to medical resources. They can reduce medical costs and improve customer satisfaction.[2] With increasing awareness and newer technology, the demand for assisted reproduction services is growing. The IVF market in India is growing at a Compounded Annual Growth Rate(CAGR) of 28% and is expected to be a Rs.500 crore market in India by 2022.[3] With growing internet penetration, internet users in India are expected to increase at a CAGR of 15.6 per cent from 450 million at the end of 2017 to 700 million by 2020.[4]

OBJECTIVES

1. To develop a patient friendly web portal for an Assisted Reproduction Center(ARC).

2.To assess the efficacy of the web portal.

METHODOLOGY

This study was conducted in an Assisted Reproduction Center (ARC) at a tertiary care hospital in South India between November 2017 and April 2018. An initial assessment was done of the requirement of online consultation in this department. The number of email exchanges between doctors and patients was counted. The need for features like report uploads and appointment scheduling was assessed. It was seen that 30-40 email exchanges per month were happening between doctors and patients. No consultation fee was being charged for the e mail consultations. There were several instances of overseas patients wanting to consult a doctor in the assisted reproduction center but not being able to do so because of the lack of a patient portal for online consultations. In order to cater to all these requirements, a patient portal with the following features was developed for the assisted reproduction center.

1. Patient Registration:

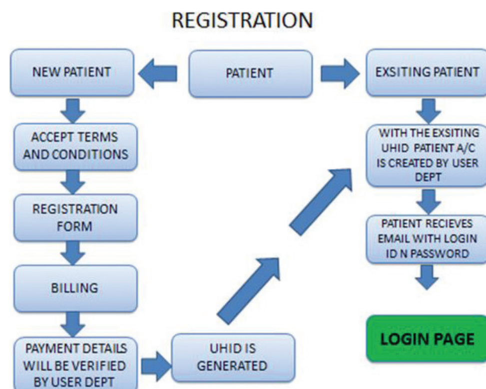

Figure 1: Registration process for a new patient

2. User Interphase: The portal has 3 kinds of users: Patients, doctors and administrators. Each one will have access to a different view. 3 different views were created:

a. Patient view (Figure 2) : This is accessible only to patients. It has the following features : Option to get an online consultation through message; Option for the patient to upload his reports to get the doctors' opinion; Option to view the date and time of the scheduled appointment. Every patient who needs an online consultation with a doctor is directed to the payment gateway for payment of the consultation fee. The patient can contact the doctor only after the payment is completed. Every message sent by the patient to the doctor is considered a consultation and is charged. The patient can upload her reports on the portal. The file size limit for each file is 5 MB. The acceptable file types are pdf and jpeg.

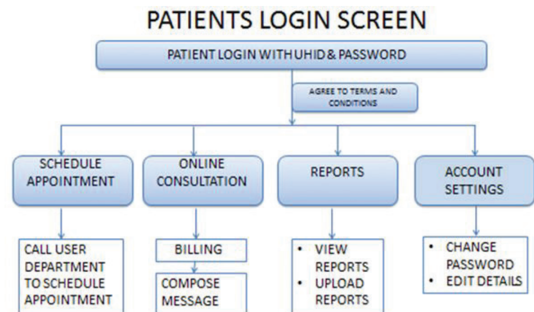

Figure 2: User interphase : Patient view

b. Doctors' view (Figure 3): This view is accessible only to doctors. It has the following features: IVF module; Exchange of messages with patients; Viewing of reports uploaded by patients; Appointment list of patients with date and time. The IVF module contains details of patients who are undergoing treatment at the ARC. This can be accessed only through a password which is unique for each doctor.

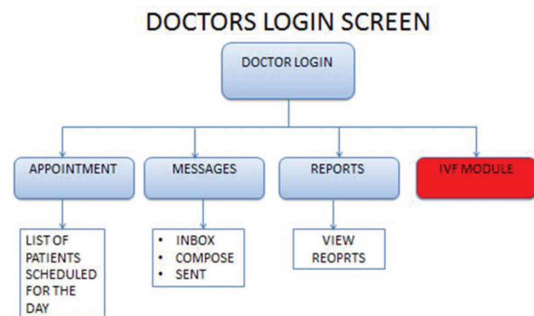

Figure 3: User interphase : Doctors' view

c. **Administrators' view (Figure 4):** This is accessible only to the front office staff. It has the following features: The registration of patients for accessing the patient portal. Every patient can be registered only through a valid email ID and valid Hospital number given to the patient at the time of registration; Scheduling of appointments; The message exchanges between the patient and the doctor.

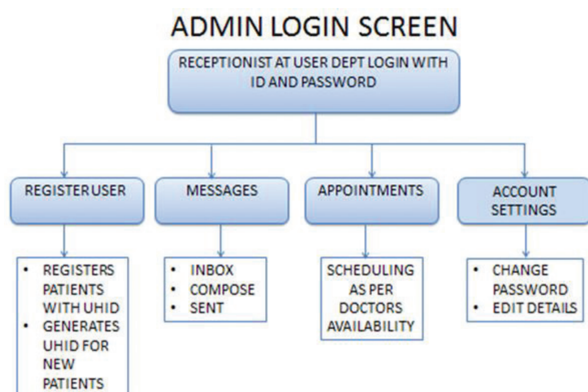

Figure 4: User interphase: Administrators' view

Assessment of the efficacy of the web portal: The web portal efficacy assessment was done by analysing the patient feedback, which was taken from patients with the help of a structured questionnaire. A sample size of 10 was considered for the analysis. Every patient who was registered in the portal had to give feed back at the time of logging out. The structured questionnaire consisted of 10 questions, out of which 8 were multiple choice questions and the remaining 2 questions were open ended, where the respondents had to fill in their comments.

RESULTS

Question 1: How easy was the login process ?

The answer options were Very Easy, Easy, Neither easy nor difficult, Difficult and Very difficult. 2(20%) respondents answered Easy. 8(80%) respondents answered Very Easy.

Question 2: Were you able to view all information after logging in successfully?

The answer options were "Yes" and "No". All 10 respondents were able to view all information after logging in.

Question 3: Did you find any issues in sending or viewing messages ?

The answer options were "Yes" and "No". All 10 respondents had no problems in sending or viewing messages.

Question 4: Was it easy to upload a report? The answer options were "Yes", "No" and Not Applicable. Of the 10 respondents, 5(50%) who actually uploaded a report found it easy to do so. The remaining 50% did not upload any reports.

Question 5: Were you able to update your password easily ?

The answer options were "Yes", "No" and Not Applicable. All 10 respondents were able to update their passwords easily.

Question 6: How would you rate the web portal?

The answer options were "Excellent", "Good", "Average", "Bad" and "Very bad". Of the 10 respondents, 6(60%) rated the web portal Excellent whereas 4(40%) rated it Good.

Question 7: Overall, how well does our website meet your need?

The answer options were "Extremely well", "Very well", "Somewhat", "Not so well", "Not well at all". Of the 10 respondents, 5(50%) responded that the website met their need extremely well, while 5(50%) responded that the website met their need very well.

Question 8: How easy is it navigate our web portal ?

The answer options were "Extremely easy", "Very easy", "Somewhat easy", "Not so easy" and "Not easy at all". Of the 10 respondents, 6(60%) responded that the web portal was extremely easy to navigate. The remaining 4(40%) responded that the web portal was very easy to navigate.

DISCUSSION

cherpbier-de Haan et al in an initial implementation of a web based consultation process for patients with chronic kidney disease observed that In the absence of telenephrology, 43 patients (35.3%) would have been referred by their family physicians, whereas the nephrologist considered referral necessary in only 17 patients (13.9%) (P <.001). The family physician would have treated 79 patients in primary care. The nephrologist

deemed referral necessary for 10 of these patients. Time investment per consultation amounted to less than 10 minutes.[5] Edwards et al in the evaluation of a pilot observational study on the use of a primary care online consultation system in 36 general practices in South West England observed that the use of e-consultations was very low, particularly on weekends. Unless this can be improved, any impact on staff workload and patient waiting times is likely to be negligible. It is possible that use of e-consultations increases primary care workload and costs. Online consultation systems could be developed to improve efficiency both for staff and patients. These findings have implications for software developers as well as primary care services and policy-makers who are considering investing in online consultation systems.[6]

Biermann et al in their study on using the internet to enhance physician-patient communication, observed that the rise in internet use by patients with musculoskeletal problems has put orthopaedic surgeons under increased pressure to provide Web-based resources. Patients are researching musculoskeletal conditions online, and many want to communicate electronically with their physicians. Online medical information may be a useful adjunct to traditional physician-patient interaction because it is readily available, is wide in scope, and can provide the patient with basic knowledge on a given topic. A clinical encounter may then be efficiently spent refining information and answering specific questions. Orthopaedic surgeons should be aware of the advantages of using Internet resources as part of their practice as well as the potential legal and confidentiality pitfalls in electronic communication. Some patient concerns may be easily satisfied and communication enhanced through the use of e-mail. Physicians planning to incorporate electronic communication with their patients must be prepared to manage unsolicited e-mail, maintain patient confidentiality, and adopt practices that maximize the use of online resources to enhance patient education.[7]

Hjelm et al, while wiring a medical school and teaching hospital for telemedicine, observed that little attention has been paid to the use of audio-visual communication within a smaller setting such as a hospital. They demonstrated that there are many applications of audio-visual communication in such an environment. They state that Audio-visual communication between patients and health professionals, and between health professionals themselves, should improve the quality of health and of undergraduate and postgraduate teaching to all categories of health professionals. They observed that the costs for a hospital-based audio-visual LAN are surprisingly low compared with overall costs for patient care. Therefore, they concluded that telemedicine in a hospital environment could well be the main application of this form of information technology in the longer term.[8] Baldwin et al in their study on the pitfalls, promises and learnings from patient portals and health apps observe that the widespread use of health information technology (IT) could potentially increase patients' access to their health information and facilitate future goals of advancing patient-centered care. Despite having increased access to their health data, patients do not always understand this information or its implications, and digital health data can be difficult to navigate when displayed in a small-format, complex interface. The authors discuss two forms of patient-facing health IT tools—patient portals and applications (apps)—and highlight how, despite several limitations of each, combining high-yield features of mobile health (mHealth) apps with portals could increase patient engagement and self-management and be more effective than either of them alone. Patient portal adoption is variable, and due to design and interface limitations and health literacy issues, many people find the portal difficult to use. Conversely, apps have experienced rapid adoption and traditionally have more consumer-friendly features with easy log-in access, real-time tracking, and simplified data display. These features make the applications more intuitive and easy-to-use than patient portals. While apps have their own limitations and might serve different purposes, patient portals could adopt some high-yield features and functions of apps that lead to engagement success with patients. The authors thus suggest that to improve user experience with future portals, developers could look towards mHealth apps in design, function, and user interface. Adding new features to portals may improve their use and empower patients to track their overall health and disease states. The authors conclude by saying that both these health IT tools should be subjected to rigorous evaluation to ensure they meet their potential in improving patient outcomes.[9]

CONCLUSION

The ARC patient portal was wilfully accepted by patients, as evidenced by the positive feedback and suggestions given by them. This could be considered a stepping stone for the acceptance of E-health and for the

further adoption of a patient portal in the departments of the hospital based on the hospital requirements.

Ethical Clearance: Taken from Institutional ethics committee

Source of Funding: Self

Conflict of Interest: Nil

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Knowledge and Practice on Dietary Management among Patients with Gallbladder Diseases

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ABSTRACT

Background: The word "Diet" means the food and drink that we habitually consume did not appear in English until thirteen century, but it also had another sense, meaning "a way of life". The second meaning is more in line with the word's origins, as it comes from the Greek "diaita via diaitan". Diaita was a noun that meant a way of living, and also had a more specific meaning, signifying a way of living as advised by a physician, which could include a "food" diet and other daily habits. The literature is increasing on the dietary management for common gallbladder disease issues. Inappropriate knowledge leads to inappropriate practice of diet which increases the problems in gallbladder disease conditions.

Objective: The main objective of the study was to assess the knowledge and practice on dietary management among gallbladder disease patients.

Method: A quantitative study based on descriptive research design. Patients were recruited from hospital. 124 patients affected with gallbladder disease were included in the study. Knowledge and practice were assessed by using self structured knowledge questionnaires and practice checklist. Data was analyzed by using a thematic analysis.

Results: Poor knowledge and practice were present among the patients regarding dietary management of gallbladder diseases.

Conclusion: Patients were having low knowledge regarding dietary management for gallbladder diseases which leads them to poor practice. Although they were aware that proper diets give them proper health but they are unaware with the appropriate diet used during gallbladder disease conditions.

Keywords: *Knowledge, practice, dietary management, patients, gallbladder diseases.*

INTRODUCTION

"Eat for the body you want not for the body you have."

-WHO

"Your diet is a bank account, good food choices are good investments."

-Bethenny Frankel

The gallbladder is small organ found fixed to the underside of the liver the job of which is to store and concentrate bile. Bile is produced in the liver and is responsible particularly for the efficient digestion of dietary fats. Bile is squirted in to the duodenum under the control of a hormone released into the blood stream as fats are detected in the stomach. As food leaves the stomach it passes to the duodenum and mixes with bile that has passed down through the biliary duct system. Disease associated with the gallbladder is very common. In western society this is usually due to the development of gallstones in the gallbladder and the following conditions may often result from inflammation, infection or blockage of the gallbladder and duct system that drains it.

OBJECTIVE

To assess the knowledge regarding dietary management of patients affected with gallbladder diseases in "Sir Sunder Lal Hospital, BHU at Varanasi, U.P"

To assess the practice regarding dietary management of patients affected with gallbladder diseases in "Sir Sunder Lal Hospital, BHU at Varanasi, U.P"

To find the correlation between the knowledge and practice of patients affected with gallbladder diseases in “Sir Sunder Lal Hospital, BHU at Varanasi, U.P”

To find the association between the demographic characteristic with their knowledge of dietary management of patients affected with gallbladder diseases in “Sir Sunder Lal Hospital, BHU at Varanasi, U.P”

To find the association between the demographic characteristic with their practice of dietary management of patients affected with gallbladder diseases in “Sir Sunder Lal Hospital, BHU at Varanasi, U.P”

REVIEW OF LITERATURE

Lindseth N. Gelenda and Denny L. Dawn, (2014), together conducted a study on “Patients‟ Experiences with Cholecystitis and a Cholecystectomy.” A phenomenological approach was used & was conducted at a 250 bedded hospital & purposive sampling technique was used for the selection of samples and interview was conducted with pre-operatively patient experiencing a indication of cholecystitis and post-operatively with those patients who had undergone cholecystectomy procedure. The study concluded the five out of six cases. They continued to describe their ongoing pain and patients also appear to describe the feeling of inadequacy in caring for their family.[10]

Hussain Muhmood Saad, (2013), conducted a study on “Quantitative analysis of chemical composition of gallbladder stones among cholecystectomy of Iraq patients.” Prospective study was used in this study in which 40 patients (8 males and 32 females) were studied. The results showed that majority of cases had mixed gallstones that involved five and four of inorganic chemicals of calcium, magnesium, uric acid and phosphate. The highest incidence was 13 gallstones in age group 40-49 years old.[13]

Misciagna Giovanni, et.al, (1998), together conducted a study on “Diet, physical activity, and gallstones-a population based, case-control study in Southern Italy.” In this study case-control method was used in which 100 patients with newly diagnosed gallstones and 290 randomly selected control subjects without gallstones were enrolled in the study. The results showed that a inactive life-style and a diet rich in animal fats and refined sugars and poor in vegetable fats and fibers are remarkable risk factor for gallstone formation.[11]

Kuwabara Kazuaki, et.al, (2011), together conducted a study on “Relationship of age, cholecystectomy approach and timing outcomes of elderly patients with cholecystitis.” In this, cohort study was used with total 2552 patients. The results showed that octogenarians were likely to have open cholecystectomy and functional decline. Since open cholecystectomy was a prediction of resource use and complications, procedures to complete earlier laparoscopic cholecystectomy and prevent complications are required for octogenarians.[15]

Haq Mujibal, et.al, (2015), conducted a study on “Effect of cholecystectomy on lipid profile in Bangladeshi patients with cholecystectomy.” The study was quantitative study in which 44 adult patients were studied. The results showed that alterations in lipid profile in which cholelithiasis were significant but complex and cholecystectomy had extreme effect suggesting a critical role of gallbladder.[16]

METHODOLOGY

A quantitative research approach was used in the present study and descriptive survey research design was adopted to assess the knowledge and practice regarding dietary management of patients affected with gallbladder diseases due to the nature of the study.

Non-probability sampling technique- purposive sampling technique was used for selecting the sample in this study because this study was adopted with the specific purpose in mind. In this study, sample size was 124 gallbladder disease patients and the data was collected with the help of structured questionnaires for the knowledge and checklist for the practice from the Government hospital.

FINDINGS OF THE STUDY

The present study was reported on knowledge and practice of patients regarding dietary management of patients affected with common gallbladder diseases. The main purpose of this study is to identify the knowledge and practice of patients regarding dietary management of patients affected with common gallbladder diseases. Total 124 patients were involved in this study. In the present study, majority 28 (23%) of the patients belongs to the age group of 40-50 years, majority 86 (69%)

of the patients were female, majority 74 (60%) of the patients belongs to hindu religion, majority 59 (48%) of the patients were having only primary education, majority 75 (61%) of the patients were unemployed, majority 74 (60%) of the patients were having income of Rs <5000, majority 81 (65%) of the patients belongs to joint family, majority 66 (53%) of the patients were vegetarian, majority 88 (71%) of the patients got the information from health personnel. The findings of the present study were based on objectives and theoretical based literature. Most of the studies revealed that having a good knowledge and practice regarding the dietary management will reduce the gallbladder disease and also in prevention of reoccurrence of the gallbladder diseases again in future.

DISCUSSION

Present Study: The present study revealed that level of knowledge score of gallbladder disease patients regarding dietary management was poor, i.e. 66% and practice score was also poor, i.e. 52%. Overall, correlation between knowledge and practice 0.49 after calculating mean and standard deviation. For knowledge mean was 5.14 and SD was 2.57 & for practice mean was 3.73 and SD was 2.04. Hence, there was poor knowledge and practice regarding dietary management among gallbladder disease patients.

Comparative Study: Sachdeva Sandeep, et.al (2011), conducted a study on "Lifestyle and gallstones disease: scope for primary prevention", with the aim quantifying the socio-demographic and lifestyle risk factors for gallstones diseases among age- and sex-matched cases and controls. The study revealed that the difference in the prevalence of gallstones among the two sexes was statistically significant (*P* **< 0.01). Large proportions of cases were asymptomatic (47%) or remained largely subclinical as chronic cholecystitis or early malignancy with nonspecific symptoms (29%).** Interestingly, intake of less protein in diet was significantly associated with cholelithiasis. A higher prevalence of cholelithiasis among females, observed in the present study. Low fiber intake and high refined sugars were similarly associated with tendency to gallstones.[8]

CONCLUSION

In the present study the patients had poor knowledge regarding the dietary management for gallbladder disease conditions. There was a significant association between the level of knowledge with educational status, occupational status, income per month and dietary pattern.

Ethical Consideration: This study is ethically considered by the panel of Teerthanker Mahaveer College of Nursing, Teerthanker Mahaveer University after discussing with each and every point of this study.

Source of Funding: Self

Conflict of Interest: Nil

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The Prevalence of Work-Related Musculoskeletal Disorders among the Nurses in Dubai: Occupational Health Study

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ABSTRACT

The purpose of this research is to explore the risk factors and prevalence of musculoskeletal disorders (MSDs) among nurses in Dubai. The research was done among nurses in Dubai's two famous hospitals – Iranian Hospital and Burjeel Hospital for Advanced Surgery. After approvals were obtained, questionnaires with attached consent forms were randomly distributed among nurses from different wards according to their availability. In this study, a total of 100 responses from nurses working in Dubai were analyzed using validated questionnaire forms. Questions focused on the percentage of nurses suffering from MSDs, risk factors perceived by nurses, and whether medical attention was sought following the development of MSDs. The results of our study showed that female nurses were more affected than male nurses. Most nurses were young (between 28 and 35 years of age) with few years of work experience. Positive responses of having developed MSDs were largely from nurses in the surgical ward. The body sites most affected were found to be the back (~44%), feet (~18%), neck and shoulder (~18%). In addition, the majority of nurses reported physical ergonomic factors as the main cause for their MSDs. These findings are especially important in the region, as very few studies have been published in this field. They also give a new perspective to the work handled by nurses and help 'voice' their problems as a call for action to nurses, hospitals, and the government itself.

Keywords: *MSDs, nurse's health, hospitals, Occupational Health*

INTRODUCTION

Musculoskeletal disorders refer to injuries or disorders of the musculoskeletal system that occur as a result of excessive exposure to hazards and/or risk factor in the work environment [1]. However, MSDs can be defined in a variety of ways based on duration, frequency and intensity of pain [2] or the existence of pain that affects daily normal functioning[3].

Although studies regarding the subject have increased dramatically, the relation between MSDs and occupations remains debatable. In a survey done by Baldwin *et al* (2004), he found that work-related MSDs are the leading cause of absenteeism and low productivity [4].

According to the Bureau of Labor Statistic (BLS), nurses and attendants had the highest rates of MSDs in 2007, which led to a high absenteeism rate, which resulted from the nature of their jobs. It is worthy to mention that nurses are indispensable in healthcare environment, so that the ergonomic risk they are exposed should not be not negligible [5] [6].

Shortage of staff is another risk factor contributing to the high rates of MSDs among nurses. Due to this, nurses often have to do strenuous work alone and over long periods. Lack of advanced nursing equipment also adds to this issue. Long working hours were reported in areas with staff shortage. This resulted in increased exposure to physical demands and therefore, limited recovery time between work shifts, which in turn led to increased rates of injuries [7]. A recent qualitative study of Canadian critical care nurses highlights the effects of overtime and increasingly heavier patients on

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nurses – leading to exhaustion, poor body mechanics and subsequent injury [8]. MSDs in nurses is an issue that is frequently overlooked not only the UAE, but in many parts of the world[9]. Therefore, our study was conducted in two of Dubai's well-recognized hospitals. This study focuses on the association of tasks involved in the nursing profession to the prevalence of MSDs among nurses. It also assesses the relationship between the current nursing ergonomics and MSDs in nurses, particularly in the UAE. Results derived will be relevant for planning, developing and implementing an ergonomic program to improve the health of nurses. Through the concept of ergonomics in workplaces can be remodeled or redesigned to suit human features and capabilities.

MATERIALS AND METHOD

The nursing population at two licensed hospitals in Dubai – the Iranian Hospital (IHD) and Burjeel Hospital of Advanced Surgery (BHAS) – was taken as the target population for the current occupational health study.

A cross sectional study was conducted in the period between February 07, 2018 to March 26, 2018 in which a sample of 120 nurses was taken at a single point in time that consisted of 57 nurses from IHD and 63 nurses from BHAS. The questionnaire was prepared by Mugga and then adopted and customized to our needs and requirements[10]. The number of questionnaires distributed differed between the two hospitals as per availability of nurses. Results were collected based on questionnaires to assess them against a set of standards provided by the OSHA. Qualitative (such as the type of MSDs in nurses, factors contributing to these MSDs) as well as quantitative data (including, percentage of nurses suffering from MSDs etc.) were also gathered and analyzed. The study focused on analyzing the MSDs in the nurses at the chosen hospitals as a sample with respect to the entire population of nurses in Dubai.

DATA ANALYSIS

The data collected was analyzed and categorized according to the questions asked, using both quantitative and qualitative methods. Risk factors were identified following the responses of the nurses. These risk factors were then categorized by frequencies. The study also looked into the relationship between demographic and employment characteristics with the prevalence of MSDs in the nurses. The information obtained was illustrated using descriptive statistics. The presence of pain and its duration was recorded according to nurses' declaration of pain. These were then compared to their effect on work, and whether they took leave or sought medical attention. Nurses were asked about body sites that were frequently injured and possible causes.

FINDINGS

MSDs were more prevalent among females than males for two reasons. Firstly, females dominated the nursing profession and therefore were more exposed to the risks of MSDs than males. Secondly, males have more physical strength than females making it easier for them to handle heavy tasks as compared to females.

Nurses in the surgical ward were the most affected by MSDs (Refer to table 3). Body sites most frequently affected were the back, feet, neck and shoulders which can be attributed to lifting and supporting partially or non-weight bearing patients, especially after their surgeries. (Refer to table 5 and 6)

Only a few nurses sought any kind of medical attention for the pain they suffered (refer to table 4) and even fewer nurses took sick leaves for the same. From the response rates (83.3%) attained from various treatment sites studied, nevertheless, most reported 'physical ergonomic factors' as the main risk contributor to their development of MSDs. (Refer to Table 3). This includes the tasks handles by nurses, equipment used, position of materials used, and so on.

The response rates obtained from different treatment sites, as shown in table 3 indicate that the surgical department was the highest among female (26.98 %) and male (47.4 %) nurses followed closely by ICU/NICU and other departments (which includes OBG, physiotherapy & clinics collectively). On the other hand, due to the very high influx of patients, it was very difficult to get the busy nurses to complete the surveys, which is also why the ambulatory department scored the lowest (0% response rate).

The demographic and employment characteristics of the nurses indicate that the majority of respondents were between the ages of 28 and 35 years old (49%), and 18-27 years old (33%) (Refer to table 1). This shows that

most nurses are quite young. Finally, the majority of the nurses' height lies between 5'1" to 5'5", (57%),(Refer to table 1). Weight 55-64kg (36%), (Refer to table 1). and the majority of participants (82%) had between 3-12 years of clinical experience which can also be concluded from their age range. (Refer to table 2). The lesser work experience and therefore, may be less familiar with the best possible way of handling Patients that is 'safest' for the nurses would be a reason for MSD's.

Overall, the values are quite different for workplaces between male and female nurses, as can be seen in table 3. Surgical unit the most among male and female nurses, 47.4% and 26.9% respectively. Pediatrics units had the least for female (1.59%) MSDs followed by emergency and ICU/NICU. For males, ICU/NICU had the least MSDs while emergency was among the highest. There were more affected male nurses in the emergency department than females (Refer to table 5 and 6).

As a result of our data analysis, we inferred the following

Table 1: Relationship between MSDs with age, Height and Weight amongst female and male nurses

	Age bracket (yrs)	Female Nurse Response Rate %	Height range (ft)	Female Nurse Response Rate %	Weight (Kg)	Female Response rate (%)
Female Nurse Data	18-27	20.6%	< 4.5	1.59%	45-54	31.7%
	28-35	68.2%	4.6-5.0	15.9%	55-64	38.0%
	36-44	7.93%	5.1-5.5	73.0%	65-74	23.8%
	45-50	3.17%	5.6-6.0	9.52%	75-84	4.76%
	51 and above	0%	6.1 and above	0%	85 and above	1.58%
	Age bracket (yrs)	**Male Response rate (%)**	**Height range (ft)**	**Male Response rate (%)**	**Weight (Kg)**	**Male Response rate (%)**
Male Nurse Data	18-27	21.0%	< 4.5	0%	45-54	0%
	28-35	63.1%	4.6-5.0	0%	55-64	26.3%
	36-44	10.5%	5.1-5.5	26.3%	65-74	26.3%
	45-50	0%	5.6-6.0	68.4%	75-90	31.6%
	51 and above	5.26%	6.1 and above	5.26%	90 and above	15.8%

Table 2: Relationship between work experience and MSDs in female and male nurses

Experience (yrs)	Female Nurse Response rate (%)	Male nurse Response rate (%)
3-12	88.8%	84.2%
13-22	9.52%	10.5%
23-32	1.59%	5.56%
33 and above	0%	0%
Total	100%	100%

Table 3: Relationship between the workplace and MSDs in female and male nurses

Workplace	Female nurse response rate (%)	Male nurse response rate (%)
Medical	12.7%	0%
Surgical	26.98%	47.4%
Pediatrics	1.59%	0%
Emergency	4.76%	31.6%

Conted…

ICU/NICU	7.93%	15.8%
Others (clinics, physio therapy, OBG)	34.92%	5.26%
OR/OT	11.1%	0%

Table 4: Nurses with MSDs that sought medical attention

Nurses	No. respondents	Response rate (%)
Sought medical attention	32	34.4%
No medical attention	61	65.6%

Table 5: Nurses' response rate about suffering from MSDs based on various body parts

Injured body parts	No. of respondents	Response rate
Back	65	43.6%
Neck and shoulder	26	17.4%
Feet	27	18.1%
Knees	15	10.0%
Head	8	5.36%
Hands	7	4.69%
Total	149	100%

Table 6: Percentage of nurses on body parts affected by MSDs in comparison to age, sex, department and work experience

Category	head	Neck and shoulders	Hands	Back	Knees	Feet
Age						
18-27	0	4	2	13	3	6
28-35	7	22	5	44	10	17
36-44	0	3	0	6	2	1
45-50	1	0	0	1	0	1
51 and above	0	0	0	1	0	0
Gender						
Male	1	4	0	17	1	4
Female	7	25	7	48	14	21
Workplace						
Medical	2	3	1	8	3	4
Surgical	2	11	1	19	3	5
Pediatrics	0	1	0	1	0	0
Emergency	1	5	1	7	0	3
ICU	1	0	0	5	2	4
OR/OT	0	1	0	4	1	3
Others (OBG, physiotherapy	1	8	5	21	6	6
Experience						
3-12	7	26	7	56	13	23
13-22	1	3	0	7	2	2
23-32	0	0	0	2	0	0
33 and above	0	0	0	0	0	0

CONCLUSIONS

Cumulative evidence refers to the continuous problems related to MSDs in healthcare sector [2, 11, 12]. In the UAE, nurses are struggling to correct the nursing shortage while working hard and maintaining standards in the absence of adequate personnel. The challenge has taken a physical toll, causing nurses to develop chronic back pain [13]. Our results clearly prove that there is an issue that is receiving insufficient attention from hospital management and nurses alike. Nursing is a very important profession, yet a demanding one as well. It requires physical, as well as mental strength to perform it well without risking the health of the nurses. Most nurses in Dubai hail from selected (younger) demographics [9] and are usually smaller in height, weight, and physical strength as compared to the patients they receive. This increases their risk of developing MSDs over long-term work exposure. Additionally, these nurses are young with low work experience due to which their knowledge on proper patient handling and other nursing tasks may be less than more experienced staff. Owing to their experience, older nurses may be more adept at recognizing their need for time off to recuperate, and knowing their own physical limits [8]. Therefore, proper training of novice nurses, working shifts and ergonomic factors, should all be considered and implemented in a way that aids the nurses in their daily activities, reducing the chances of developing MSDs, and thus, enabling them to perform their tasks in a healthy manner.

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A Postmortem Study of Blunt Cardiac Injuries

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ABSTRACT

Introduction: Blunt cardiac injury (BCI) refers to injury sustained due to blunt trauma to the heart. The manifestations of such range from clinically silent, transient arrhythmias to deadly cardiac wall rupture.

Objectives: To study the blunt cardiac trauma following vehicular accidents brought for autopsy to the morgue of Osmania Medical College, Hyderabad have been studied.

Method: 55 cases of blunt cardiac trauma following vehicular accidents brought for autopsy to the Department of Forensic Medicine , Osmania Medical College, Hyderabad have been studied to find out types of cardiac injuries, their association with sternal and rib fractures, mechanism of causation, risk factors, etc.

Results: It was observed that 60 % of the cases with blunt cardiac trauma had associated sternal and rib fractures. Maximum number (58%) of the cardiac rupture was seen in run-over cases. The right ventricle of the heart was involved in 23 (41%) cases . All the injuries were located on the anterior surface of the heart.

Conclusion: In assessing blunt cardiac trauma victims in vehicular accidents, knowledge about the commonest sites, types and degrees of injuries have been highlighted in the present study, which will help in a timely intervention.

Keywords: *Vehicular accident, rib fracture, sternal fracture, blunt cardiac trauma.*

INTRODUCTION

Nonpenetrating chest trauma with injury to the heart and aorta has become increasingly common, particularly as a result of rapid deceleration in high-speed vehicular accidents, over the past 2–3 decades . Airplane crashes, falls from height, and other severe crushing injuries of the thorax and the lower body may also lead to the nonpenetrating cardiac injuries [1–7]. Because blunt cardiac injury is the most clinically underdiagnosed traumatic injury in the adult and pediatric population [8], these kind of injuries significantly increase morbidity in polytrauma patients, and in many cases lead to death [9]. The incidence of cardiac injury is presented 20% after blunt chest trauma in postmortem studies [10]. In the pediatric age group, the incidence is slightly lower and previous studies suggested that cardiac injury was found in 15–20% of the pediatric patients examined [7-11]. The incidence might be as low as 0.5–0.8% in clinical for all age groups. Therefore, there is always a possibility of fatal cardiac injuries to be unnoticed leading to a fatal outcome.

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METHOD

55 cases of blunt cardiac trauma following vehicular accidents brought for autopsy to the morgue of the Department of Forensic Medicine , Osmania Medical College, Hyderabad have been considered for this study. The cases were studied to analyze the types of cardiac injuries, their association with sternal and rib fractures, mechanism of causation, risk factors, etc.

RESULTS

All the victims were males within the range age of 21-40 years, and all of them were involved in vehicular accidents. Out of these 55 cases of blunt cardiac trauma, 33 cases (60%) had associated sternal and rib fractures.

27% of the cases had only associated rib injuries. Only five cases (10%) had no associated sternal or rib fractures (Table-1).

Table 1: Incidence of Cardiac Injuries and Association with sternal and rib fractures

	Cardiac injuries	Number	Percentage
1.	With sternal fracture	2	3%
2.	With rib fracture	15	27%
3.	With both sternal and rib fractures	33	60%
4.	Without sternal or rib fractures	5	10%

The right ventricle of the heart was involved in 23 (41%) cases. It was lacerated in 20 (86.5%) of these 23 cases, while the remaining three (13.2%) had contusion. The right atrium was lacerated in five (9.09%) cases. Both atria were lacerated in four (7.2%) cases, while both the ventricles were lacerated in five (9.09%) cases. The right ventricle and right atrium combined were lacerated in 10 (18.14%) cases. Extensive lacerations of the heart involving both the ventricles and both the atria were seen in five (9.07%) of the cases. The left ventricle and the left ventricle and left atrium combined were contused in two (3.6%) case each. In one (1.8%) case, laceration of the right atrium without any external injury of the chest region was seen and it was observed in a motorcyclist knocked down by a truck.

DISCUSSION

Waele J.J.D. et al., [12] noticed that blunt cardiac injury was common after sternal trauma and the severity of the fracture was an indicator of possible myo or pericardial damage. This holds true in the present study as cardiac injuries were associated with sternal and rib fractures in 48.57% of the cases. In the run-over cases, the mechanism of injury could be attributed to compression of the heart between the sternum and vertebral bodies or penetration by a fractured rib or sternum. A direct blow to the anterior chest or penetration by a fractured rib or sternum could be the cause in the remaining cases. Bright E.F and Beck C.S., [13] and Parmley L.F. et al [14] , observed that while all the four chambers of the heart are susceptible to rupture in non-penetrating trauma, ventricular ruptures are preponderant. This is in concurrence with the present study. The findings of the present study were also comparable to the findings observed by Brathwaite C.E. et al [15] except for the fact that they observed a higher right atrial involvement (40.6%). The common sites of traumatic cardiac rupture in order of diminishing frequency are: right auricle, right ventricle, left ventricle, left auricle, ventricular septum and valves [13] . The preponderance of right ventricular injury over the left in blunt trauma can be explained by the fact that the sternocostal surface of the heart is mainly formed by the right ventricle, so the major brunt of the trauma is borne by the right ventricle ultimately leading its rupture. In one (2.86%) case, laceration of the right atrium without any external injury of the chest region was seen in the present study. The laceration of the right atrium without any external injuries of the chest region signifies that serious cardiac injuries may be present in absence of any visible external injuries.

CONCLUSION

In assessing blunt cardiac trauma victims in vehicular accidents, knowledge about the commonest sites, types and degrees of injuries sustained by them is often required. Patients with cardiac rupture who reach the hospital alive can often be saved by prompt diagnosis and immediate surgical treatment. Interestingly, survival is more common with right-sided injuries, especially right atrial lacerations [16,17]. Moreover, as most of the cardiac injuries have associated rib and sternal fractures, proper monitoring of the victims with rib and sternal fractures is desired in blunt thoracic trauma cases. The presence of fatal cardiac trauma in head on collision cases emphasizes the utility of safety belts while driving.

Ethical Clearance: Taken from the Institutional Ethical committee

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A Study of Determination of Stature in Hyderabad Population from External Ear Morphometry

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ABSTRACT

Introduction: Many studies have been conducted on the estimation of stature from different body parts like hands, trunk, vertebrae, extremities and foot. Since, all these parts of the body and also bones are not always available for forensic examination. It becomes now necessary to make use of other parts of the body like head & face region. Determination of stature is considered an important parameter in medico-legal and forensic examinations. Objective: this study was carried out to investigate the possibility of estimating stature from external ear morphometry in a sample of Hyderabad population.

Method: This study was carried out on 300 persons (180 males and 120 females). Besides stature, eight measurements were obtained from both ears of each participant using manual vernier caliper. Data were analyzed by SPSS version 16.

Results: There was a strong significant positive correlation between all measurements and stature. A linear equation model for prediction of stature from given external ear dimension was generated. By simple linear regression analysis, the most accurate predictable variable of stature from both ears in males was ear length (R^2 = 0.728 in right ear and R^2 = 0.815 in left ear). While in females; right ear width (R^2 = 0.655) and left conchal width (R^2 = 0.791) are the most accurate variables that can predict stature.

Conclusion: it is concluded that external ear morphometry can be used as an additional tool in the estimation of stature in Hyderabad population.

Keywords: *Ear morphometry; Hyderabad; Linear Regression*

INTRODUCTION

Personal identification means determination of individuality of a person. It is an important aspect in forensic science. In living subjects, identification was based on certain morphological criteria unique to that individual. In case of skeletal remains, identification is more complicated and requires accurate examinations of these remains [1].

Anthropometric data are believed to be objective and they allow the forensic anthropologist go beyond subjective assessments such as “similar” or “different” [2]. Establishment of alternative methodologies for personal stature estimation is very important for a number of reasons. An estimate must be then made on the known relationship of the remains to stature [3]. However, a number of common diseases or deformities of the vertebral column make it difficult to accurately measure stature in standing position in many patients.

Many studies have been conducted on the estimation of stature from different body parts like hands, trunk, vertebrae, extremities and foot. Since, all these parts of the body and also bones are not always available for forensic examination. It becomes now necessary to make use of other parts of the body like head & face region [4,5].

Ears in humans are the defining feature of the face and its structure shows the signs of age and sex. The human ear is divided into external, middle and internal parts. Pinna and external acoustic meatus form the external ear. The lateral surface of the pinna is irregularly concave, faces slightly forward and displays numerous eminences and depressions [6] . So the objective of this study was to estimate stature by using external ear measurements and derive an equation of linear regression that are specific for identification of stature in of Hyderabad population

METHOD

This study was carried out on 300 persons (180 males and 120 females), with age ranges from 18-25 years. Subjects were randomly selected from the Osmania Medical College, Hyderabad . A written informed consent was taken from each participant. Any participant with physical deformity, tumors, congenital anomalies and previous surgeries of external ears were excluded from this study.

Eight measurements beside individual stature were taken from both ears of each participant. According to Krishan [7] , stature was measured as a vertical distance from the vertex to the floor using a standard anthropometric Frankfurt plane. Stature was taken by making the subject stand on a horizontal resisting plane, with foot bared and heels together and they must not leave the ground.

Beside stature, standardized measurements of the external ear were taken according to the landmarked points defined by De Carlo et al [8] and the methodology was adopted from Mckinney et al [9] . The parameters were measured in the sitting positing with the head in the Frankfurt horizontal plane by manual vernier caliper. They include Ear length (EL), Ear width (EW), Conchal length (CL), Conchal width (CW), Lobule length (LL), Lobule width (LW), Tragus length (TL) and Tragus width (TW). All ear measurements were taken in millimeters.

For each subject, the measurements were carried out twice to ascertain accuracy and the arithmetical mean of the two measurements was used for each dimension. Secondly, all measurements were carried out by the same investigator in order to minimize bias and error of identification of the parts of the external ear involved in the measurements.

The data were analyzed using SPSS version 20. Mean and standard deviations were obtained for stature and all measurements of both ears in males and females. Correlation between stature and different measurements was tested using Pearson's correlation. Student-t-test was done to establish that a significant sexual difference was present. Linear regression analysis was performed to derive an equation to predict stature in Hyderabad region.

RESULTS

In this study, there was a significant sexual difference in stature and insignificant sexual difference in all ear measurements except right and left EL, left EW, left LL and right TW. There was a statistically significant difference in all measurements of both ears except EL in males and EL, LL and CW in females.

There was a significant strong positive correlation between all measured parameters of right and left ears and stature in both sexes . Linear regression analysis was done in this study to predict the stature of both sexes from external ears measurements.

By linear regression analysis, stature can be estimated from this equation:

Person's stature= constant+ (slopping of unstandardized coefficient x ear measurement). By simple linear regression analysis, the most predictable variable in estimation of stature in males from right ear measurements was EL (R= 0.963 & R^2 = 0.928) followed by CL (R= 0.945 & R^2 = 0.944) and finally EW (R= 0.930 & R^2 = 0.865). While, in left ear, the most accurate variable that can predict stature was EL (R= 0.956 & R^2 = 0.915) followed by CW (R= 0.955 & R^2 = 0.913) and finally CL (R= 0.945 & R^2 = 0.893).

In females, the most predictable variables of stature from right ear parameters were EW (R= 0.925 & R^2 = 0.855), followed by EL (R= 0.898 & R^2 = 0.806) and lastly LW (R= 0.893 & R^2 =0.797). While, in left ear, the most accurate variable that can predict stature was CW (R= 0.878 & R^2 = 0.771) followed by EL (R= 0.863 & R^2 = 0.745) and finally CL (R= 0.862 & R^2 = 0.744) .

By multiple linear regression analysis, combination of all measurements in both ears was occurred. In the right ear in males, R= 0.997 and R^2 =0.994. While, in the left ear, R= 0.994 and R^2 = 0.987. In females, R= 0.996 and R^2 = 0.991 in the right ear, in the left ear, R= 0.991 and R^2 = 0.982 .

By stepwise linear regression analysis, 6 models can be used to predict stature in males from right ear measurements. The most predictable model in stature estimation was that contained combination of (CL, EL, TW, LW, LL and EW) (R= 0.997 and R^2 = 0.993) . While, in the left ear of males, 7 models can be used and the model that can estimate stature accurately was that contained combination of (EL, TW, EW, CW, LL, LW and CL) (R= 0.994 and R^2 = 0.986) .

Three models were used to predict stature from right ear measurements by stepwise linear regression

analysis in females. The model that can highly predict stature accurately was that contained combination of (EW, LL and EL) (R= 0.993 and R^2 = 0.986). While, in left ear five models were used. The model that contained combination of (EL, LW, TL and TW) was the most predictable model in stature estimation (R= 0.990 and R^2 = 0.981) .

DISCUSSION

Human identification is of a great importance in many anthropological cases and traumatic events. Within the medicolegal field, the objective of the forensic anthropologist when working with recovered skeletal remains is the determination of sex, stature, age and race. Estimation of stature is an important tool in forensic examination especially in unknown highly decomposed, fragmentary and mutilated human remains[7].

Stature is being one of the criteria of personal identification that helps in narrowing down the investigation process and thus provides useful clues to the investigation agencies. It becomes very difficult for a forensic anthropologist when isolated remains of head, face, or skull are brought for forensic examination, as the standards available in this direction are scanty. Therefore, facial measurements (e.g. nose, mouth and ear measurements) act as a useful tool in the absence of the other evidences for stature estimation [11].

There are many functions of external ear. It receives sound waves for hearing and supporting eye glasses. Also, it is an important aesthetic defining feature of the human face. Overall, facial beauty arises from symmetric and harmonious proportions of its defining features [12].

There are many benefits of using the ear dimensions as a data source for individual identification. The ear has characteristic ear parts; the location of these parts, their directions, angles; their size and relation within the ear are distinct and unique to humans. So, ear measurements can be used as a modality for personal identification [13].

Studies of external ear morphometry have been significantly used in many purposes like plastic surgery [14-17], determination of racial variation [18] and designing of ear related products [19]. The use of external ear measurements in stature estimation is limited. Therefore, the objective of this study was to estimate stature in Hyderabad population using external ear morphometry and derive a linear regression equation to predict stature.

The results of this present study demonstrated that there was a statistically insignificant sexual difference in all ear measurements except right and left EL, left EW, left LL and right TW. Coinciding with these results, Cagatay and Erol [17] concluded that there was a significant sexual difference in right and left EL, EW, LW and LL.

Deopa et al [2] conducted a study included anthropometric measurements of external ear of medical students in Uttarakhand region. Their study revealed the presence of insignificant sexual difference in all measured parameters of both ears. Their study is not in agreement of our study. In the study of Oludiran and Omotoso [20], there was a significant sexual difference in EL, EW and lobule parameters of both ears and this is not in concordance with our findings except in EL of both ears, left EW and left LL which are significantly sexually different.

This study revealed that there was a strong significant positive correlation between all measurements of both ears and stature in both sexes. These results agree with the results of Magaji et al [21]. Their study revealed that there was a statistically significant correlation between EL and EW of both ears and stature. Also, our results are in concordance with the results of Lynn et al [22,23]. Their study on ear print revealed that there was a possible correlation between some auricle dimensions and stature.

Prediction of stature from external ear measurements in this study was done by the use of linear regression analysis. By simple linear regression analysis, the highly predictable variables of stature from right ear measurements in males were EL, CL and EW. While, from left ears measurements, the variables were EL, CW and CL. In females, the most highly predictable variables of right ear were EW, EL and LW. On the other hand, the highly predictable variables of left ear were CW, El and CL.

In stepwise linear regression analysis, the model that can highly statistically significantly predict stature in males from right ear measurements was the combination of (CL, EL, TW, LW, LL and EW). While, in left ear the model was the combination of the following parameters (EL, TW, EW, CW, LL, LW and CL). In females, the most predictable model of stature from right ear measurements was combination of (EW, LL and EL). In left ear, the model was that contained combination of (EL, LW, TW and TL).

This study revealed that left EW (R^2= 0.086) was the most predictable variable to estimate stature, this is followed by right EL (R^2= 0.082) and finally left EL (R^2= 0.074) and their results are not in concordance with this study [17].

When comparison of this study with those of others, this study found that there is a difference in the values of ear measurements and these differences could be a result of many factors such as race, age, genetic variables, individual constitution, environmental factors, and human error in both ear measurements and stature estimation.

CONCLUSION

In conclusion, this study has demonstrated that the ear morphometry is an additional important tool in the estimation of stature by using simple statistical method. The regression equations generated from external ear measurements can be a supplementary approach for the estimation of stature when extremities are not available. Also, the regression formulae derived in this study will be of potential use in clinical, medicolegal and anthropological studies.

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Comparable Study between Panic Disorder Patients (with or without) Mitral Prolapse in Nassiria City/Iraq

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ABSTRACT

Background: There are considerable hypothesis about possible relationship between panic disorder (pd) and mitral valve prolapse (MVP), panic disorder usually consider as impact factor on patient with (MVP) either in exaggeration of symptoms or complications of (MVP) like angina, chest pain, chronicity of course of (pd). (MVP) is myxotamous disconfiguration of valve due thickening and dislocation of valve leaflet into left atrium through systole.

Patients and Method: Cross sectional study of (52) patients with panic disorder with MVP (31) or without (21) through the period (March- October 2018) in private clinics of (physician, psychiatrist, Echocardiographic specialist), all study sample were submitted to (DSMIV) criteria to document panic disorder diagnosis by psychiatrist and physical assessment.

Results: All study sample (52) patients were documented as (pd), (31) patients (59.6%) were with negative (MVP), 21 patients (40.4%) were with positive, < 20 year age group were the major with positive MVP, >60 year were the major negative (MVP) their percentage were (66.7%,100.%) successively, most common count of positive (MVP) who were unemployed were (44.4%) in comparism with (55. 6%) with negative (MVP), (41. 2%) of MVP were from rural area, (60. 0%) were with negative MVP,(50. 0%) of positive Mitral valve were from moderate social class, which is equal to negative (MVP) (46. 2%),

Keywords: *Panic disorder, Mitral valve Prolapse, comparable study, DSMIV Criteria, Nassiriya, Iraq.*

INTRODUCTION

Panic disorder (pd) is repetitive and sever psychiatric disorder characterized by frequent panic attack (PA) which is the main syndrome of panic disorder, it is expressed as sever fear or unpleasant feeling comorbid physical and mental symptoms in presence or absence of phobic stimulus (ICD 10, W H O) [1]. Panic attack usually sudden onset often takes (5- 15 minute), or rarely extend for hours with anxiety, tremor, palpitation [2],panicky patients preoccupied with integrity of their main vital organs like their heart, respiratory system these symptoms are suggested to be psychological in nature and still masked those organs diseases like; chest pain, dysphagia, and certainly mitral valve disease (MVP). All theories suggest a basic of disturbance of autonomic system and easily diagnosed with irregular heart pulse and chest pain might developed clear cut panic attack, which concerned with group of motions disturbance which perceived as phobia[3].

Mitral valve Prolapse (MVP) or (floppy mitral valve syndrome), which shows thickening of mitral valve leaflet into left atrium at systolic phase [4] , Leaflet has three layers of tissues: the atrialis, fibrosa and spongiosa, huge connection tissue lead to thickening of spongiosa layer which isolate collagen bundle in the fibrosa, which lead to prolongation of chorda tindinea that may result in damage of posterior leaflet in inversion and dislocation of Left atrium[5].

No, obvious clinical evidence for relation between excessive co-existence of panic disorder and mitral valve prolapse[6].

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PATIENTS AND METHOD

Setting and sample- DSM-IV Symptoms of panic attack in Arabic& English version (Appendix 1) was applied to diagnose the panic disorder. Through the period (March- October, 2018). Patients should have at least {4} attacks per month followed by other one in same or other month and meeting full criteria in (Appendix 1), which mean positive symptoms of panic disorder and exclusive criteria involve (substance abuse, thyrotoxicosis or Lung disease) other exclusive criteria involve (anxiety, specific phobia, OCD, PTSD, dissociative disorder) (Appendix)(1). Such diagnosis of criteria should be submitted for expert psychiatrist and physician, other visit to document the diagnosis.

Fifty two patient were giving oral consent, examined by cross-sectional study in private clinic of (physician, psychiatrist) and Modern clinic of echo cardio graphic machine to elicit even the complicated case of MVP which are interviewed by physician through auscultation, physician also diagnosed comorbid medical disorder(x^2, P value, Fisher exact test, Pearson Chi-Square)were not find significant result between study sample (pd) with or without MVP.

RESULTS

Table 1: Distribution of age in study* sample (panic disorder patients (pd) with or without mitral valve prolapse)

Specimens			**(pd) with ***MVP		Fisher'sTest****
		Negative	Positive	Total	P value*****
Age	<20 y	Count	1	2	3.858
		% within age	33.3%	66.7%	0.263
	20y-	Count	19	9	
		% within age	67.9%	32.1%	
	40y-	Count	9	10	
		% within age	47.4%	52.6%	
	>60 yr	Count	2	0	
		% within age	100.0%	0.0%	
Total		Count	31	21	
		% within age	59.6%	40.4%	

*Study sample means panic disorder patient with or without milral valve disease.

** (pd) means panic disorder.

*** (MVP) means mitral valve prolapse.

**** Fisher exact test is not significant (NS)

***** P value is not significant (NS)

Table 2: Shows Distribution of occupation in study sample

Specimens		**(pd) with ***MVP				Chi-Square*
			Negative	Positive	Total	value
Occupation	Unemployed	Count	16	9	25	.384[a]
		% within occupation	64.0%	36.0%	100.0%	0.535
	Employed	Count	15	12	27	
		% within occupation	55.6%	44.4%	100.0%	
Total		Count	31	21	52	
		% within age	59.6%	40.4%	100.0%	

Table 3: Distribution of address in study sample

			(pd) with (MVP)		Total	X^2 *
			Negative	Positive		P value **
adress	Urban	Count	21	14	35	.007, 0.935
		% within adress	60.0%	40.0%	100.0%	
	Rural	Count	10	7	17	
		% within adress	58.8%	41.2%	100.0%	
Total		Count	31	21	52	
		% within adress	59.6%	40.4%	100.0%	

Table 4: Distribution of social class in study sample

			(pd) with (MVP)		Total	X2 *
			Negative	Positive		P **
***SC	Low	Count	12	5	17	1.846[a]
		% within SC	70.6%	29.4%	100.0%	0.397
	Moderate	Count	12	12	24	
		% within SC	50.0%	50.0%	100.0%	
	High	Count	7	4	11	
		% within SC	63.6%	36.4%	100.0%	
Total		Count	31	21	52	
		% within SC	59.6%	40.4%	100.0%	

Table 5: Distribution of heart and comorbid disease in study sample

			(pd) with (MVP)		Total	X^2*
			Negative	Positive		
**H.D	Negative	Count	25	14	39	1.305[a]
		% within HxofH.D	64.1%	35.9%	100.0%	
	Positive	Count	6	7	13	.135
		% within HxofH.D	46.2%	53.8%	100.0%	
Total		Count	31	21	52	
		% within HxofH.D	59.6%	40.4%	100.0%	

			(pd) with (MVP)			X^2
			Negative	Positive	Total	
Comorbid disease	Negative	Count	23	12	35	1.654[a]
		% within comorbid disease	65.7%	35.3%	100.0%	
	Positive	Count	8	9	17	0.198
		% within comorbid disease	47.1%	52.9	100.0%	
Total		Count	31	21	52	
		% within comorbid disease	59.6%	40.4%	100.0%	

Table 6: Distribution of comorbid psychiatric diseases in study sample

			(pd) with (MVP)		Total	X^2 *
			Negative	Positive		P **
Comorbid psychiatric diseases	Negative	Count	23	17	40	.322[a]
		***% within com-psy-dis	57.5%	42.5%	100.0%	0.741
	Positive	Count	8	4	12	
		% within com-psy-dis	66.7%	33.3%	100.0%	
Total		Count	31	21	52	
		% within Post psychiatric dis	59.6%	40.4%	100.0%	

DISCUSSION

Study exposed for (52) patients with panic disorder, (31) of them were with normal mitral valve, (21) were presented with valve prolapse, study was achieved in private clinics of psychiatrist, physician as outpatient in Nassiriya city.

Majority of patients (66. 7%) with (MVP) were< 20 year. Because of development of diagnostic tools and alertness of patients and physicians about the risk of disorder last twenty years, one study revealed (38%) of health teenager age have the same disorder [7] , which means increase (MVP) in panic disorder in comparism with healthy teenager, other study goes with this study that use the diagnosis before age of (40) years [8] .

Least incidence was (0. 00%) at age of (60) years, which is due to exclusive criteria of other valve involvement and probably the age of patients with complicated (MVP) does not prolong survive of patients above (60) year for self-ignorance of general health to such group, or due to their tolerance for panic attack symptoms, which reduce older age consultation of physician.

(MVP) mainly range between (20- 40) years, it is related for proper use of antibiotics to prevent rheumatic fever which cause valvular heart diseases, similar study mention that majority of (MVP) under 30 years age [9] .

Most employed patients with negative (MVP) (55. 6%) was higher than those with positive (MVP) (44. 4%), this is mostly revealed to crippling effect of (MVP) like fatigability or heart failure, intolerance with physical activity, in addition to factors that panic

symptoms severely affect socio- occupational life, same conclusion was settled that symptoms of (pd) with (MVP) like (tacky cardia) and palpitation, syncope, fatigue, excessive intolerance, chest pain dyspnea [10] .

(40%), (41%,) of study sample have equal count of urban and rural area with (MVP), this is probably related to presence of panic disorder fearful symptoms that enhance early consultation of physicians or psychiatrists.

(60%), (58%) of study sample with negative (MVP) are equal in both urban and residence count, also it is related to co-existence with a good leading symptoms of (pd) in spite of different address.

A availability of diagnostic tools of diagnosis of (MVP) like modern echo graphic machine and well trained resident doctors in rural area, the ratio of negative: positive mitral value state was equal to 3:2, results goes with normal distribution of study sample of patient with or without (MVP).

Comprehensive training in all place, systemic investigation, appropriate medical centers, feedback physicians information will be more in industrialized area that met suitable personal skills with strong communication abilities, all these facilities will result in more accurate diagnosis [11] .

Regarding social class in study sample among patients with moderate class count as the highest percentage (50%), high social class with positive (MVP) was (36. 4%), low social class was (29.4%),high count among high social class are goes with economic normal distribution of Iraqi population, due to improvement of income that facilitate early consultation of professional physicians, low social class with (MVP) has least count for financial obstacles to afford the payments of medical care in city center, marked fatigue, hyperventilation, chest pain are more prevalent in civilian life as well, (MVP) and other medical illness that comorbid (pd), these conclusions are contradictory with our study of highest count of (pd) with (MVP) in high social class [12] , study sample with (pd) with (MVP) with low social class are the highest (76. 6%) in comparism with high social class, this result might be accidental, which goes with other study which mentioned (pd) and its comorbidities are more prevalent in low social class due to poor somatic status [13] .

Distribution of heart diseases in this study sample in patients with (MVP) was (53. 8%), which is higher than study sample with negative (MVP) (46. 2%), most common complications of (MVP) are mitral valve regurgitation, endocarditis and destruction of choradal, some patients experience chest pain, dyspnea [14] . So we can conclude that Patients with panic disorder express more cardiovascular diseases and(MVP).

Positive count percentage within study sample with (MVP) was (52. 9%) in comparism with study sample without MVP (47. 1%), the case related to synergistic effect of (pd) with (MVP), longitudinal evaluation of (pd) referred to increased distribution of physical diseases likes hypertension, migraine, peptic ulceration,

endocrine disturbance as comorbid physical disease [15] , approximately half (52%) of all patients present with at least one physical health condition, the relation of medical comorbidity in (pd) highly concerned to bad health perceived compare to those without, (p- valve is< 0. 5) [16] , significant value cannot be found out in our study due to small size study sample.

Non psychiatric medical comorbidity, health perception and treatment out common in patients with panic disorder suggested correlation of (pd) and (MVP), with low in frequency (0- 8%) other higher [17] , which goes with this study finding of comorbid diseases.

Comorbid psychiatric diseases in study sample with positive (MVP) was (33%), (pd) with negative (MVP) was (66%) higher percentage among negative (MVP) than positive refers to negative correlation with other mental effect, the case that concerned with denial approach of patients for their mental symptoms is due to social stigma or it is type of chance effect. Some studies mentioned that (MVP) is disorder which occurs more probably with emotional disorder and fear of serious heart diseases likes palpitation and chest pain which suggest angina pectoris, cardiac arrhythmia, phobia are usually comorbid panic disorder and anxiety disorder [18] , patients with MVP and (pd) are frequently have major depressive disorder [19], the case which was not observable during mental state examination in this study; which is probably due to time restriction or Long term use of chronic (pd) patient of selective serotonin Reuptake inhibitors (SSRI) which control both panic and depressive disorder in (60%) of cases. (36) out of (100) patients with (MVP) are presented with uncontrolled anger- rage symptoms [20] .

Concerning distribution of duration of (pd) with positive (MVP) in study sample were relatively equal in the following periods (1 month, 1 year, 6- 10 years) were the duration relatively in (63%), these results referred to the chronicity of (pd) with MVP, however (1 month) duration was the most common (66. 7%), but this is mainly related to younger age<20years old.

High percentage of long duration among study sample with (MVP) (1year), (6- 10 years) probably referred to ignorance the symptoms of panic disorders, because of short time of episode of (pd) (few minutes- hour), or poor medical training for diagnosis and differentiating (pd) among many practitioners, other causes related to similarity of (pd) to generalized anxiety, exertional arrhythmia, mid (MVP) usually a symptomatic although its prevalence is (24- 35%) definite (MVP) with (pd) [21].

Duration of (pd) with negative (MVP) were lower than positive (MVP) in most durations course of (pd) mostly in (1 month,6 month,1 year,6-10 year), this is related to impact effect of panic disorder on study sample of comorbid diseases, mitral valve regurge, ischemic heart disease.

(MVP) patients with (pd) who did not seek professional care would be low and similar to patients with negative (MVP) [22] .

CONCLUSION

There was obvious different in percentage of various socio- demographic or medical variables of study sample with MVP or without, despite presence of controversial some results that was interpreted through this study.

Conflict of Interest: The author has no disclosures to report.

Source of Funding: Self.

Ethical Clearance: All patients and their relative were giving oral and written consent to carry out all investigations and interviews.

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A Study to Assess the Knowledge and Compliance of Critical Care Nurses Regarding Ventilator Care Bundle in Prevention of Ventilator Associated Pneumonia

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ABSTRACT

Mechanical ventilation is one of the major supportive modalities in the intensive care unit but it carries a lot of risks and complications, the most common one being VAP. VAP is a problem in intensive care units worldwide and dramatically increases morbidity and mortality rates on mechanically ventilated patients. It is the most common infectious complication among patients admitted to intensive care unit[1]. Knowledge of nurses on ventilator care bundle for the prevention of VAP and adherence to them would reduce the risk of occurrence of VAP and decrease morbidity and mortality of mechanically ventilated patients in the ICU. Nursing care is growing rapidly in conjunction with technology and it is catching up with developed countries guidelines and standards of care. Nursing shortage, however, is a burden and intensive care nurses are in huge demand .The few intensive care nurses still practicing need to constantly update themselves with current knowledge and scientific evidence on many issues existent in the ICU,including VAP [2]. The four primary recommended practices includes: elevating the head of the bed to 30 degrees, sedation vacations, oral care with chlorohexidine (CHG) and subglottic suctioning endotracheal tubes. Ventilator "bundles" usually include other elements such as deep venous thrombosis (DVT) prophylaxis, peptic ulcer prophylaxis. The nurse are expected to care for these patients in a setting of intensive care unit. The nurses should have thorough knowledge of the modes of ventilation, assessment, and trouble shooting of ventilators and assessment and care of the patients requiring mechanical ventilation.[3,4]

The result shows that more than half (56.7%) of the staff nurses had excellent knowledge regarding ventilator care bundle and 43.3% of them had good knowledge regarding ventilator care bundle It shows that knowledge and compliance of staff nurses regarding ventilator care bundle were found to have significant association.

Keywords: *Compliance, Critical care nurse, Ventilator-associated pneumonia (VAP), Ventilator care Bundle,*

INTRODUCTION

The lungs are usually amongst the major organs involved in multiple organ failure and thus the challenge of delivering appropriate ventilation with as little complications as possible is extremely important. Nosocomial pneumonia is a leading cause of death from hospital-acquired infections, with an associated crude mortality rate of approximately 30 percent. Ventilator-associated pneumonia(VAP) refers specifically to nosocomial bacterial pneumonia that has developed in patients who are receiving mechanical ventilation.To ensure the highest standards of nursing care, nursing practice must be based on a strong body of scientific knowledge. This can be achieved through adherence to the evidence based guidelines for prevention of VAP, ultimately improving patients' outcomes. Improved outcomes will shorten patient's ICU length of stay, hospitalization as well as benefit the patient financially with decreased hospital costs. Hospitals also gain benefits as they are continually faced with the challenge of providing cost effective services to patients and communities.[1]

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PURPOSES

To assess the knowledge, compliance of staff nurses regarding ventilator care bundle.

NEED OF THE STUDY

Intubation and mechanical ventilation both increase the risk of bacterial pulmonary infection because the invasive endotracheal tube allows direct entry of bacteria into the lower respiratory tract since the tube is located in the trachea. Bacterial colonization in the respiratory tract is further facilitated by the absence of the cough reflex and excessive mucus secretion in the mechanically ventilated patients.[5]Nosocomial pneumonia is a leading cause of death from hospital-acquired infections, with an associated crude mortality rate of approximately 30 percent. Ventilator-associated pneumonia(VAP) refers specifically to nosocomial bacterial pneumonia that has developed in patients who are receiving mechanical ventilation. Ventilator-associated pneumonia that occurs within 48 to 72 hours after intubation is usually termed early-onset pneumonia; it often results from aspiration, which complicates the intubation process.Ventilator-associated pneumonia that occurs after this period is considered late-onset pneumonia**.**

Between 5-15% of hospital in-patients develop infection during admission to intensive care unit(ICU). ICU patients are 5-10 times more likely to acquire nosocomial infections than patients in the wardsand approximately 86% of hospital associated pneumonia is linked with mechanical ventilation.The prevention of Ventilator Assisted Pneumonia (VAP), a hospital acquired infection, among intensive care patients is a major clinical challenge. It is a condition that is associated with high rates of morbidity, mortality, length of stay and hospital costs.[6]

Conceptual Framework: The conceptual framework is developed by the investigator herself based on the critical thinking of nursing practice Health Belief Model (HBM)developed in the 1950s by social psychologists Hochbaum, Rosenstock and Kegels working in the U.S. aims toassess the knowledge and compliance of critical care nurses regarding ventilator care bundle in prevention of ventilator associated pneumonia.

RESEARCH METHODOLOGY

Design: Exploratory survey research design

Sample: 60 nurses.

Tool: Demographic data, structured questionnaire, Observation checklist

Validity: Validation of the tool was done by experts and modifications were made accordingly.

Reliability: The reliability of the tool was calculated to be 0.9538 for knowledge aspects and 0.8072 for practice aspects. Split half method, Inter rater method was used to find out the reliability for knowledge and compliance aspects which was analysed using Karl Pearson co-efficient correlation.

DATA COLLECTION

Data was collected from 60 subjects working in critical care unit.

DATA ANALYSIS

The data collected was analysed using descriptive and inferential statistics.

Major Findings of the Study:

- Majority of 71.7% of the staff nurses had age 21-25 years, 25% of them had age 26-30 years, and remaining 3.3% of them had age above 35 years.
- Majority of 75% of them were females and 25% of them were males.
- Majority, 95% of them had B.Sc. Nursing, 1.7% of them had GNM and 3.3% of them had Post B.Sc.
- Majority shows 81.7% of them had 1-3 years of total experience and 18.3% of them had more than 3 years of experience
- Majority shows,58.3% of them had less than one year of ICU experience, 33.3% of them had 1-3 years of experience and 8.3% of them had more than 3 years of experience.
- Majority shows,33.3% of them were working in CCU, 33.3% of them were working in ICU and 33.3% of them were working in NTU.
- Majority,51.7% of them were in Evening shift, 23.3% of them were in morning shift and 25% of them were working in night shift.
- Majority shows,51.7% were in the evening shift followed by 25% in night and 23.3% in morning.

Findings related to knowledge of staff nurses regarding ventilator care bundle: It shows that more than half (56.7%) of the staff nurses had excellent knowledge regarding ventilator care bundle and 43.3% of them had good knowledge regarding ventilator care bundle.

Findings related to complianceof staff nurses regarding ventilator care bundle: It shows that knowledge and compliance of staff nurses regarding ventilator care bundle were found to have significant association. More the knowledge, better is the compliance, as the p-value is less than 0.05.

Findings related to association between knowledge regarding ventilator care bundle and selected demographic variables of staff nurses: It shows that shift was found to have significant association with the knowledge of the staff nurses regarding ventilator care bundle, as the p-value corresponding to shift was small, the null hypothesis is rejected.

Findings related to association between compliance regarding ventilator care bundle and selected demographic variables of staff nurses: It shows that area of work and Shift were found to have significant association with the compliances of the staff nurses regarding ventilator care bundle, as the p-values corresponding to area of work and shift was small, the null hypothesis is rejected.

CONCLUSION

The Findings of the study show that there is a highly significant association between knowledge and compliance scores of the group.. There is significant association of knowledge score with shift and compliance scores with area of work and shift as 'p' value <0.001.

This study could help in increasing the knowledge and compliance of staff nurses regarding ventilator care bundle in prevention of VAP.

DISCUSSION

In the present study 43 (71.7%) of the subjects were from the age group of 21-25 years whereas 15 (25%) of them were in the age group of 26-30 years. Majority 45 (75.%) of subjects were females and only 15 (25%) were males. Maximum 57 (95%) did their B.Sc. nursing, whereas 2 (3.3%) did their PBSc nursing where as G.N.M 1 (1.7%). Most 49 (81.7%) of the subjects had 1-3 years of experience remaining 11(18.3%) of the subjects had > 3 years of total experience. Most 35 (58.3%) of the subjects had less than 1 year remaining 20 (33.3%) of the subjects had 1-3 years of experience remaining 5(83%) of the subjects had > 3 years of total ICU experience. There was equal representation 20 (33.3%) of subjects had CCU, ICU, NTU experience. Majority 31(51.7%) of the staff nurses were in evening shift while around 23 - 25% morning shift & night shift respectively. More than half (56.7%) of the staff nurses had excellent knowledge regarding ventilator care bundle and 43.3% of them had good knowledge regarding ventilator care bundle. Majority (71.7%) of the staff nurses had good compliance regarding ventilator care bundle, 18.3% of them had satisfactory compliance and 10% of them had excellent compliance regarding ventilator care bundle. It shows that knowledge and compliance of staff nurses regarding ventilator care bundle were found to have significant association. More the knowledge, better is the compliance, as the p-value is less than 0.05.

Source of Funding: Self

Ethical Clearance: Taken from RAC

Conflict of Interest: Nil

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Determinants of Levels of Cardiac Troponin I in Post-Mortem Blood Sample in Sudden Cardiac Death–An Autopsy Based Study

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ABSTRACT

Cardiac Troponin I (cTnI) is a very sensitive biochemical marker for the diagnosis of myocardial infarction (MI) in Sudden Cardiac Death (SCD). cTnI has nearly absolute myocardial tissue specificity, thereby reflecting even microscopic zones of myocardial necrosis. The aim of this study is to find out the gross and microscopic changes in heart and determinants of elevated levels of cTnI in cases of SCD. This cross sectional study was conducted in 50 cases of SCD brought for medicolegal autopsy at Government Medical College, Thiruvananthapuram. Heart was examined for gross and microscopic changes and blood level of cTnI. The mean value of cTnI was 3.4 (sd – 7.8) ng/dl. Age (>50 years), male sex, BMI (>25), previous history of CAD, family history, diabetes mellitus and hypertension were the determinants of level of cTnI in the postmortem blood. Common morphological findings observed in heart were haemorrhage, hypereosinophilia and oedema. From this study it can be concluded that cTnI assay can be used as a valuable supportive measure for postmortem diagnosis of SCD.

Keywords: *Sudden Cardiac Death (SCD); Cardiac Troponin I (cTnI); myocardial infarction (MI); determinants; postmortem diagnosis*

INTRODUCTION

According to Hurst, sudden cardiac death (SCD) in a person is the unexpected natural death in a person, due to cardiac causes, within a short period of time from the onset of symptoms without any prior fatal disease[1]. Acute myocardial ischaemia due to Coronary Artery Disease (CAD) accounts for 45 to 90% of all sudden natural deaths according to various authors[2]. Post-mortem demonstration of ischaemic heart disease is based on conventional gross and histological changes. Gross changes occur 8 hours after coronary occlusion. No macroscopic changes will be evident by classical method for at least 8 hours or much longer[3]. Cardiac Troponin I (cTnI) is a very sensitive biochemical marker for the diagnosis of myocardial infarction (MI). Cardiac troponin I has nearly absolute myocardial tissue specificity, thereby reflecting even microscopic zones of myocardial necrosis[4]. cTn I was found to be power aid in diagnosis of myocardial damage[5].

The main aim of this study is to find out the gross and microscopic changes in heart and determinants of elevated levels of cardiac troponin I in cases of sudden cardiac death

MATERIAL AND METHOD

This cross sectional study was conducted in the Department of Forensic Medicine, Government Medical College Thiruvananthapuram for a period of one year after getting Institutional Ethics Committee Clearance. A sample size of 50 cases of SCD due to CAD was studied. Unknown cases, decomposed bodies and those with other causes of death were excluded from the study. Cases were selected after scrutinizing the inquest reports. Informed written consent was obtained from the available near relative. Preliminary details were collected from the available relative and the police. During autopsy,

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a sample of 5ml of blood collected from neck veins for analysis of level of cTn I. All organs including heart were examined in detail for gross pathological changes. Bits of tissues from heart were subjected to hisopathological examination using haematoxylin and eosin staining. cTnI was analysed by High Sensitivity assay at Advanced Research Laboratory (ACR Lab), Government Medical College Thiruvananthapuram. All data were entered in proforma and MS Excel Spread sheet.

Statistical analysis was done using soft ware, Statistical Package for Social Sciences (SPSS) Version 16.0. The descriptive data was represented; qualitative variables as frequencies and percentage and continuous variables as mean and standard deviation (sd). Categorical variables were made into binary variables and comparison was done using't' test. Correlation between variables was done by Pearson correlation.

OBSERVATIONS

Results are as follows

Table 1: showing characteristics of the study population (N = 50)

Variable	Mean	sd	Min.	Max.	25th percentile	Median	75th percentile
Age	52.2	12.8	23.0	83.0	44.5	53.5	61.0
Body Mass Index (BMI)	24.0	3.6	16.4	36.3	21.5	24.5	26.1
PM interval	14.8	5.6	4.0	23.0	10.0	16.5	18.5
Trop I	3.4	7.8	0.8	56.6	1.5	2.1	3.2

Table 2: showing Microscopic appearance of heart (N = 50)

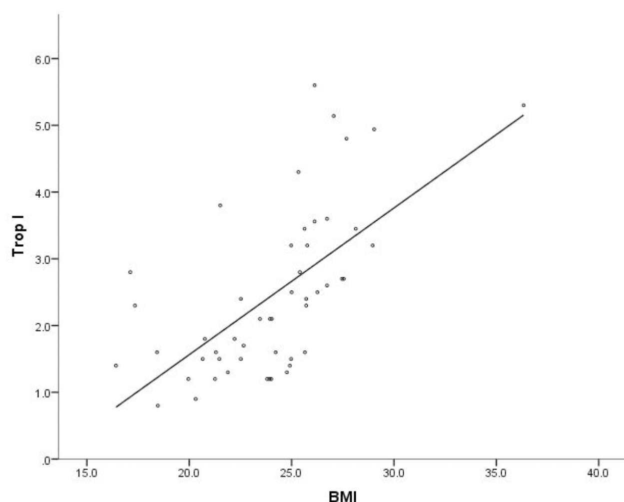
Characteristics	Frequency	Percentage
Wavyness of fibres	27	54
hyper eosinophilia	43	86
haemorrhage	44	88
oedema	42	84
Necrosis	19	38
Vascular proliferation	12	24
Inflammatory cell infiltration	22	44
Fibrosis	32	64

Table 3: Showing correlation of Trop I level with independent variables (N = 50)

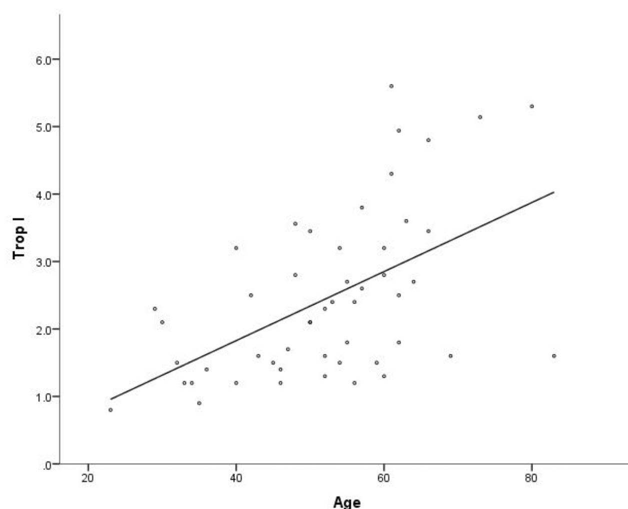
Variable		N	Troponin I		t	p
			mean	sd		
Age	<50	18	1.78	0.79	-.126	0.003
	≥50	32	2.83	1.29		
BMI	Normal	30	1.75	0.67	6.845	<0.001
	Abnormal	20	3.51	1.14		
Gender	Male	30	2.74	1.23	2.064	0.044
	Female	20	2.02	1.14		
Previous h/o CAD	No	22	1.95	0.70	2.679	0.010
	Yes	28	2.84	1.43		

Conted…

Family history	No	39	2.24	1.01	2.451	0.018
	Yes	11	3.22	1.67		
Smoking	No	25	2.54	1.34	0.504	0.617
	Yes	25	2.36	1.15		
Alcoholism	No	17	2.66	1.39	0.852	0.398
	Yes	33	2.35	1.16		
Diabetes Mellitus	No	29	2.05	1.10	2.924	0.005
	Yes	21	3.01	1.21		
Hypertension	No	25	1.98	0.87	2.899	0.006
	Yes	25	2.93	1.38		



Pearson correlation- r= 0.633 p< 0.001
Figure 1: Showing the relationship of Troponin I with BMI



Pearson correlation- r = 0.53, p.001
Figure 2: Showing the relationship of Troponin I with Age

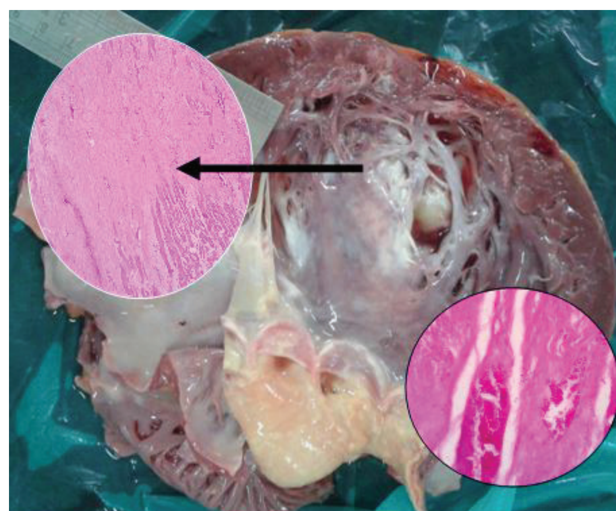


Figure 3: Showing gross appearance of fibrosis and its microscopic appearance (insight upper left H&E100 x and haemorrhage (insight lower right H&E 400x))

DISCUSSION

In the present study the mean age at death of SCD was 52.2 years (sd- 12.8) which is in agreement with previous study showing mean age 47 years (sd - 13)[6]. There is male predominance similar to many other studies[6,7]. The average postmortem interval was 14.8 hours (sd - 5.6); so that decomposition changes has not started and so no changes in level of troponin could have occurred due to decomposition. The average Body Mass Index (BMI) was 24.0 (sd- 3.6). It indicates that majority of persons died of SCD is having BMI within normal limits.

Microscopic findings: Common microscopic findings in heart in SCD were similar to observation made by Fishbein and slightly higher from observations of Martinez. The findings were haemorrhage (88%), hyper

eosinophilia (86%), oedema (84%) and waviness of fibres (54%). In the study by Fishbein etal[3] the findings were haemorrhage (71%), hyper eosinophilia (10%), oedema (10%) and waviness of fibres (94%) and Martinez et al[8] observed haemorrhage (18%) and oedema (78%). The most common observation in Fishbein etal[3] study was vascular proliferation (100%) whereas in our study that observation was 24%. Fibrosis was observed as indicator of old Myocardial Infarction and observation varies from 40% to 80% in different studies[9,10]. In the present study it was 32 (64%)

Level of Troponin I: The mean level of Trop I was found to be 3.4 ng/dl (sd – 7.8) in the present study. This value is diagnostic of Myocardial Infarction. This finding is in well agreement with various other postmortem studies. Because cardiac Troponin I is not normally found in blood, any detectable amount is considered as indicative of MI. In the meta analysis by Sethi A etal[11], the researchers found out a pooled cut off value of High sensitivity Trop I as 0.867 (95% CI: 0.845 – 0.887, $\chi^2 = 43.46$, $p<0.001$). In a study Patel PR etal[12] concluded that cardiac Trop I level > 0.04 ng/ml was considered as positive test and 93.75% cases of SCD gave positive test and none of cases of Noncardiac death gave positive test. Whereas Martinez etal[8] in his study observed serum mean value of Trop I 11.8ng/ml (sd – 23.6). Many authors also suggested CardiacTrop I assay in postmortem blood as a diagnostic tool of SCD[5,13,14]. Sharma etal[14] observed in his study, trop I value indicative of myocardial damage ranges from 0.1 to 2 µg/ml. In another study by Bossard etal[15] observed a median value of 0.68 (interquartile range 0.43 to 1.18) ng/ ml. A similar observation was made in the present study with a median value of 2.1 (interquartile range 1.5 to 3.2) ng/ ml

Determinants of Postmortem blood level of Trop I: Univariate analysis of various independent variables upon the level of Trop I could identify certain determinants of the level of Trop I in postmortem blood sample. Among general factors Age (>50 years), Male sex, BMI (>25), Previous history of CAD, Family history, Diabetes Mellitus and hypertension are found to be the determinants and causes elevated levels of trop I in post mortem blood sample. Various studies had observed male gender, age as determinants[15-17]. BMI and age showed positive correlation with the level of Trop I with high significance ($p<0.001$) as shown in charts.

CONCLUSION

Cardiac Troponin I assay can be used as a valuable supportive measure for postmortem diagnosis of SCD. Common morphological findings observed in heart were haemorrhage, hypereosinophilia and oedema. The mean tropinin I value in postmortem blood sample was found to be 3.4 (sd- 7.8) ng/dl. Age (>50 years), male sex, BMI (>25), previous history of CAD, family history, diabetes mellitus and hypertension were the determinants of level of Troponin I in the postmortem blood. The smaller sample size and the difficulty to get previous history and personal habits are the limits of this study.

Conflict of Interest: None to declare

Source of Funding: Study is part of a project funded by State Board of Medical Research (SBMR) Government Medical College, Thiruvananthapuram.

Ethical Clearance: The study started only after receipt of Institutional Ethics Committee, Government Medical College, Thiruvananthapuram.

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Effect of Group Education (Simulation Model) on Information Disclosure and HIV/AIDS Transmission Prevention for HIV/AIDS Risk Groups

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ABSTRACT

WHO calls the case of HIV/AIDS as an iceberg phenomenon, especially in countries that have not yet carried out HIV testing evenly, including Indonesia. The Ministry of Health of the Republic of Indonesia reports that the rate of increase in new cases of HIV/AIDS is accelerating, especially in the last 3 years. This study aims to analyze the effect of group education (simulation model) on information disclosure and efforts to prevent HIV/AIDS transmission for HIV/AIDS risk groups in Malang, Indonesia, using pre-test and post-test group design. The population of this study was all people at risk of HIV/AIDS, who had a special group and had names in the community: *IGAMA* (Malang gay bond), *IWAMA* (Malang Transgender Association), *Penasun* (syringe users), *Sadar Hati* (narcotics users), *Paramita* (commercial sex vendor) in Malang City, with 140 people. The sample of this study was the risk group with HIV/AIDS in the working area of Arjuno Health Center and Dinoyo Health Center, Malang, with a sample size of 30 from *IGAMA, Penasun*, and *Sadar Hati*. The results showed that: 1) information disclosure before and after group education was> 90% quite disclosure; 2) prevention of transmission before intervention was 56% good, and after intervention increased to 83%. The results of the paired sample t-test showed that: 1) there was difference in information disclosure between before and after the intervention (p-value = 0.001); 2) there was difference in HIV/AIDS transmission prevention between before and after administration of intervention (p-value = 0.002).

Keywords: *HIV/AIDS, Group education, Information disclosure, Prevention of transmission*

INTRODUCTION

HIV/AIDS is a deadly disease that until now there is no vaccine and cure. WHO calls HIV/AIDS an iceberg phenomenon, especially in countries that have not even carried out HIV testing, including Indonesia.(1) Many programs have been implemented by the Indonesian government to tackle HIV/AIDS, but their reach is still limited. Ministry of Health of Republic of Indonesia reports the increasing rate of new cases of HIV/AIDS, especially in the last 3 years. Data from January 1987 to June 2014 showed that 142,950 Indonesians had contracted HIV and 55,623 people had been diagnosed with AIDS. The known risk factors are heterosexual (34187), homo-bisexual (1298), *Penasun* (8451), blood transfusion (129), perinatal transmission (1499) and unknown (9532). Until June 2014, the number of people with HIV in East Java was 18,210 people, while AIDS was 8,976 people.(2) In East Java Province, Malang City was ranked second after Surabaya, with the number of cases of "People Living with HIV/AIDS" in March 2014 was 2,929 people.(3),(4) Gay people in Malang also contribute, also *IGAMA*.(4)

Gay and transvestites who are known as homosexuals who live as a special group in the city of Malang, tend to have sexual intercourse by ano-genital or uro-genital, so it does not rule out the possibility of body fluids (sperm/ blood) coming out of people with HIV/AIDS or the existence of injuries from the process of sexual activity. This situation increases the chances of transmission of the HIV virus among fellow gays. This should not be allowed, and needs to be watched out, especially when they engage in sexual activities without using safety devices.

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So far, health workers in Malang City have made efforts to prevent transmission of HIV/AIDS through various campaign or counseling activities in schools, Islamic boarding school, high-risk groups such as *IWAMA, IGAMA*, along with the "*Paramita*" Community Social Institutions, "*Sadar Hati*" and etc. The results of interviews with Malang Health Service officials show that general awareness to prevent transmission of HIV/AIDS through gays in Malang City is still general.

Other efforts based on personal and group approaches with certain techniques have not been carried out. During this time, it was known that certain learning methods with the right approach succeeded in changing human behavior, especially healthy behavior. Intervention towards behavior is often carried out in the framework of holistic and comprehensive management. *IGAMA/IWAMA* is a special group in the city of Malang that has long been sexually deviant. Deviant sexual behavior is an indicator of a real risk factor for the spread of HIV/AIDS.

Some data shows that the health team has difficulty diagnosing HIV/AIDS because of the difficulty of getting information due to privacy factors. The closure of information is the impact of unpreparedness in facing social isolation for people with HIV/AIDS. Some *IWAMA* and *IGAMA* members feel ashamed as members of the community with abnormal life styles that are not in accordance with the norms and values that apply in society, so they choose to isolate themselves or gather together in groups.

Until now, health education is still considered an effective approach to provide awareness and appropriate behavioral changes to health. There are many approaches to health education, one of which is group education in the form of discussion, brainstorming and simulation, which is expected to help reduce the prevalence of HIV/AIDS through information disclosure, using a simulation model that contains moral messages about the dangers of HIV/AIDS. This simulation model is made interesting so that they can be motivated and open themselves to avoid the dangers of transmission of HIV/AIDS.

The discussion method is chosen as an interesting way, where participants are faced with a problem in the form of questions or problematic statements to be discussed and solved together. In the discussion, the facilitator will facilitate all group members and provide appropriate answers to many possible alternative answers.[5]

This research is expected to produce learning models (prototypes) with a simulation model of moral messages and the dangers of HIV/AIDS, so that it can be useful to encourage the realization of information disclosure and prevention efforts for the community that can ultimately contribute to achieving a high degree of public health.

This study aims to analyze the effect of group education (simulation model) on information disclosure and efforts to prevent HIV/AIDS transmission for HIV/AIDS risk groups in Malang City.

MATERIALS AND METHOD

The method applied in this study is summarized in table 1.

Table 1: Research methods

No	Elements	Implementations
1.	Type of research	Quasi experiment
2.	Design	Pre-test and post-test group design
3.	Population	All people at risk of HIV/AIDS, who had a special group and had names in the community: *IGAMA* (Malang gay bond), *IWAMA* (Malang Transgender Association), *Penasun* (syringe users), *Sadar Hati* (narcotics users), *Paramita* (commercial sex vendor) in Malang City, with 1400 people.
4.	Sample	The risk group with HIV/AIDS in the working area of Arjuno Health Center and Dinoyo Health Center, Malang, with a sample size of 30 from *IGAMA, Penasun*, and *Sadar Hati*.
5.	Intervention	Group education (simulation method) with smart card game play
6.	Data collection	Information disclosure: filling out questionnaires and interviews Efforts to prevent HIV/AIDS transmission: filling out questionnaires and interviews
7.	Data analysis	Paired sample T-test

FINDINGS

Table 2: Distribution of information disclosure before intervention

No.	Category	Frequency	Percentage
1.	Tell the whole	2	6.67
2.	Tell some	27	90.00
3.	Tell a little	1	3.33
4.	Don't tell	-	-
	Total	30	100

Table 2 shows that before the intervention was given, most respondents only told some of what they knew.

Table 3: Distribution of information disclosure after intervention

No.	Category	Frequency	Percentage
1.	Told the whole	1	3.33
2.	Told some	28	93.34
3.	Told a little	1	3.33
4.	Didn't tell	-	-
	Total	30	100

Table 3 shows that after the intervention was given, most respondents only told some of what they knew.

Table 4: Distribution of HIV/AIDS transmission prevention before intervention

No.	Category	Frequency	Percentage
1.	Made overall efforts	22	73.33
2.	Made partial efforts	8	26.67
3.	Made a little effort	-	-
4.	Didn't Make effort	-	-
	Total	30	100

Table 4 shows that before the intervention was given, most respondents made overall efforts.

Table 5: Distribution of HIV/AIDS transmission prevention after intervention

No.	Category	Frequency	Percentage
1.	Made overall efforts	25	83.33
2.	Made partial efforts	5	16.67
3.	Made a little effort	-	-
4.	Didn't Make effort	-	-
	Total	30	100

Table 5 shows that after the intervention was given, most respondents made overall efforts.

Table 6: Effect of group education on information disclosure and HIV/AIDS transmission prevention (the results of paired sample t-test)

Variabel	Correlation coefficient	p-value	Note
Information disclosure	0.585	0.001	H0 was rejected
HIV/AIDS transmission prevention	0.539	0.002	H0 was rejected

Table 6 shows that there was a difference in information disclosure between before and after the intervention (p-value = 0.001). Likewise, there was difference in HIV/AIDS transmission prevention between before and after the intervention (p-value = 0.002).

DISCUSSION

Most of the respondents actively responded and explained about the learning media cards they held. The results of the paired sample t-test showed that there were differences in information disclosure and HIV/AIDS transmission prevention significantly between before and after group education was implemented.

In general, respondents have often been exposed to various information about HIV/AIDS through the activities they have been following regularly every month with the guidance of nurses from the local community health center. With these activities, respondents became increasingly rich in information and knowledge about these dangerous diseases. Thus, there is a possibility that there is already a similarity of information and knowledge when group education is implemented. The group education method implemented is game. This method is expected to stimulate the activity of the respondents, while providing an opportunity for respondents to express their opinions according to their knowledge and experience about HIV/AIDS. By referring to the game card he holds, respondents can explore the knowledge, attitudes and behaviors that have been occurring in themselves. During this time,

respondents did not realize that their behavior was dangerous and threatening the lives of others around them. This is known from the results of questionnaire filling which shows that most (90%) they are quite open and willing to convey information as a whole.

The results of filling out the instruments both before and after group learning are the data delivered by the respondents according to their life experience. This is important information about the knowledge, attitudes and behavior of a particular community or group as a carrier of the risk of HIV/AIDS transmission.

Most of the respondents know a lot about HIV/AIDS material through the routine activities they follow every month. Unconsciously the respondents had openly and without objections conveyed what had happened in their lives, which had been considered taboo and privacy through questionnaires provided. Based on the results of filling out the questionnaire, it is known that they have been able and willing to convey information openly before and after the implementation of group education.

Referring to the respondent's ability to implement healthy living behaviors, it appears that the current condition is far from the target of reducing the number of HIV/AIDS cases in Malang. The results of filling out the questionnaire showed that most of them did not care about the lifestyle they had chosen and they lived, and almost all of them did not want to quit their deviant sexual behavior.

Based on Cognitive Consistency Theory, in the stage of forming healthy behavior, human behavior is more likely to be consistent with their knowledge, attitudes and behavior. Giving information and experience will produce knowledge & attitudes that are consistent with the desired behavior. Until now, health education is still the best choice in achieving healthy and HIV/AIDS free behavior. The method of group education with game play in the form of cards is intended to give its own meaning that is to attract the attention of the respondent, is not boring, and can explore the abilities and knowledge that have been previously possessed. The data shows that with the implementation of the learning method of using this smart card game, most of the respondents said that the method of play like this had never been experienced by them, more interesting to follow, and can be done as a medium of play and discussion with fellow friends. Learning models like this can be done at any time and can be followed by anyone.

CONCLUSION

Based on the results of the study, it can be concluded that group education (simulation model) using card games has proven to be effective in improving information disclosure and efforts to prevent HIV/AIDS transmission for risk groups in Malang, Indonesia.

Source of Funding: Author

Conflict of Interest: No

Ethical Clearance: Yes

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Health Insurance for Indonesian Migrant Workers

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ABSTRACT

Health insurance is one of the aspects and part of the social insurance which must be given by the state to its citizens, including migrant workers. There are millions of Indonesian migrant workers who work overseas, so health insurance is an urgent need to be fulfilled, as it is a constitutional right of the citizens. The government gives a legal protection for migrant workers according to the legislation, the destination country's law, as well as the international laws and customs. One form of protection given by the government is the right to receive health insurance. Each country has its own characteristics and procedures in giving health insurance protection to its migrant workers, which may result to problems and obstacles in its implementation, which is caused by differences in it law and its government's administration. Indonesian social insurance protection for migrant workers is managed by BPJS (*Badan Penyelenggara Jaminan Sosial*/Social Security Administrator) as written in the Mandate of 1945 Constitution (*Amanat UUD 1945*), yet in reality, health insurance protection from the state of Indonesia for Indonesian migrant workers abroad is not yet operated because the facility mechanism overseas cannot work together with BPJS *Kesehatan* (Health).

Keywords: *Health insurance, Migrant workers, Indonesia*

INTRODUCTION

Millions of Indonesian labor were forced to work as migrant workers overseas, both legally as well as illegally. This is caused by the fact that the Indonesian government cannot fulfill their need for work [1]. Undeniably, apart from the absence of working opportunities, the comparison of wages for migrant workers is much larger than the wages they obtain for the same work in Indonesia. Averagely, Indonesian migrant workers work in sectors which may be categorized as dirty, difficult, and dangerous in sectors such as agriculture, husbandry, industry or as blue-collar workers (becoming house-cleaning assistants) which are unwanted by the local citizens of that country. A research from the Mahidol Migration Centre, Institute for Population and Social Research, Mahidol University, Thailand states that theworking condition and the health of Indonesian migrant workers in the blue-collar sector are on average apprehensive, low, and inhumane [2].

The majority of Indonesians think that working overseas is a choice which may change the degree of lifestyle and the degree of their financial condition. Migrant workers exist in all economic sectors. They play an important role in the positive economic growth of the home state as well as the host state. But the increase of the citizens' migration is followed by the different cases of violation towards their rights [3].

Based on the BNP2TKI (*Badan Nasional Penempatan dan Perlindungan Tenaga Kerja Indonesia*/The National Agency for Placement and Protection of Indonesian Workers) on July 2018, there are 159.702 Indonesian migrant workers overseas. Indonesia is one of the largest sending countries of migrant workers in Southeast Asia [4]. Because of that, social insurance for Indonesian migrant workers is urgently needed as a form of the citizens' constitutional rights protection. The government's protection towards the migrant workers overseas is regulated in the Constitution, No.18, 2017 (*Undang-Undang No.18, 2017*) on the protection of Indonesian migrant workers. This law regulates the social insurance, in which one of its elements is the health insurance during pre-hosting, hosting, and post-hosting.

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Indonesian migrant workers are often said to be foreign currency heroes, as the contribute foreign currency through remittance [5]. The various problems connected to the Indonesian migrant workers forces the government to work harder in protecting them [6]. According to many, the Indonesian government are still not proactive nor comprehensive enough in protecting the migrant workers, physically, financially, and especially in the form of social insurance and health insurance towards the Indonesian migrant workers overseas.

When analyzing further on the development of the different policy products of the government, we can conclude that so far, those policies don't seem to be supporting the Indonesian migrant workers. On the contrary, it seems to bring more harm and it cannot yet insure the health of the Indonesian migrant workers overseas [7]. One of the rights of the Indonesian migrant workers overseas is the right of national social insurance as well as the right for health insurance.

The state establishes the social insurance for its citizens to support their lives [8]. The right for health insurance and social insurance according to Anna Boucher and Terry Carney are as follows, "The definition of 'social security' is malleable and varies according to context. In this chapter, we focus primarily on social security cash transfers, public health provision and the restrictions placed upon newly arrived residents isn accessing these provisions (Health care and child care benefits, these can legitimately also be viewed as forms of social security [9].

The Mandate of the 1945 Constitution article 28 H paragraph (3) [*Amanat UUD 1945 pasal 28 H ayat (3)*] states that each citizen has the right for social insurance which enables self-development holistically as a dignified human being. The protection for social insurance for Indonesian migrant workers is now fully managed by BPJS, every labor worker must have social insurance, if an Indonesian migrant worker does not have social insurance, he/she is not permitted to work overseas.

Each person has the right to access health services [10]. Global Convention International Labour Organisation No. 102/1952 also states that the establishment of social insurance is the right of the citizens who are migrant workers in which in it includes health necessities. Added to that, the issuing of the International Covenant on Economic, Social, and Cultural Rights and the International Covenant on Civil and Political Rights with the approval of the UN General Assembly [11]. The establishment for social insurance for the Indonesian migrant workers is the responsibility of the state of Indonesia and the host country of the migrant workers.

One aim of the Republic of Indonesia stated in the Preamble of the 1945 Constitution is the effort to increase the citizens' prosperity [12]. Based on the Mandate of the 1945 Constitution article 34 paragraph (2) on the state's obligation to develop a social insurance system for all Indonesian citizens and also with the issuing of the Law No.40/2004 on the national social insurance system, social insurance programs, including the public health insurance which is integrated into a system and will be established by a body which was formed by the government (BPJS).

The Law No. 24 year 2011 also declares that the National Social Insurance (Jaminan Sosial Nasional) is established by BPJS which consists of BPJS *Kesehatan* (Health) and BPJS *Ketenagakerjaan* (Employment) which was implemented since January 1st, 2014. Parallel to that, in the Constitution article 2 No.24, 2011 on BPJS: BPJS in its service fulfills the principles of humanity, benefit, and justice [13]. Also, parallel to the Law on the National Social Insurance (Jaminan Sosial Nasional) and the Constitution on BPJS, and there is also the Law No.18, 2017 on the Protection for Indonesian migrant workers.

The right to receive health service and insurance is also the right of the migrant workers as they are also Indonesian citizens. Indonesia does have a limitation in the sovereignty of the country's territory in the place where Indonesian migrant workers are hosted and because of that, an accurate form of negotiation is needed. According to Cruz, a number of migrant-sending and receiving countries have negotiated bilateral social security agreements to enhance the cooperation and to ensure the adequate portability of contributions. Portability in this context is understood as the migrant worker's ability to "preserve, maintain and transfer acquired social security rights to determine the migrant worker's public health care in both countries to guarantee continued health coverage for migrants" [14].

National health insurance for Indonesian migrant workers must be done to keep the dignity of migrant workers. This opinion is articulated by Majda Al Muhtad, "Objective is simply to organize the system in a way that

treats each member of society with dignity and respect" [15]. The status of the national government's budget can also influence both the structure of social welfare institutions and the economic effect of social welfare policies [16].Based on the problem above, the research problem is, how is the health insurance for Indonesian migrant workers?

METHODS

This research uses a descriptive method, where we describe the health insurance for Indonesian migrant workers. This research is also a prescriptive study which has the aim to solve the problem of the theory examination, this research is the connector between the essence and the reality of health insurance for migrant workers.

FINDINGS

The government gives a legal protection for migrant workers according to the constitution, the law of the host country, also the international laws and customs. One form of protection given by the government is the right to receive health insurance as well as prosperity, which are part of the human rights, therefore they are the rights of the migrant workers and are agreed by all countries of the world, including Indonesia(1). This agreement is written in the United Nations Declaration year 1948 on the Human Rights. Article 25 paragraph 1 states that every human being and every family has the right to live a sufficient life in terms of health, prosperity, food, shelter, healthcare, social service necessary. They are also responsible for insurances when unemployed, sick, disabled, widowed, aged, or other conditions which forces them to not be able to obtain sufficient income, which are outside their power(18). The protection of social insurance for Indonesian migrant workers is given by BPJS as written in the Mandate of the 1945 Constitution, article 28 H paragraph(3), where all citizens have the right for social insurance which makes self-development possible holistically as a dignified human being. Indonesia develops a social insurance system for all citizens and also empowers poor and weak citizens according to the human dignity. As Indonesian citizens whose constitutional rights include social insurance, it should be that Indonesian migrant workers have the right for social insurance as obligated in the Constitution, No.40, 2004.

The Labor Ministerial Regulations (Permenaker/ Peraturan Menteri Tenaga Kerja) No 7 year 2017 only obligates two programs, which are work-related insurance and death insurance,old-day insurance for migrant workers are voluntary, whereas pension and health insurances are not received by the migrant workers. Even though migrant workers are obligated to completely pay for health and work insurances, they do not receive service nor such insurances while working overseas. Employers at the host state cannot be constrained by Indonesian regulations. Also, the health insurance for migrant workers cannot yet be implemented because the health facility mechanism overseas cannot work together with the Indonesian BPJS *Kesehatan* (Health). Yet there is not yet a regulation which strongly regulates the health insurance for migrant workers overseas.

The state's protection towards migrant workers are regulated in the Constitution No. 18 year 2017, which includes social insurance with health insurance as one of its elements, in the pre-hosting, during the hosting, and post-hosting. Social insurance for Indonesian migrant workers overseas is regulated in the Law No.18, 2017: the state of Indonesia must fix the whole protection system for Indonesian migrant workers and their families which reflects the values of humanity and dignity as a noble state from before working overseas, during the work overseas, and after working overseas. The general explanation of the constitution also gives social insurance protection for Indonesian migrant workers.

The social insurance while working overseas is the responsibility of the migrant worker and paid by him/ herself without help from the state. This scheme is done by insurance companies which are members of the insurance consortium with a protection program which includes pre-hosting, during the hosting, and post-hosting protection. The role of such protection is now diverted and done by BPJS according to the Law No. 40 year 2004 on the national social insurance system and the Law No.24 year 2011 on BPJS. Yet, after such insurances are diverted to BPJS, the workers lost their health insurances which they usually had while still joining the insurances from the insurance consortium, so the health insurance from the state seems to be half-hearted.

The Labor Ministerial Regulations (Permenaker) No.7, 2017 declares that Indonesian migrant labor must participate in four insurance programs, which are health insurance, work-related accident insurance, death insurance, and old-day insurance. There is an inconsistency in the Labor Ministerial Regulations

No.7, 2017, article 16: migrant workers who experience a work-related accident during the stay do not have the right to receive such health service. Health insurance is not the right of migrant workers while working overseas. This means that the migrant workers must pay for a different health insurance without receiving the national health insurance service.

Problems of health rights and the right to receive health care which are experienced by the Indonesian migrant workers are a reflection of the inexistence of access for health insurance for migrant workers, as they are limited by the state's territory. Based on the Constitution, the state of Indonesia should give a protection in the form of health insurance for migrant workers. Apart from the constitution, international law states that the state must fulfill that right as written in article 22 of the Universal Declaration of Human Right (UDHR):''*every one as a member of society; has the right to social security and is entitled to realization, thourght national effort and international co operation and resources of each state*."

The host country's legislation usually only limits the insurance only to its citizens. Even if they offer insurance for migrant workers, there will be administration conditions with a particular amount of premium to be paid, also with the condition of having stayed in the host country for a particular amount of time. Indonesia should have the initiative of giving ease of document issuance and also pay for the health insurance premium for Indonesian migrant workers, as it is the obligation of the state.

CONCLUSION

Health insurance protection for Indonesian migrant workers cannot yet be implemented as the health facility mechanism overseas cannot work together with BPJS Health. The insecure protection for migrant workers during the stay proves that the state cannot yet give a maximum health insurance for its citizens.

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An Artificial Neural Networks (ANN) Based Lung Nodule Identification and Verification Module

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ABSTRACT

The objective of the work is to propose and identify lung nodule system using Artificial Neural Networks (ANN) which is as of now a hot research territory in medical field and it is trusted that it will get broad application to biomedical frameworks in the following couple of years. Neural systems are perfect in perceiving sicknesses utilizing checks since there is no undeniable reason to give a particular calculation on the most proficient method to distinguish the malady.This paper depicts a calculation to isolate the lung tissue from a Chest CT to lessen the measure of information that should be broke down. We will probably have a completely programmed calculation for sectioning the lung tissue, and to isolate the two lung sides too. The picture is threshold to isolate low-thickness tissue (lungs) from fat. Cleaning is performed to expel air, clamor and aviation routes. At last, an arrangement of morphological tasks is utilized to smooth the unpredictable limit. The database utilized for assessment is taken from a radiology-instructing document. The present assessment demonstrates that the connected division calculation takes a shot at an expansive number of various cases. The textural highlights were removed from the portioned lungs and it was given as. The neural system is utilized to distinguish the different lung maladies.

Keywords: *Biomedical frameworks, Radiology scan, lung swelling, lung maladies*

INTRODUCTION

Lung malignancy is the main source of passing in the two people in the US. Measurements from the American Cancer Society assessed that in 2017, around 222,500 new lung malignancy cases happened in the U.S with assessed 155,800 passing. It represents 1 out of 4 tumor passing [1].The 5-year relative survival rate for lung growth is 15% for men and 21% for ladies. In any case,the survival rate is 55% for early recognized lung malignancy that is at a confined stage which just takes just 16% everything being equal. The visualization of lung tumor is generally poor since patients tend not to feel debilitated until the point that it is at a propelled organize. Despite the fact that advances had been made in careful, radio helpful, and chemotherapeutic methodologies have been made, the long haul survival rate remains low[2].

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The future advancement of Neural Network are utilizing the hereditary calculation which holds the level of achievement in biological field. It depicts about Neuro-Genetic approach of lung picture division. Division is a critical instrument in restorative picture handling and it has been generally utilized as a part of numerous restorative indicative applications, for example, estimating tumor volume and its reaction to treatment, identification of small scale calcification on mammograms, mechanized grouping of blood cells, examining mental health, picture enlistment, and so on[3].

Concentrate medicinal pictures depends primarily on the visual translation of the radiologists. The American Cancer Society report [4], it recommended that screening with low-measurements winding processed tomography(LDCT) has been appeared to decrease lung disease mortality by around 20% contrasted with standard chest x-beam among grown-ups with no less than 30 pack-year smoking history who were ebb and flow smokers or had stopped inside 15 years. Lung knobs are characterized as adjusted opacities, with reasonably identifiable edges and distances across littler than 3cm in [5]. Granulomatous infection and lung tumor are

two normal reasons for lung knobs [6].The complexity between the knob and lung of CT is higher than that of chest radiography. CT likewise disposes of overlying structures, for example, the chest divider, mediastinum, and vessels [7].

Nonetheless, confinements in knob ID utilizing CT must be taken note. In [6], the neglected knobs were little, swoon in attenuation, adjacent to vessels, or contiguous discoveries of earlier tuberculosis. There are different ways to describe lung knobs: by their morphology, densitometry, size and development [8]. In the recent development the improvement of CT that empowers higher spatial and differentiation determination, more knob portrayal highlights are thought about CT filters. A standard neural network(NN)consists of many simple, connected processors called neurons, each producing a sequence ofreal-valued activations. Input neurons get activated through sensors perceiving the environment[9]. The basic determination is to overcome the difficult extraction of image through NN are simplified, However, overfitting is a serious problem in such NN. The solutionis to arbitrarily plunge units beside with their associations from the neural network during training[10].

Proposed lung analysis method: It is concentrated on lung segmentation which is necessary for the mainframe aided analysis from CT scan images and it is to fundamentally divide the voxels equivalent to the lung hollow in the axial CT scan separates from the contiguous lung anatomy. We have proposed a scheme that first performs an most favorable thresholding which selects the threshold based on the entity and background pixel means. Once the threshold has been preferred and functional, province mounting and connectivity investigation are then used to extract the accurate crater region with accuracy. The classification starts by preprocessing and augmenting the image regions obtained in the segmentation process. An ANN is then trained with back-propagation using the augmented dataset. It is achieved to reduce overlapping detections through an adjacent image classification and rejection rule.

Lung nodule verification with Ann and Hereditary Algorithm:

Neuro-Genetic Segmentation: In outlining the division-demonstrate utilizing Artificial Neural Networks,the model straightforwardness, representativeness and sufficiency are fundamental to the unwavering quality of the exploration to be done. Effortlessness of the model relies upon the best approach to hybridize two unique procedures in which just the least complex hypothesis that fits the reality of an issue is to be considered. In the present examination Artificial Neural Networks and Genetic calculation with insignificant parameters were engaged with the calculation. In the mean time, representativeness of the show relied upon the nature of the information which must speak to the sort of data that is being explored. Both Artificial Neural Networks and Genetic Algorithm are versatile, powerful and ready to bargain effectively with an extensive variety of issues including profoundly nonlinear models and uproarious information. What's more, they don't require earlier data to display the issue being studied. Therefore, from a pragmatic point of view, Neural Network and Genetic Algorithm appeared to 53 work best in blend. The Neuro-Genetic approach performs programmed and hearty lung division by figuring the ideal edge of the picture.

The proposed technique deals with the subsequent steps.

Preprocessing → Threshold → Conditions elimination → Border discovery → Image segmentation

Lung segmentation involved the above mentioned steps. The subsequent model is to show cast the represented form of Background image filtering Genetic segmentation.

Lung province in CT cross sectional image: Lung dataset of frontal chest x-beams ordered by the Japanese Society of Radiological Technology (JSRT) and Dataset of CT pictures were taken from the lung Image Database Consortium (LIDC) which had been utilized as the info pictures for the trials. The set contained 200 chest x-beams, among which 125 x-beams were strange and 81 x-beams were ordinary. It is intended to state that the lungs in the X-beam had been influenced by some malady that had been talked about in section 1. The LIDC dataset comprised of 200 CT pictures out of which 196 pictures were anomalous and 102 were typical pictures. All x-beam pictures had a size of 1024x1024 pixel sand dark scale shading profundity of 12 bit. The pictures were isolated into two sections. One half was utilized for preparing and the other for testing the calculation. Translating a chest radiograph was amazingly a testing work. Radiographs frequently contained substantial differentiation varieties and critical low complexity points of interest as shown in the code below.

MATLAB Code to locate the two lung regions in a CT cross sectional image.

```
load clown
subplot(221)
Z = ind2gray(Z,map);
imshow(Z)
title('Original','FontWeight','bold')
for n = 2:4
IDX = otsu(Z,n);
subplot(2,2,n)
imagesc(IDX), axis image off
View (['n = ' int2str(n)],'FontWeight','bold')
End
```

==

```
% Recite the lungs gray scale demo image.
Binder =password;
IgnobleFileName = 'lungs_CT.png';
% Get the full filename, with path prepended.
CompleteFile Name = complete file(folder, baseFileName);

% Patterned if file exists.
if ~exist(complete FileName, 'file')
% File doesn't exist -- didn't find it there. Check the search path for it.
Complete FileNamearrangedSearchPath = baseFileName; % No path this time.
if ~exist(complete File Name arranged SearchPath, 'file')


% Immobile didn't find it. Attentive user.
InaccuracyMessage = sprintf('Error: %s does not exist in the search path folders.', complete FileName);
    Uiwait(warndlg(errorMessage));
    Return;
End
End
GrayImage = imread (complete FileName);

% Grow the dimensions of the image.
% numberOfColor Bands should be = 2.
[Rows, columns, numberOfColorBands] = size(grayImage);
if number Of Color Bands > 2

% it's not really gray scale like we expected - it's color.
% Convert it to gray scale by taking only the green channel.
GrayImage = grayImage (0.5, 1.5, 2); % Take green channel.
End

% Exhibit the imaginative gray scale image.
subplot(2, 3, 1);
imshow(grayImage, []);
axis on;
view ('Original Grayscale Image', 'image Size', fontSize);
drawnow;

% widen figure to complete screen.
set(gcf, 'Units', 'Normalized', 'exterior Position', [0 0 1 1]);
set(gcf''units', 'normal', 'interior position', 'ON')
% Stretch a name to the heading bar.
set(gcf, 'Name', 'Demo by ImageAnalyst', 'Number view', 'Off')
```

Image preprocessing in infected lung area: Keeping in mind the end goal to section the lung imaged effectively the researcher included the preprocessing advance for the proposed technique to recognize whether the info picture was defiled with some kind of clamor. In the event of tainted picture, the procedures of division may be influenced. Picture upgrade techniques improved pictures look. Picture improvement was an answer for a PC imaging issue. Different picture upgrade methods were underscored to hone picture highlights for show and analysis. The histogram was gotten for the picture partitioning the interim amongst least and most extreme pixel esteem into similarly divided canisters. The researcher relegated every pixel to the container that encompassed its esteem. Next, number of pixels relating to each receptacle was checked.

The picture histogram was a plot of these recurrence considers a component of the receptacle areas. The states of histograms for a similar picture changed relying upon the span of the intervals. Histograms were the reason for numerical spatial area preparing strategies (Brant et al., 2012). Histogram control was a successful technique for picture enhancement. Histogram evening out was a standout amongst the most critical parts for any picture processing. The essential standard of histogram leveling was that all the picture powers ought to be similarly visit. A picture whose pixels had a tendency to possess the

whole scope of conceivable dark levels and, also, had a tendency to be appropriated consistently would have an appearance of high differentiation and display a vast assortment of dim tones. Crests in the histogram spoke to visit pixel forces, and could frequently be identified with almost homogeneous locales. After histogram evening out, the pinnacles expanded, implying that unpretentious force contrasts in a district turned out to be better settled. Histogram balance did not "level" a histogram. It redistributed power circulations.

This implied any quantitative data in the pixel force was lost. The requesting of pixel esteems were just kept up, not their quantitative relationship. Since histogram adjustment was a point procedure it didn't bring new forces into the picture. The accompanying articulation was utilized to compute the recently doled out esteem R for every brilliance level k in the first image

$$R = \sum_{i=0}^{K} \frac{Pi}{A} * Po\max \quad \ldots(1)$$

Where Pi was the quantity of pixels with splendor esteems Po, Imax was the most extreme pixel power esteem, and A was the aggregate number of pixels in the picture.

Figure 2 demonstrates a unique info picture of lung X-ray. The picture was one of the pictures utilized as a part of this examination.

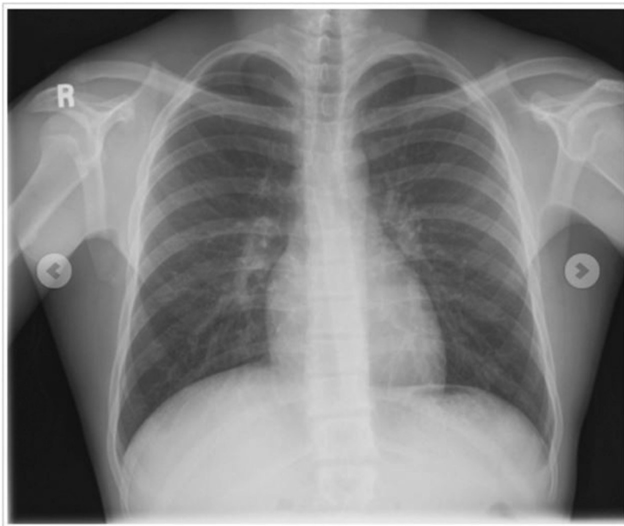


Figure 1: Original Lung X-Ray Image

Lung enlargement classification: A strategy proposed to utilize a multi-scale neural system architecture to recognize genuine knobs from foundation designs. An arrangement of Gabor channels and a Laplacian of Gaussian channel are utilized to remove highlights from the information areas and to bolster a 3-layer neural system using MATLAB. Most approaches section knob areas to catch highlights from specific districts of the knobs. At that point, they convolve the info locales with an arrangement of Gaussian channels to separate measurements from the inward and band areas of the knob.A two-advance lung image segmentation window order is performed utilizing rough k-closest neighbor calculation.

Image Thresholding and dissection: Image now had enhanced differentiation however there was excessively immaterial foundation data and mess that should have been expelled. It was distinguished that a large portion of the foundation data by pixel esteems were not quite the same as those of the lungs. Picture thresholding was a subclass of picture division as it partitions a picture into portions in view of the estimation of pixels with respect to limit esteem. Ideal thresholding was the initial phase in thresholding the picture. A thoracic CT contained two fundamental gatherings of pixels: high power pixels situated in the body and low force pixels that were in the lung and the encompassing air. Because of the extensive contrast in force between these two gatherings, thresholding lead to a decent detachment. The thresholding was utilized for assurance of the genuine double veils for the lung territory. Twofold veils are created from input dark level CT information utilizing an iterative threshold calculation and it's a superior technique than the traditional threshold calculation, in which the limit was just picked as the least between the two maxima of the dark level histogram. The picture histogram was at first partitioned into two sections utilizing a beginning limit esteem, which could be for instance a large portion of the greatest of the dynamic scope of the present picture, or the traditional edge esteem just described. Afterwards, the example mean of the dim qualities related with the closer view pixels and the example mean of the dark qualities related with the foundation pixels were processed, and edge esteem was resolved as the normal of these two examples implies as shown in figure 4.

Image segmentation is the next essential process for image analysis. Segmentation divides an image into regions that constitute the image. The segmentation of images in 2D has many useful applications in the medical sector: estimation of volume and visualization of objects of interest, detection of abnormalities (such as tumors), tissue quantification and classification, are among the few (Lee cum et al, 2015). The objective of segmentation is to change the representation of an image into something more meaningful and easier to analyze.

Image segmentation is generally used to locate objects and boundariesin images. To be more precise, image segmentation is the process of assigning a labelto each pixel in an image such that the pixels with the same label share certain visual characteristics. The result of segmentation is a set of similar segments that collectively make up the entire image. All pixels in a given region are similar with respect to some characteristic or computational property, such as color, intensity or texture.

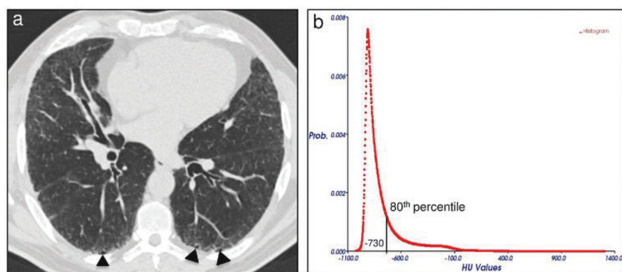
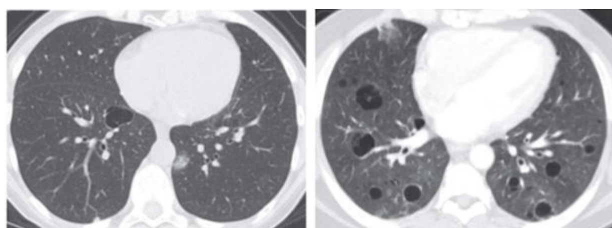


Figure 2: Original Lung image after background removal (a) (left) and percentile graph (b) (right)

Results on lung image background removal and segmentation: Foundation Removal After picture thresholding, foundation evacuation of the picture was finished. By applying the limit to the picture, the entire lung picture could be gotten from the foundation. So there was a need of a foundation evacuation instrument to expel the foundation. Along these lines, the histogram based strategy was utilized for this reason.



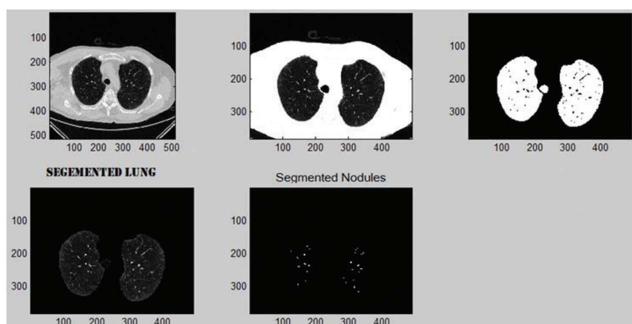


Figure 3: Lung image original (left) after background removal (right) and Segmented lung image results

The system began crossing the picture from the beginning of the primary segment of original lung image and segmented lung image results are navigated the entire limit completing at a similar point where it began as shown in figure 5.

CONCLUSION

It has been presented a system that works with ANN that are trained on point labels with respect to lung swelling identification, which is focused mainly on lung image background verification and it is easier to obtain. While the initial results look promising, there are areas to further improve the system. The current research is processed with lung nodule identification and image retrieval and border discovery in image segmentation; this could be improved with processing, threshold and condition elimination. A lung segmentation approach could also eliminate the air tracts which are a primary cause for false positives, but these cannot be differentiated when observed in normal view. Next, the training set can be invaded even further using image transforms of existing labels, which has been done for ANN. Such a technique will also ensure there is little overlap between the original label and transformed label to avoid image filtering and nodule lung recovery

Ethical Clearance: Ethical Clearance- VISTAS.

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Training and Communication Skills of Little Dentist Cadre

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ABSTRACT

Training for little dentist turns into one of promotion efforts to empower the cadre. Meanwhile, the communication skills is expected to promote the importance of dental and oral health to others. This study aims ***t***o analyze the relationship between little dentist's training towards their communication skills. The cross sectional research was done to the participant of little dentist's training at Bina Sehat hospital, involved 82 children selected by purposive sampling. The variables were training and communication skills of little dentist cadre. Data were collected using checklist and questionnaire, then analyzed by Gamma correlation test. The most of repondents (86.59%) got high score dealing with the training. There was 42.68% respondents'score categorized as good, 54.88% as sufficient. The p-value of Gamma correlation was 0.000 (there was relationship between little dentists cadre's training and their communication skills

Keywords: *Little dentist cadre's, Training, Health promotion, Communication skills*

INTRODUCTION

Around 25.9% of Indonesian people have oral and dental health problem during the last 12 months. Besides, 31.1% of them decide to have treatment with the dentist, while 68.9% having no treatment. In other words, there was only 8.1% ability to get the treatment from the medical personnel, where the percentage of those who live in city is higher than people living in village[(1)].

The scope of medical check up to the elementary school students at Jember runs into ups and downs in 5 years recently. The lowest scope happened in 2012 (15.79%) while 2013 was 21.5% scope of students' medical check up. In 2016, the total amount of dental treatment towards preschools had target 18.601 children, yet the fact was only 15.705. Besides, it was expcted that 111,214 elementary students got dental treatment, but the realization reported that it was 88,001 children. The 49 community health center from 31 Districts in Jember, Patrang Health Center targeted 9477 but the realization was only 683 children, Sukorejo Health Center had 921 out of 4885 from the first target and the last, Lojejer Health Center realized 805 from the target which was 2777 children[(2)].

The difficulty of achieving the target by the community health center happens because of lack medical professional while the elementary and junior high school students are quite a lot. Thus, to do the health sorting towards the students will need longer time. Besides, the integrating of reporting management is not well yet[(3)]. It shows that children health service in Jember has low quality.

The data of dental patient visitors in Bina Sehat hospital of Jember from January to May 2016 showed that children patient was 4% from the total of dental patient visitors with diagnose 54% caries, 38% persitention, and 8% others. Based on the data of 54% caries, it was found that it can cause severe disease namely abscess 38%. Dental fear and anxiety (DFA) refers to a big problem for every people, especially children and teenagers. DFA prevalence of children and teenagers is around 5-20% in all over the world and some cases towards dental phobia. Children will try their best to avoid or postphone the treatment, so their oral cavity will not be taking care of[(4),(5)]. The evidence research shows that hospital environment rises children's traumatic such as

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hospital physical environment, medical professional; whether coming from how to dress (white dressing) or their attitudes , the medical equipment, and social environment of one patient to another[6]. Survey results of Commision for Child protection in 2017 reported that children access to get any information about the dental and oral health was still limited, so it was necessary to held socialization dealing with dental and oral health through education in school or society environment.

Bina Sehat hospital of Jember has used marketing communication strategy public relations through Little Dentist Cadre's Training. This program had held since 2011. The target program was pre-school children. Those are also called the golden age periode. According to FIP-UPI of Science Development Team Research (2007), the domination characteristics of preshool children in line with Sholehudin's idea relating with their study activity are active and energetic, having high sense of curiousity, high learning enthusiasm, and learning from experience. Montessori argues that children within the age of 0-6 has sensitivity to language[7].

One of training materials given is training becomes little dentist cadre. The participants are trained become little dentist cadres. The method used is role playing, they act out as their own or other characters in certain condition. The participants are asked to act out the role of characters they probably know in advance. Moreover, it seems to be effective method to be applied, or even to complete other methods. For instance, after giving the explanation through oral explanation, the participants do role play to give them more understanding about those have been explained. Appying only role play sometimes are difficult and meaningless[8]. Role play method is able to improve their communication skills through expressing idea or knowledge from dialogue they use during role play. This method is appropriate with their characteristic which tends to show their interests to their friends. As the passed, they grow older and they will show their interests more to their friends. They start to show their skill to collaborate and communicate with their friends. Moreover, they will improve their vocabulary skills to communicate with others.

This study has aimed to know whether or not the relationship between little dentist training towards their communication skills. Having good communication skills will help them to be such an informant for their friend.

METHOD

This study applied quantitative research using analytic observational with cross sectional approach. It was done in mini laboratory of Bina Sehat hospital of Jember which is located in Jaya Negara Street, 81 as the place for training of little dentist cadre. Moreover, it was done in May-August 2017. It started in May 2017, June for validity and instrument reliability test and respondents' study was done in August 2017.

Population involved were all the participants of little dentist in August 2017, consisting of two classes, As-Sholihudin Kindergarten of Mumbulsari that consists 50 participants (it was done in 30th August, 2017) and 52 students of An-Nur Kindergarten of Kaliwates (it was conducted in 31st August, 2017), so the population size was 102. The total was 102; 5% for error rates, so the sample used was: $n = 102/102\ (0.05)^2 + 1 = 81.274 = 82$ participants. Purposive sampling was used for taking the samples.

The variables were little dentist training and communication skills of little dentist cadre. Training score of little dentist cadre belongs to the results' cadre gotten during the learning process of dental and oral health through role play. It consist of speaking skills, listening skills, and communication skills related with dental and oral health behavior. This research applied few data collection method techniques, namely interview and observations. During the interview, respondents were accompanied with their parents, so their parents can help them to fill out the form or to read the questions given since the respindents do not have the ability yet in reading and writing. The observation was also done to know the respondents' skill by using observation form. The observation form provided and it was done by the parents. The data was drawn in table and descriptive either analyzed by using Gamma correlation test to know the relationship between little dentist training and the little dentist cadre's communication skills.

RESULTS

Table 1: Training score of little dentist cadre

Training score	Frequency	Percentage
Good	71	86.59
Sufficient	11	13.41
Total	82	100

Table 1 shows that some of the little dentist cadre had the training scores in good categories.

Table 2: Communication skill score of little dentist cadre

Communication skill score	Frequency	Percentage
Good	35	42.68
Sufficient	45	54.88
Less	2	2.44
Total	82	100

Table 2 shows that some of the little dentist cadre had the communication skill score in the sufficient and good category.

Table 3: Distribution of Communication skills score

No.	Communication material	Explaining, role-playing and asking other to do	Explaining and role-playing	Telling simply thing	No telling at all
1.	Communicating their own experience	18%	43%	28%	11%
2.	Mantaining their own health	23%	46%	28%	2%
3.	Looking for and applying health system or health service	11%	27%	45%	17%
4.	Taking care of the environment	35%	26%	28%	11%
	Total	22%	35%	32%	10%

Table 3 shows that respondents had communication skill the most of the stage namely explaining and role-playing, that was 35%, telling simply thing was 32%, 22% explaining, role playing and asking others to do, and the rest was only 10%. Most topic chosen (35%) for explaining, role-playing and asking others to do was taking care of environment. Besides, for explaining and role playing (43%) was about maintaining their own health topic such as brushing teeth, taking bath, etc and 43% respondents were reported communicating their experiences. Moreover, it was found that 45% respondents were able to tell simply thing dealing with looking for the hralth system or health service. This study found 10% respondents who tell noting at all.

Table 4: The results of Gamma correlation test

Variable	Correlation coefficient (r)	p-value
Training–Communication skills of little dentist cadre	0.951	0.000

Based on Table 4, the p-value of Gamma correlation test was 0.000 and correlation coefficient was 0.951 (there was a strong relationship between training and communication skills of little dentist cadre)

DISCUSSION

Most of respondents got good score because they are ready to do the training. The training had been done in the previous weeks by the school. Teachers and parents told us that the children were awaiting for the training. The methodology used were oral explanation, demonstration and role play, likewise, it was appropriate with their characteristic. One of Dewey's theory is said that children need to be really interested in getting involved of any activity, experiences, and educated-work to get better result for their score[9].

The result showed that most of respondents had good communication skill score. It happens because one of the methods used is role-play. Rumilasari, *et al.* argues that role playing can give positive effect toward children's development[10].

The differentiate of children's communication skills are affected some factors. They are culture, intelligence, family relationships, numbers of family members, speak-up chance, and their role model[11].

Three main components of communication are message, sender, and channel for communication.

Message is something to deliver. Sender includes spokesman, sponsorship, partner, that belongs the person who deliver the message. Meanwhile channel communication is involving two persons or more face to face directly[12]. The result found that cadre is able to get the information well through the little dentist training, whether it is medical things or the result of the introducing oral and dental health to the respondents. The message gotten is accepted by the children and expected to be able to motivate them as the communicator. At the end of the result, they are hoped as communication for health promotion.

The results showed that 35% respondents have communication skills in the stages namely explaining and role playing. Explaining simply 32%, 22% explaining, role playing and asking others to do, and there was 4% respondents who tell nothing at all. Pre-school children within the age of 4-5 years old have 1.600-2.100 vocabularies. In this stage of age, they start learning to make a sentence by connecting word to word and concerning to the grammar use and the understandable language[10]. Those who are 5-6 years old belong to the children who like to live in groups. The pre-school children quality is the mobility to understand the others' talking and point of view are increasing. The capability of communication skills can raise their pleasure to have relationship with others.

It was reported that there was 35% respondents chose the topic namely respondents' attention dealing with the environment and the indicator is explained, being role played, and asked others to do. The most communication material used that is being role played by the respondents is about maintaining their own health such as taking a bath and brushing teeth that reaches 46% and respondents' experiences that shows 43%. There was 45% respondents who can tell simply about health system and medical services. Besides, it was found that there was 10% respondents who tell nothing at all. The differences of respondents' communication skills can be affected by some factors such as children's culture, intelligence, family relationships, numbers of family members, speak-up chance, and their role model[11].

The result showed that the respondents have good understanding dealing with the material given related to their attitude toward oral and dental health. It covers their habitual in maintaining their own health, looking for and using medical service. Their ability while starting to learn at kindergarten is they areable to understand many vocabularies, pronounce some words well and they are able to make a sentence consisting of six up to eight words that covers verb, suffix, affix, and conjunction[13].

There is a strong relationship between training and communication skills of the little dentist cadre. The higher score of theirs show they are participated actively during the training. The communication skills shows their speaking, listening, and communication non verbal skill that is related with their health habitual.

This training applied role-playing method. This method can improve their ability to communicate with other. Through role playing, they can get involved directly so they can learn it easily. Role-playing method is chosen with the target respondents of preschool chidren and it is suitable with their characteristic. Those who wre 5-6 years old is categorized as children who like to live in groups. The quality of pre-school children have high modality in understanding words and others' point of view, so they communication skills will automatically increase. Mastering communication skill can raise their pleasure to have friend as well as relationship with others. They are able to use many vocabularies, pronounce some words well and they are able to make a sentence consisting of six up to eight words that covers verb, suffix, affix, and conjunction[13].

Role-playing method makes children get involved actively during the training. Kamil argues that the children's participation is so important since they can learn effectively when they are participated actively. This case make there is a positive relationship and strong correlation between training score and their communication skills[8].

CONCLUSION

There is a relationship between training and communication skills to the little dentist cadre with strong relation. Those who has higher score for training are those who have better communication skills.

Ethical Clearance: taken from The Ethical Committee of Medical Research Faculty of Dentistry, University of Jember, No: 088/UN25.8/KEPK/DL/2018.

Source of Funding: Authors

Conflict of Interest: No

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Service Quality Model with Cultural Perspective in Effect on Patient Satisfaction in Hospitals with Different Accreditation Status

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ABSTRACT

There is a problem in achieving the accreditation status of hospitals in Indonesia and their understanding. The existence of an accreditation process is designed to improve the safety culture and quality culture in the hospital, so that the hospital will always strive to improve the quality of its services. The purpose of this study is the implementation of indicators of quality culture and safety culture for the development of indicators of dimensions of hospital service quality with different accreditation statuses. This type of research is observational research for the development of models from the Quality Dimensions of Services. Conducted in private hospitals in Central Java and Yogyakarta Special Region in April to August 2017. The study population was patients who were treated surgically, aged between 20 and 70 years. A total of 190 patients were collected proportionally from 5 private hospitals based on their accreditation status strata. The result is a positive relationship between Quality Culture and Service Quality, There is a positive relationship between the Culture of Safety and Service Quality, a Accreditation Status positively meaningful with Service Quality, Service Quality is positively related to Patient Satisfaction and There is a significant positive relationship indirectly between Accreditation Status and Patient Satisfaction.

Keywords: *Accreditation, Quality culture, Safety culture, Service quality, Patient satisfaction*

INTRODUCTION

In Indonesia, there are problems with hospital accreditation status, namely from the accreditation target of all hospitals in Indonesia in 2014 have been accredited locally, realization until July 2013, 41.81% of 2,083 hospitals have not been accredited in 2007 version and 99.42% of homes ill has not been accredited in version 2012. In Central Java the perceptions of each hospital are different, namely: accreditation causes an increase in management costs, because to prepare documents, facilities and infrastructure that are in accordance with the standards require a large amount of costs and accreditation due to being linked with permits(1). Problems related to accreditation in Canada, among others, are to obtain and maintain accreditation status requiring large investment of resources. For many service organizations, there are doubts about the benefits of accreditation, namely whether the accreditation is worth the time, effort and cost, and whether it can show measurable improvements in health service delivery and outcomes(2) in North America, where there is competition sharp among health care providers, accreditation is voluntary. Without an accredited status, health service organizations can already run. Conversely, not 100% of forced accreditation participation fosters a culture of transparency and improvement, or only encourages sanction avoidance and even encourages deviant behavior(3).

In Australia, health service providers who do not accredit on the grounds of high costs, difficulties in meeting standards and data collection, and accreditation programs are difficult to implement and take time to

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implement[4].The accreditation process is not always satisfactory, problems related to accreditation can occur due to deficiencies or obstacles which include Quality Culture[3]. From the hospital, the existence of an accreditation process was designed to improve the safety culture and quality culture in the hospital, so that it always tried to improve the quality of its services[5],[6],[7]. A strong organizational culture will encourage and enhance strong organizational and mission work so that behaviors are aligned with the priorities of the strategy[8]. Organizational culture is used to implement strategic changes in organizations. Organizational culture can accelerate the achievement of desired results and allow the achievement of optimal levels of work[9]. Organizational culture in the health service sector has a significant influence on quality improvement practices[10]. Organizational culture is needed to achieve success in the business environment, organizational culture encourages the creation of good services[8].

Status Accreditation stimulates continuous improvement and quality improvement efforts[2]. Status of Accreditation is useful for Service Improvement, Improvement in the Administration & Development Planning process of the Hospital[11]. Based on the gaps model of service quality, the source of service quality problems comes from the recipient of the service (customer) and the process from the service provider (management). The dimensions of service quality from patient perceptions refer to the concept of "RATER" namely Responsiveness, Assurance, Tangiable, Empathy, and Reliability[12]. Accreditation is based on the premise that compliance with reliable evidence-based standards will produce high-quality health services, in a safer environment, than those without accreditation[2]. Accreditation levels according to Adhani[7] are based on their graduation, namely the basic level, Middle level, Primary Level and Plenary Level. The ability of the Hospital to prepare for its accreditation is proof of the hospital's managerial ability in dealing with market mechanisms. The more services that can be given, the more it shows its readiness to compete with other hospitals. This is very important for resource-based strategies and competitive advantages[13].

Competition in the health services industry is the ability to provide consumers with goods or services for health care with better quality, lower value, more perfect services, easier to reach, meet needs, demands, expectations, and customer satisfaction[14]. The purpose of Accreditation is based on the Republic of Indonesia Minister of Health Regulation No. 012 of 2012, including improving the quality of Hospital services and in improving competitiveness. The purpose of Joint Commission International accreditation is to determine whether the organization has met a set of standards. improve the safety and quality of services[5]. Standards are one measure of where performance is measured. Performance is said to be successful if it is able to reach the specified standard[15]. Individual performance contributes to group performance, then group performance contributes to organizational performance[16],[17]. Individual performance will affect organizational performance[18],[19]. Customer satisfaction is categorized as a high-level goal in the public service performance measurement system[17]. Customer satisfaction is the level of one's feelings after comparing the perceived performance with expectations[20].

To measure the level of satisfaction of the service unit, the Minister of Administrative Reform issued Decree No.KEP/25/M.PAN/2/2004 concerning the preparation of the Community Satisfaction Index which consists of 14 elements that are relevant, valid and reliable. Namely: Service procedures, Service Requirements, Clarity of Service Officers, Discipline of Service Officers, Responsibility of Service Officers, Ability of Service Officers, Speed of Service, Justice in Obtaining Services, Courtesy and Hospitality of Officers, Fairness of Service Costs, Certainty of Service Costs, Certainty of Service Costs, Certainty of Service Schedule, Service Comfort, Environmental Comfort , and Service Security[21].

This research is limited to the implementation of indicators of quality culture and safety culture for the development of indicators of service quality dimension models from Parasuraman, Zeithami & Berry[12] namely Physical Evidence (Tangiable), Reliability, Responsiveness, Assurance , and Empathy and its effect on patient satisfaction in hospitals with different accreditation statuses.

MATERIALS AND METHOD

The purpose of this study was to describe the influence of quality culture and safety culture which was added as an indicator of the dimensions of hospital service quality, which was analyzed from the effect of accreditation status on service quality, influence of service

quality on patient satisfaction and indirect influence of accreditation status on patient satisfaction. This study was an observational study for the development of Quality Dimension of Services Model. This research was conducted at private hospitals in Central Java and Yogyakarta in April to August 2017. The population was patients who were treated surgically, aged between 20 and 70 years. A total of 190 patients were collected proportionally from 5 private hospitals based on their accreditation status strata.

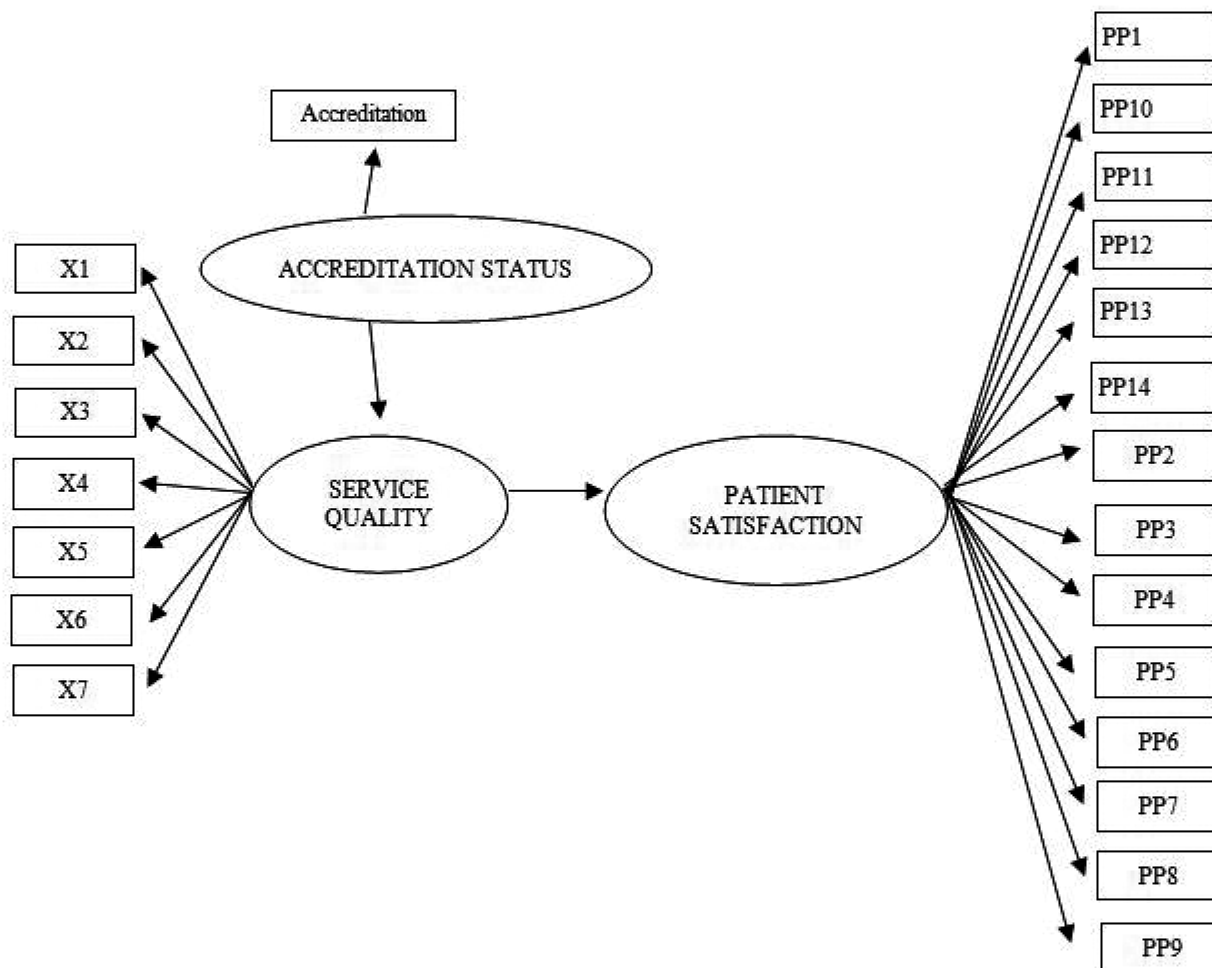

Figure 1: Structural Model Design

The hospital accreditation status assessment was carried out by looking at the accreditation status listed in the Ministry of Health, namely Plenary, Main, Middle, Basic and Not Accredited, Likert Scale. Assessment of the quality of hospital services was done by direct interviews with patients using 7 indicators consisting of indicators of service quality dimensions from Parasuraman, Zeithami & Berry[12] namely Tangible (X1), Reliability (X2), Responsiveness (X3), Assurance (X4) and Empathy (X5) plus Cultural indicators namely Culture of Quality (X6) and Safety Culture (X7). Patient satisfaction assessment was done by direct interviews with patients, using 14 indicators namely Service Procedure (PP1), Service Requirements (PP2), Clarity of Service Officers (PP3), Discipline of Service Officers (PP4), Responsibilities of Service Officers (PP5), Ability of Service Officers (PP6), Service Speed (PP7), Justice Getting Service (PP8), Courtesy and Hospitality of Staff (PP9), Fairness of Service Costs (PP10), Certainty of Service Costs (PP11), Certainty of Service Schedule (PP12), Environmental Convenience (PP13), and Service Safety (PP14). The data were analyzed using Partial Least Square Structural Equation Modeling (Figure 1).

FINDINGS

Table 1: Outer Loading

	Original Sample (O)	Sample Mean (M)	Standard Deviation	T Statistics	P Value
Accreditation ← Accreditation Status	1.000	1.000	0.000		
PP1 ← Patient Satisfaction	0.686	0.688	0.060	11.471	0.000
PP2 ← Patient Satisfaction	0.710	0.711	0.056	12.771	0.000
PP3 ← Patient Satisfaction	0.783	0.779	0.047	16.738	0.000
PP4 ← Patient Satisfaction	0.586	0.582	0.072	8.175	0.000
PP5 ← Patient Satisfaction	0.458	0.452	0.089	5.132	0.000
PP6 ← Patient Satisfaction	0.804	0.803	0.039	20.770	0.000
PP7 ← Patient Satisfaction	0.776	0.775	0.047	16.425	0.000
PP8 ← Patient Satisfaction	0.786	0.788	0.040	19.723	0.000
PP9 ← Patient Satisfaction	0.814	0.812	0.034	23.954	0.000
PP10 ← Patient Satisfaction	0.348	0.349	0.101	3.432	0.001
PP11 ← Patient Satisfaction	0.343	0.344	0.105	3.263	0.001
PP12 ← Patient Satisfaction	0.617	0.618	0.064	9.614	0.000
PP13 ← Patient Satisfaction	0.424	0.427	0.079	5.366	0.000
PP14 ← Patient Satisfaction	0.566	0.570	0.069	8.213	0.000
X1 ← Service Quality	0.715	0.716	0.048	14.989	0.000
X2 ← Service Quality	0.814	0.814	0.032	25.517	0.000
X3 ← Service Quality	0.826	0.825	0.028	29.114	0.000
X4 ← Service Quality	0.706	0.705	0.044	16.135	0.000
X5 ← Service Quality	0.850	0.850	0.026	33.155	0.000
X6 ← Service Quality	0.872	0.872	0.019	46.256	0.000
X7 ← Service Quality	0.561	0.561	0.058	9.761	0.000

Outer loading of service quality with indicators of Tangiable=0.715, Reliability=0.814, Responsiveness=0.826, Assurance=0.706, and Empathy=0.850, Quality Culture=0.872 and Safety Culture=0.561. Outer loading of Patient Satisfaction with indicators of service Procedure=0.686, Service Requirements=0.710, Service Officer clarity=0.783, Service Officer discipline=0.586, Service Officer Responsibility=0.458, Service Officer Ability=0.804, Service Speed=0.776, Justice Get Service=0.786, Courtesy and Hospitality Officer=0.814, Service Costs Fairness=0.348, Service Costs Certainty=0.343, Service Schedule Certainty=0.617, Environmental Comfort=0.424, and Service Safety=0.566. T results calculate all indicators greater than T table. According to Ghozali[22], indicators with factor loading of 0.5 to 0.6 can still be maintained, which is less than 0.5 removed. But if the T is greater than T table it is still called valid, even though the value of the loading factor is less than 0.5, so the indicator can be maintained. It was concluded that the indicator was declared valid and could be used for further analysis.

Table 2: Discriminant Validity

	Accreditation Status	Patient Satisfaction	Quality Services
Acreditation	**1.000**	0.335	0.490
PP1	0.348	**0.686**	0.262
PP2	0.239	**0.710**	0.268
PP3	0.280	**0.783**	0.296
PP4	0.103	**0.586**	0.212
PP5	0.000	**0.458**	0.104
PP6	0.306	**0.804**	0.288
PP7	0.262	**0.776**	0.352
PP8	0.342	**0.786**	0.287

Conted…

PP9	0.300	**0.814**	0.291
PP10	0.025	**0.348**	0.183
PP11	0.021	**0.343**	0.179
PP12	0.214	**0.617**	0.310
PP13	0.156	**0.424**	0.276
PP14	0.126	**0.566**	0.251
X1	0.373	0.299	**0.715**
X2	0.372	0.355	**0.814**
X3	0.442	0.310	**0.826**
X4	0.219	0.248	**0.706**
X5	0.432	0.305	**0.850**
X6	0.420	0.383	**0.872**
X7	0.322	0.306	**0.561**

The correlation coefficients between the indicators and the construct was greater than the correlation coefficient with other constructs. This showed good discriminant validity, meaning that the construct of latent variables predicts indicators on their blocks is better than indicators in other blocks, in other words the indicators used in this study have good discriminant validity in arranging their respective variables.

Table 3: Reliability Test

	Cronbach' Alpha	Rho A	Composite Reliability
Quality Services	0.881	0.893	0.909
Patient Satisfaction	0.880	0.897	0.902
Accreditation Status	1.000	1.000	1.000

From Cronbach's alpha and composite reliability test, each construct very reliable, because it had Cronbach's alpha and composite reliability that were high (>0.80).

Table 4: Path Coefficients

	Effects	Original Sample	T Statistics	P Value
Accreditation Status → Patient Satisfaction	Indirect	0.203	4.427	0.000
Accreditation Status → Quality Services	Direct	0.490	9.047	0.000
Quality Services → Patient Satisfaction	Direct	0.414	5.995	0.000

Assessment of the inner model, from the results of calculating path coefficients, for the hypothesis test, found a significant positive relationship at 0.05 (T table=1.96) between accreditation status and service quality with a path coefficient of 0.490, between service quality and patient satisfaction with path coefficient of 0.414, and indirectly between accreditation status and patient satisfaction with path coefficient 0.203. From this calculation the hypothesis can be accepted and proven significantly.

DISCUSSION

Quality of Service according to the patient's perspective is a service that can meet the needs felt and organized in a polite and polite manner, timely, responsive and able to heal complaints and prevent them from developing or expanding[23]. Service quality can be obtained from Accreditation Status due to status accreditation is beneficial for Service Improvement, Improvement in the Administration & Development Planning process of the Hospital[11], the Accreditation Process evaluates a health service place, so that accreditation status can be established[5],[24] to create a culture of safety and quality of the patient care process and results. The standard of accreditation is based on the principles of quality management and continuous quality improvement[5]. Accreditation status stimulates efforts to improve and improve sustainable quality. ditasi Hospital that is increasing protection for patients, the public, human resources hospitals and hospitals as an institution[2]. Customer satisfaction is the level of one's feelings after comparing perceived performance with expectations[20], customer satisfaction is Impact service, customer satisfaction is categorized as a high-level goal in the public service performance measurement system[17]. This research develops the service quality dimension indicator model of quality from Parasuraman, Zeithami & Berry[12] by adding indicators of culture of quality and safety culture, the results of which models can be applied.

CONCLUSION

Development of dimensions of service quality dimensions with a cultural perspective influences patient satisfaction in different hospitals with accreditation

status, with the main concern adding indicators of quality culture and safety culture into Dimensional Indicators Service quality is proven to be acceptable model, which is seen from the acceptance of the accreditation has a positive and significant relationship with Service Quality: Service Quality has a positive and significant relationship with Patient Satisfaction and there is a significant positive relationship indirectly between Accreditation Status and Patient Satisfaction.

Ethical Clearance: from Ethic Committee of Health Research, Faculty of Public Health, Airlangga University, Indonesia

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SPEOS (Stimulation of Endorphin, Oxytocin and Suggestive): Intervention to Improvement of Breastfeeding Production

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ABSTRACT

Background: The problem of preliminary breast milk expenditure that is not yet smooth is often the reason for the mother to delay or replace it with breast milk substitutes. Even though they have obtainedearly breastfeeding initiation, the expenditure and production of breast milk are not yet smooth.

Objectives: Proving the SPEOS method (Stimulation of Endorphin, Oxytocin,and Suggestive) is effective against increasing breast milk production.

Method: The study used a quasi-experimental pre and posttest design. The sample was 60 postpartum mothers in the Mojokerto area hospital who met the research criteria, taken with a simple random sampling technique. The control group gets early breastfeeding initiation according to the procedure. The intervention group was given the SPEOS method (Stimulation of Endorphin, Oxytocin and Suggestive) intervention method, which was carried out according to the procedure. Assessment of breast milk production is carried out by pumping breast milk, using Pigeon (ml) pumps. Data collection used a weighing test for breast milk production. Processing and analysis of data used paired t-test, Mann Whitney test,and LSD test.

Result: The SPEOS method affected the increase in breast milk production. There were significant differences in the production of breast milk pre-post control group, obtained t-count 8.923 (p = 0.000) and the experimental group t-count 18.886 (p = 0.000). The difference in the level of comfort between groups with the LSD test obtained p-value = 0.035.

Conclusion: The findings of the study show that the SPEOS method (Stimulation of Endorphin, Oxytocin,and Suggestive) is one of the alternative interventions for increasing milk production and accelerating the release of breast milk through increased work of prolactin and oxytocin.

***Keywords:** SPEOS method, Breast milk production, Postpartum*

INTRODUCTION

Indonesia, encouraging exclusive breastfeeding for infants up to 6 months of their first life and continued until the child is two years old. For babies, breast milk has an important role to support growth, health, and survival. Whereas for mothers, breastfeeding can reduce morbidity and mortality because the breastfeeding process will stimulate uterine contractions there by reducing puerperal complications[(1)]. UNICEF asserted that babies are given formula die 25 times higher than babies who are exclusively breastfed[(2)].

Nationally, mothers who breastfed alone in the first 24 hours were 30.2%. Data shows that the coverage of exclusive breastfeeding in Indonesia is still low, only 54.3% of babies in Indonesia are exclusively breastfed, meaning that there are still 45% of babies in Indonesia who are not getting enough breast milk[(3)]. While the national target for exclusive breastfeeding is 80%, in Southeast Asia the achievement of exclusive breast milk shows numbers that are not much different. In

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comparison, exclusive breastfeeding coverage in India has reached 46%, in the Philippines 34%, in Vietnam 27%, and Myanmar 24%[4].

Research in Ghana shows that 16% of infant deaths can be prevented through breastfeeding babies from the first day of birth. This figure rose to 22% if breastfeeding began in the first hour after birth[5].

Failure in the breastfeeding process is often caused by the emergence of several factors, including maternal factors, infant factors, psychological factors, health personnel factors, socio-cultural factors. The research conducted by Diana (2001) showed that inhibiting factors of exclusive breastfeeding in the form of false beliefs about baby food, promotion of formula milk, and health problems for mothers and babies led to the failure of exclusive breastfeeding[6].

The reality in the field, the production, and ejection of breast milk which is a little on the first day after birth, becomes an obstacle in early breastfeeding. The problem of breastfeeding is affected by the reduction of stimulation of the hormone oxytocin, the physical and psychological changes in the mother during the lactation process. Theoretically, the workings of the oxytocin hormone are influenced by psychological conditions. Therefore maternal postpartum preparation is an important factor that can influence the success of breastfeeding, stress, excessive worry, unhappiness plays a role in breastfeeding success[7].

The problem of breastfeeding does not come out on the first day of birth must be anticipated since pregnancy through lactation counseling, but the dissemination of information among officers has not been optimized,so it is necessary to do alternative ways to stimulate milk production[8]. Various researches that have been carried out in Indonesia to facilitate breast milkproduction include methods of Oxytocin Massage, Marble Technique, Warm Compress, Massage Rolling (back), Breast Care, but due to limited information on health services about the procedure of implementation, these methods are only known and rarely given by health workers as care giver to patients[9].

The SPEOS method (Stimulation of Endorphin, Oxytocin,and Suggestive) is one of the preferred interventions to stimulate the release of oxytocin through oxytocin and endorphin massage, provide comfort and foster confidence in the mother that breast milk must come out and mothers can breastfeed exclusively[10].

Endorphins are known as substances that have many benefits. Endorphin massage can stimulate the release of endorphin hormones and can stimulate the appearance of prolactin and oxytocin reflexes to increase the volume and production of breast milk[11]. When combined with oxytocin massage and supported suggestively so that the mother has confidence in her ability in the process of breastfeeding, the resistance to the release of oxytocin will increase. This has an impact on increasing milk production in the early life of the baby.

MATERIALS AND METHOD

The research design was quasi-experiment with pre and post-test design, measurements were taken before and after intervening in the SPEOS method which was a combination of endorphin massage, oxytocin massage, and suggestion, starting 1-6 hours postpartum every day up to week 4. Deep population of this research is all postpartum mothers in the Mojokerto area hospital. Samples were primiparous postpartum mothers giving birth to 60 people (divided into 30 experimental groups and 30 control groups). Research criteria: samples aged 20-35 years, postpartum first day (1-6 hours postpartum), primiparous and multiparous, it did not experience postpartum complications, gestational age above 37 weeks, infants were not given formula milk, BB ≥2500gram, mother, did not smoke, form of nipples on both mother's breasts stood out, condition of mother and baby healthy. Taken with a simple random sampling technique.

The SPEOS method is given every day starting on day 1 (1-6 hours post partum) for four weeks. The duration of the massage starts 10 minutes at week 1, then increases to 15 minutes week II. Then evaluating if the milk production is small then the time that the massage is increased to 20 minutes and maintained until week IV, breast milk production assessment is carried out by pumping breast milk, using a Pigeon pump (ml), breast milk is pumped before and after massage every week up to 4 weeks, pumped 2 hours before the breastfeeding baby. Data collection uses a weighing test for breast milk production. Processing and analyzing data using a paired t-test for breast milk secretion, Mann Whitney test to measure the mean difference of breast milk secretion, while to see the difference in comfort level between groups of respondents with the LSD test.

FINDINGS

Table 1: Distribution of Age, Parity, Education, BMI and Baby Weight

No.	Variable	Control		Experiment		p-value
		Frequency	Percentage	Frequency	Percentage	
1.	**Age**					
	< 20 years	5	17%	2	6%	0.241
	20-30 years	16	53%	18	60%	
	> 30 years	9	30%	10	34%	
	Total	30	100%	30	100%	
2.	**Parity**					
	Primigravida	11	37%	8	27%	0.356
	Multigravida	16	53%	19	63%	
	Grande multi	3	10%	3	10%	
	Total	30	100%	30	100%	
3.	**Education**					
	Elementary school	5	17%	4	13%	0.489
	Middle school	10	34%	12	40%	
	High school	9	30%	10	34%	
	College	6	19%	4	13%	
	Total	30	100%	30	100%	
4.	**BMI**					
	Thin skinny level	8	27%	8	27%	0.653
	Thin weight	0	0%	0	0%	
	Normal	16	53%	20	66%	
	Light weight level	6	20%	2	7%	
	Fat weight level	0	0%	0	0%	
	Total	30	100%	30	100%	
5.	**Baby weight**					
	2500-3000	11	37%	8	27%	0.356
	3001-3500	16	53%	19	63%	
	3501-4000	3	10%	3	10%	
	Total	30	100%	30	100%	

All variables showed p-value >0.05, which indicated that there was no significant difference of the characteristics of the respondents between the experiment and control group. It could be said that both group were homogeneous.

Table 2: Breast milk secretion in the experiment and control group

Variable	Mean	SD	t-count	p-value
Control Group				
Pre-test	17.49	5.063	8.923	0.000
Post-test	73.00	29.047		
Experiment Group				
Pre-test	17.49	5.063	18.886	0.000
Post-test	221.29	55.738		

The table shows that there are differences in the results of pre-post in the control and experimental groups, as evidenced by the results of the t-count of the control group = 8.923 and the experimental group = 18.886. This show that SPEOS, increase milk production.

Table 3: Mean difference of breast milk secretion in the experiment and control group

Variable	Control	Experiment	p-value
Difference of breast milk secretion			
Mean	55.51	203.80	0.0001
SD	29.98	51.689	

The difference in mean values, shows that the SPEOS intervention in the experimental group increased breast milk production, with p-value = 0.0001

Table 4: Differences in the level of comfort between groups

Variable	Mean	SD	p-value
Control group	0.56	9.86	0.035
Experiment group	13	11.55	

The difference in mean values, shows that the SPEOS intervention in the experimental group increased level of comfort, with p-value = 0.035.

Table 5: Indicators of breast milk production in the control and experimental group

Indicators	Control group				Experimental group			
	Yes		No		Yes		No	
	%	n	%	n	%	n	%	n
Tense breast	45	14	55	16	65	20	35	10
Mother relaxes	55	16	45	14	65	20	35	10
Let down good reflexes	55	16	45	14	100	30	0	0
The frequency of breastfeeding is> 8 times	100	30	0	0	70	21	30	9
Use 2 breast	40	12	60	18	70	21	30	9
Correct attachment position	25	8	75	22	70	21	30	9
Putting is not blisters	65	20	35	10	100	30	0	0
Looks full red breasts	20	6	80	24	70	21	30	9
Breastfeeding without schedule	45	14	55	16	75	22	25	8
Babies suck strongly with a slow beat	55	16	45	14	65	20	35	10

Increased production of breast milk, indicated by tense breasts, Mother relaxes, Let down good reflexes, Use 2 breasts, Correct attachment position, Putting is not blisters, Looks full red breasts, Breastfeeding without schedule, Babies suck strongly with a slow beat. While the frequency of breastfeeding is> 8 times, experienced by all control groups. This shows that the quantity of breast milk production is insufficient, so the baby must breastfeed more often than the experimental group.

DISCUSSION

The theory of neurotransmitters that produce endorphins is by affecting the area of the brain, stimulating the secretion of β-endorphin and enkephalin in the brain and spinal cord. Neurotransmitter release affects the immune system and antinociceptive system(12).

Endorphins are naturally produced by the body's pituitary gland which is useful for reducing pain, affecting memory and mood which then gives a relaxed feeling(10).

While oxytocin massage is a massage along the spine (vertebrae) to the fifth-sixthcostae bone and is an attempt to stimulate the hormone prolactin and oxytocin after childbirth. This massage serves to increase the feeling of comfort and relaxation that can stimulate the release of endorphins, with smooth blood flow to the brain, the hypothalamus quickly receives a signal, forwarded to the posterior pituitary that secretes oxytocin, so that the milk automatically comes out(13).

Relaxing muscles, vasodilation of blood vessels, stimulates long fibers and opium receptors such as β-endorphin, which contains large peptides that can be released slowly. Furthermore, the opium on the dorsal

spinal cord blocks the pain signal, closes the substantial galatinosa so that the pain signals are pressed[14].

By the theory that prolactin produced during the breastfeeding process has been studied has a relaxation effect which causes breastfeeding mothers to feel calm and even have a euphoric effect, so that the higher the prolactin level, the better the production of breast milk[7].

The massage will eliminate tension and can cause relaxation of body muscles. This will give a sense of safe and comfort which means psychologically giving a positive impact on the feeling of calm, comfort, relaxation and decreased stress; this stimulates an increase in body morphine, namely endorphins[6]. A comfortable, calm and relaxed atmosphere will bring positive emotions that can increase the secretion of neurotransmitter endorphin through POMC which serves as a pain reliever and excessive control of Corticotropin-releasing hormone (CRH) secretion[15]. This positive response through the HPA pathway will stimulate the hypothalamus to reduce CRF secretion followed by a decrease in corticotropin, adrenocorticotropic hormone (ACTH), and the adrenal medulla will respond by decreasing catecholamine secretion, then peripheral resistance and cardiac output will decrease,so that blood pressure decreases. The state of relaxation that is felt by the mother will improve maternal comfort so that it increases the letdown reflex and increases the amount of the hormone prolactin and oxytocin[15].

Endorphin and oxytocin massage are actions that function to stimulate the production of the prolactin hormone from the brain. This hormone which affects a lot of breast milk. The main massage points to facilitate breast milk, according to Daris, are in the breast itself. The three main points for a massage on the breast are one point above the nipple, right on the nipple, and the point under the nipple. If this is done routinely and correctly, this effort can facilitate breast milk production. In addition to the dots in the breast, the point below the knee (point ST 36) will also help facilitate breastfeeding[16].

Mother's belief in being able to breastfeed her baby is a factor that supports the success of breastfeeding. What the body experiences depend on its subconscious mind. The unconscious soul plays 82% of the function of the self, while the conscious soul plays 18. When the recording is negative, it can be neutralized to be reprogramming with positive suggestions. Suggestions made by relaxing the mind will cause feelings of relaxation and happiness so that breast milk will come out smoothly[17].

The most important period of breastfeeding babies is the first 30 minutes of birth for up to 3 days because at that time colostrum was first produced. This means that it shows signs that breastfeeding in the first hour decreases mortality, and breast milk is exclusively six months old, will reduce infant mortality[6].

CONCLUSION

In postpartum mothers, the SPEOS method can be used as an intervention option for increasing breast milk production. In addition to increasing production, SPEOS has advantages that can be done from an early, has a good impact on the acceleration time of release breast milk and provides confidence and comfort for postpartum mothers.

Ethical Clearance: Yes

Conflict of Interest: No

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Natural Insecticide Spray for *Aedes sp.*, Made from Ethanol Extract of Purple Eggplant Fruit (*Solanum melongena L.*)

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ABSTRACT

Dengue Hemorrhagic Fever (DHF) is an infectious disease caused by the Dengue virus. This virus is transmitted by *Aedes sp*. Many studies have been carried out on the use of plants as biological insecticides, one of which is purple eggplant (*Solanum melongena L.*). This study aims to determine whether *Solanum melongena L*. extract spray can be used as an insecticide for *Aedes sp*. This research was a true experimental study, with a sample of 25 *Aedes sp*. 2-5 days old. The treatment given was eggplant extract spray with a concentration of 80%, 60% and 40% then left for 24 hours, with 3 replications. The concentration of 80% ethanol extract caused 84% of the deaths of *Aedes sp*., The concentration of 60% caused 68% of deaths, and a concentration of 40% caused 44% of deaths. The p-value of the probit test was 0.000 (*Solanum melongena L*. ethanol extract in spray form significantly caused the death of *Aedes sp*.) LC_{50} and LC_{90} values were at concentrations of 49.124% and 81.343%. Spray of *Solanum melongena L.* ethanol extract can be used as natural insecticide for *Aedes sp*.

Keywords: *Ethanol extract, Solanum melongena L., Natural insecticide, Aedes sp, Spray*

INTRODUCTION

DHF is an infectious disease caused by the dengue virus, which is transmitted through the main vectors, namely the mosquitoes *Aedes aegypti* and *Aedes albopictus*. DHF is spread throughout the tropics including Indonesia. The spread of this disease is influenced by rainfall, temperature, and urbanization[(1)]. Before 1970, dengue outbreaks occurred in only 9 countries, but subsequently became endemic in more than 100 countries in Africa, America, the Eastern Mediterranean, Southeast Asia and the Western Pacific. The highest rates of DHF occur in America, Southeast Asia and the Western Pacific, with the number of cases > 1.2 million in 2008 > 2.3 million cases in 2010. In 2013 there were 2.35 million cases in America, and 37,687 cases were Severe DHF. From 1968 to 2009, WHO reported that Indonesia was the country with the highest DHF cases in Southeast Asia[(2)].

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In 2015, the Ministry of Health of the Republic of Indonesia noted that the number of dengue sufferers was 129,650 cases, with the number of deaths being 1,071 (morbidity = 50.75 per 100,000 population and mortality = 0.83%). This number is greater than in 2014, namely 100,347 cases, with morbidity = 39.80[(1)]. In 2015, the number of dengue cases in NTB province was 1,340, then increased to 3,385 cases, with an increase of 152.61% in 2016. The most cases occurred in Sumbawa, East Lombok and Mataram City. DHF morbidity in NTB in 2016 was 69.10 per 100,000 population. This condition shows an increase compared to 2015, even exceeding the nationally defined limit of <40 / 100,000 population, with the number of cases dying = 32 people[(3)].

Indonesia has high air humidity, and this condition triggers the breeding of *Aedes aegypti* and *Aedes albopictus*. *Aedes sp*. is a diurnal animal that starts sucking blood when the sun rises (08.00 - 12.00) until before sunset (15.00 - 17.00). *Aedes aegypti* prefers human blood and is often found indoors, while *Aedes albopictus* prefers animal blood and is usually found outside the home. Population of *Aedes sp*. greatly increased in the rainy season, due to the availability of breeding sites, namely puddles of rain water in used cans, used tires, pieces of bamboo, holes in trees, places to drink birds, etc.[(4)].

Vector control has been carried out both mechanically, biologically and chemically. Vector control is mechanically and biologically friendly to the environment. Mosquito repellent products generally contain high concentrations of synthetic chemicals, which can interfere with human health[5], so that there are currently many studies conducted on the use of plants as biological insecticides to minimize negative effects on humans. Biological insecticides have proven potential for controlling vectors, both for eradicating adult larvae and mosquitoes. In addition, these insecticides are biodegradable so they do not pollute the environment, and are relatively safe for nature, humans and livestock, because the residues of these substances quickly disappear.

The power to kill biological insecticides comes from the toxic substances they contain. These substances can be contact poisons, respiratory toxins and stomach poisons in soft-bodied animals[5]. Biological compounds that have functions as insecticides include saponins, tannins, flavonoids, alkaloids, steroids and essential oils[6].

Purple eggplant contains an active substance that can be used as an insecticide, because it contains steroid alkaloids (solasodine, solanine, solanidine), saponins, flavonoids, tannins, coumarin. This fruit skin is rich in anthocyanin and chlorogenic acid[7]. Saleh (2015) reported that purple eggplant ethanol extract contained flavonoids, tannins, glycosides, steroids and alkaloids. Purple eggplant has better antioxidant activity than 5 other eggplant varieties because it contains high levels of total flavonoids[8]. The total flavonoid content of purple eggplant ethanol extract was 29.35 ± 0.09% b / b Equivalent of Quercetin[9]. Purple eggplant also contains alkaloids = 0.99 ± 0.0 mg / 100 g, tannin = 11.34 ± 0.48 mg / 100 g, and saponin = 11.63 ± 0.29 mg / 100 g (11). Kandita et al. (2015) reported that leunca fruit had an insecticidal effect on *Aedes aegypti* with a concentration of 80%. Purple eggplant is one genus with leunca fruit, so it is logical to do research on the utilization of purple eggplant fruit ethanol extract as an insecticide for *Aedes sp*., Because purple eggplant fruit is easier to obtain in NTB and has high flavonoids[10].

MATERIALS AND METHOD

The design of this study was Post-Test Only Control Group Design, with 3 treatments and 1 negative control, namely T0: Negative Control (Aquadest); T1: Extract with a concentration of 80%; T2: Extract with a concentration of 60%; T3: Extract with a concentration of 40%. The population of this study were *Aedes sp*. adults obtained from egg breeding. The sample were 25 *Aedes sp*. adults 2-5 days for each group, referring to WHO guidelines, using insecticides in the form of spray, with 3 repetitions[11]. The sample was chosen by purposive sampling technique. The research tools and materials were knives, trays, ovens, blenders, analytic balance, glass jars (simplicia containers), funnels, filter paper, extract storage, aluminum foil, rotary evaporator. The tools used for preparation and maintenance of mosquitoes were black buckets, filter paper, cages, containers (eggs and mosquito larvae), drops of pipettes, aspirators. The tools used for dilution of the test solution were beaker glass, measuring cup, stirring rod, mosquito cage (test barrel) measuring 30 x 30 x 30 cm^3, sprayer, label, cotton, paper cup, aspirator, tweezers, tray, basin, observation sheet , purple eggplant fruit, 96% ethanol, water, sugar solution, fish pellets, *Aedes sp*. adult.

The preparation stage was preparing the eggs of *Aedes sp*; making ovitrap using black bucket 3; insert clean water up to ¾ bucket; put filter paper on the bucket wall; put the ovitrap in dark places and leave it for 5-7 days. Filter paper containing eggs was removed and then dried.

The maintenance phase of *Aedes sp* was soaking filter paper in a container filled with water; leave it for 1-2 days until the eggs hatch, then become larvae. Larvae develop from stage I to IV within 5 days. The larvae turn into pupae; then transferred to the cup. Each cup contains 30 pupae, then the cup was moved into the barrel, each barrel contains 2 cups. During its development period, pupae which had become adult mosquitoes were fed with a 10% sugar solution on cotton.

Making ethanol extract of purple eggplant fruit was washing purple eggplant, then slicing it thinly, then putting it in the oven at 40ºC for 24 hours. The dried fruit is mashed using a fine mesh, then dissolved in 96% ethanol with a ratio of 1:5, then taken 200 grams then added to 1000 ml of 96% ethanol. The maceration container is closed and then stored for 3 x 24 hours in a place protected from direct sunlight, then stirred every 5 minutes. After leaving, then filtered, then the extract is separated from the pulp. Ethanol was evaporated using a rotary evaporator at 40ºC, so that 100% extract was obtained[8].

Making variations in extract concentration was: making a solution of purple eggplant ethanol extract with a concentration of 80%, 60%, and 40% from the solution of 100% purple eggplant ethanol extract using a dilution formula:

The 1 time spray weight

$$= \frac{(A-B)+(B-C)+(C-D)*}{3\,\text{replicants}\times 10\,\text{sprays}}$$

The amount of spray needed is calculated by the formula:

$$\text{Amount of spray} = \frac{\text{Standard does (0.70 grams)}**}{\text{The 1 time spray weight}}$$

Note:

*The difference between each test must be <0.20 grams

**Standard dosage used at UPKV/USM Malaysia[10].

The testing stage was to prepare 4 barrels of square test (30 cm^3) and 4 spray bottles containing a solution of ethanol extract of purple eggplant fruit. Prepare 10% sugar solution for each barrel. Move 25 Aedes sp. to each barrel. Spray the extract solution with a certain concentration into each barrel, on the barrel wall. Barrel 1 is sprayed using aquadest, a maximum of 10 sprays; 2-4 test barrels were sprayed using extracts with concentrations of 80%, 60% and 40%; then let stand for 24 hours, then the number of dead mosquitoes was calculated and recorded. If the number of mosquito deaths in the negative control group was <5%, it could be ignored; but if> 80%, then the test must be repeated. If the mortality of mosquitoes in the negative control group was 5% -80%, then the percentage of mosquito deaths in each dose was calculated using the Abbot formula:

$$\frac{\text{Percentage of deaths in the treatment group} - \text{Percentage of deaths in the control group}}{100\% - \text{Percentage of deaths in the control group}} \times 100$$

The data analysis stage was using a probit test with a confidence level of 95%, to prove the effect of giving purple eggplant ethanol extract and Lethal Consentration value (LC_{50} and LC_{90}).

FINDINGS

Insecticide test results of purple eggplant fruit extract against *Aedes sp*. can be seen in table 1.

Table 1: Death of *Aedes sp.*

Extract concentration	Number of *Aedes sp.*	*Aedes sp*. Deaths (replication)			Mean	Percentage
		1	2	3		
80%	25	22	21	21	21	84%
60%	25	17	18	16	17	68%
40%	25	11	11	10	11	44%
Negative control	25	0	0	0	0	0%

Table 1 shows that the number of deaths of *Aedes sp*. the highest was at a concentration of 80%, followed by a concentration of 60%, 40% and control with the number of deaths = 0.

The relationship between the percentage of mosquito deaths with extract concentrations is shown in Figure 1.

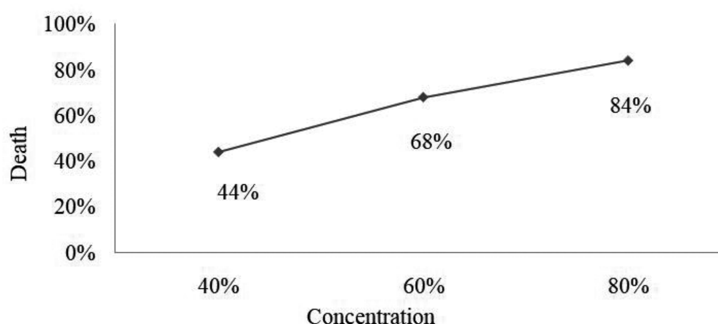

Figure 1: Relationship between the percentage of mosquito deaths with the concentration of purple eggplant extract

Figure 1 shows that the percentage of mosquito deaths was directly proportional to concentration.

Effect of purple eggplant extract on the death of *Aedes sp*. can be seen in tables 2 and 3.

Table 2: Parameter estimates

	Parameter	Estimate	Std. Error	Z	Sig.	95% CI	
						Lower	Upper
PROBIT	Concentration	0.040	0.004	9.457	0.000	0.032	0.048

Table 2 shows the p-value of the Probit test was 0.000 (purple eggplant extract caused the death of *Aedes sp.* significantly).

Table 3: Chi-square test

		Chi-Square	df	Sig.
PROBIT	Pearson Goodness-of-Fit Test	5.327	10	0.868

Table 3 shows that Pearson goodness-of-fit-test was 0.868 (> 0.500), so it was interpreted that the relationship between extract concentration and mosquito mortality was directly proportional.

The values of LC_{50} and LC_{90} are presented in table 4.

Table 4: Nilai LC_{50} dan LC_{90}

	LC	95% CI		
		Estimate	Lower	Upper
PROBIT	50	49.124	44.431	53.474
	90	81.343	75.029	90.208

Table 4 shows that extract concentrations caused 50% of the deaths of *Aedes sp*. was 49.124%, while the concentration of extract which caused 90% of deaths was 81.343%.

DISCUSSION

Eggplant powder was extracted by maceration method using 96% ethanol. The maceration method is chosen because it is a simple method of retrieval. The use of 96% ethanol aims to attract active substances namely flavonoids, glycalkaloid, saponins and tannins which are thought to have an insecticidal effect on *Aedes sp*. 96% ethanol is semipolar so it can dissolve polar and non-polar chemicals[(6)].

Aedes sp. in this study was 2-5 days old. The age of mosquitoes is a factor that greatly influences the resistance of mosquitoes to exposure to chemical compounds, so the age of mosquitoes is important. Referring to WHO insecticide test guidelines, 2-5 days is the best age, with good and productive body resistance[(6)].

The results showed that the higher the concentration of purple eggplant extract given, the higher the percentage of death of *Aedes sp*, with LC_{50} and LC_{90} being 49.124% and 81.343%, respectively. Similar reports were submitted by Kandita et al. (2015) that leunca fruit extract (one genus with purple eggplant) has an insecticidal effect on *Aedes aegypti* with a concentration of 80%[(10)].

Musdalifah (2016) reported that the average mortality of mosquitoes given lime peel extract with a concentration of 15% was 25%, with a concentration of 30% was 45% mortality, and with a concentration of 60% was 62% death[(6)]. These results are similar to the results of this study, that the percentage of mosquito deaths is directly proportional to the concentration of extracts of biological materials used. The higher the concentration used, the higher the active ingredient in the extract. The toxic power caused by purple eggplant extract is caused by the presence of active ingredients contained in the extract. Some bioactive compounds that are thought to be contained in purple eggplant extract include flavonoids, saponins, glycalkaloid and tannins which have proven to be contact poison and respiratory toxins in insects, especially *Aedes sp*.[(6)].

As a phenol, flavonoids attack the nerves in some vital organs of insects, causing nerve weakness, such as respiratory problems and death. As terpenoids,

saponins can bind to free sterols in the digestive tract of mosquitoes, where sterols are precursors of the hormone ekdison, so that if the number of free sterols decreases, there will be disruption of moulting of insects. Saponins can also destroy red blood grains and are toxic to cold blooded animals (6). Glikolkaloid functions as a contact poison for *Aedes sp*. The ability of the glycosalkaloid to bind the 3β-hydroxy sterol membrane can interfere with membrane function. This substance also inhibits the action of the acetylcholinesterase enzyme, giving rise to the accumulation of acetylcholine in the nervous system, which in turn causes digestive defects, nervous disorders and death[(10)].

Utilization of biological compounds is relatively safe for the environment and humans, because it is easily biodegradable so that the residue quickly disappears. In general, the function and effectiveness of insecticides is directly proportional, meaning that the higher the dose of insecticide, the higher the chance to control insects. Even though there are no studies that directly explain the effects of using natural insecticides on human health, its application in the environment must remain under control. For now, the use of natural insecticides is an alternative to controlling insects in households safely, and helps minimize the risk of environmental damage.

CONCLUSION

Based on the results of the study it can be concluded that purple eggplant fruit extract is effective as an insecticide for *Aedes sp*.

Conflict of Interest: This research is free from conflict of interest

Ethical Clearance: This study has been equipped with a certificate of ethical clearance from the health research ethics committee

Source of Fundings: The authors are funders of this study

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Effect of Vitamin A and Zink Intake of Breastfeeding Mothers on Infection in Infants

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ABSTRACT

Background: Breastmilk is an important nutrient for newborn baby that can improve health and reduce morbidity so the babies are expected to achieve an optimal growth and development according to their abilities so that later they can become a nation's successor with high quality and competitiveness. However, giving exclusive breastfeeding based on The "Basic Health Research" is increasingly alarming, namely the average coverage of exclusive breastfeeding in 2013, which was 67.80% and decreased by 61.0% in 2014. Ministry of Health of Republic of Indonesia in 2017 set a target of achieving 44% Exclusive Breastfeeding, but the achievement was 35.7%.

Purpose: Knowing the effect of Vitamin A and Zink Intake for Breastfeeding Mothers on Infection in Infants in the Sudiang Raya Health Center.

Method: This research was an survey with cross sectional design. Sample were breastfeeding mother that selected by simple random sampling. The collected data were analyzed using contingency coefficient.

Result: In general breastfeeding mothers get less vitamin A and zinc. The frequency of infection was twice that of 59.79 percent. The results of the Spearman test showed p-value = 0.000, with a correlation coefficient marked negative, so it was concluded that the intake of vitamin A breastfeeding mothers correlated with the frequency of infectious diseases in infants.

Conclusion: Reduced intake of vitamin A will have an impact on increasing the frequency of infections in infants.

Keywords: *Vitamin A, Zinc, Breastfeeding, Infection, Infant*

INTRODUCTION

Exclusive breastfeeding is very useful for reducing child morbidity and improving maternal health, in accordance with one of the goals of the Sustainable Development Goals (SDGs), which is to ensure that children consume exclusive breastfeeding during the first 6 months after birth. Mother's milk not only provides benefits for 'mother and baby health', but also has high economic and practical value. In addition, breast milk contains important nutrients that can improve health and reduce infant morbidity, so that they can achieve optimal growth and development according to their abilities, so that later they can become qualified future generations and have high competitiveness and productivity[(1)].

Children who get breast milk early, generally have a better immune system than those who do not get breast milk. Children who are not breastfed, their development is hampered, or the quality of their development is not optimal[(2)].

The percentage of exclusive breastfeeding in infants 0-6 months in Indonesia in 2013 was 54.3% (lower than the condition in 2012, which was 48.6%). The coverage of exclusive breastfeeding for infants aged 0-6 months in South Sulawesi Province is 56.02%. The percentage coverage of exclusive breastfeeding in 2013 at Sudiang was 40.13%. The percentage of exclusive breastfeeding

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for infants 0-6 months in the work area of community health centers in Makassar in 2011 was 36.8%, in 2012 it was 63.7% and in 2013 it was 67.8%. This achievement is lower than the target of the National Development Program and National Strategy[3]. In 2015, the Ministry of Health of the Republic of Indonesia had set a target for achieving exclusive breastfeeding as outlined in the strategic plan. The target of exclusive ASI achievement in 2017 was 44%, but the national achievement was only 35.7%[4],[5].

Based on the explanation above, it is important to conduct research on the effect of intake of Vitamin A and zinc for breastfeeding mothers on the incidence of infection in infants in the Sudiang Raya Health Center, Makassar.

MATERIALS AND METHOD

The design of this study was cross sectional, which was conducted in the Paccerakkang Daya Village, Makassar. The sample was selected using a systematic sampling technique with the help of random number tables. The variables in this study were: 1) intake of vitamin A and zinc for breastfeeding mothers, obtained through interviews, with the help of food recall = 3x24 ja; 2) the incidence of infection in infants obtained through filling in questionnaires. Data was collected by trained enumerators with an educational background in Applied Nutrition Bachelor, Makassar Health Polytechnic graduates. Categorical data types are presented in the form of frequency and percentage[6], then analyzed using the contingency coefficient test.

FINDINGS

Distribution of vitamin A and zinc intake from breastfeeding mothers is presented in Table 1 and Table 2. It appears that in general breastfeeding mothers get less vitamin A and zinc.

Table 1: Distribution of Vitamin A Intake of Breastfeeding Mothers

Vitamin A Intake	Frequency	Percentage
More	8	8.25
Sufficient	9	9.28
Less	80	82.47
Total	97	100.00

Table 2: Distribution of Vitamin A Intake of Breastfeeding Mothers

Zinc Intake	Frequency	Percentage
More	0	0.00
Sufficient	0	0.00
Less	97	10.00
Total	97	100.00

The distribution of incidence of infection in infants is presented in Table 3. It appears that the frequency of infection was twice that of 59.79 percent.

Table 3: Distribution of Twice Infections in Infants

The incidence of infections	Frequency	Percentage
Never	17	17.53
Once	7	7.22
Twice	58	59.79
Thrice or More	15	15.46
Total	97	100.00

Table 4: Effect of Vitamin A Intake of Breastfeeding Mothers on the Incidence of Infection in Infants

No.	Vitamin A Intake	The Incidence of Infection in Infant				Total
		Never	Once	Twice	≥ Thrice	
1.	Less	1 (1.3%)	7 (8.8%)	57 (71.3%)	15 (18.8%)	80 (100%)
2.	Sufficient	9 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	9 (100.0%)
3.	More	7 (87.5%)	0 (0.0%)	1 (12.5%)	0 (0.0%)	8 (100%)
Total		17 (17.5%)	7 (7.2%)	58 (59.8%)	15 (15.5%)	97 (100%)
Spearman Rank (α = 5%)		p-value = 0.000, r = - 0.368				

Based on Table 4 it is known that the results of the Spearman test showed p-value = 0.000, with a correlation coefficient marked negative, so it was concluded that the intake of vitamin A breastfeeding mothers correlated with the frequency of infectious diseases in infants. In this case, reduced intake of vitamin A will have an impact on increasing the frequency of infections in infants.

DISCUSSION

In general, breastfeeding mothers in Paccerakkang Daya Village get less vitamin A. Low vitamin A intake often occurs in developing countries. Lack of intake of vitamin A will reduce the body's resistance to infectious diseases and cause growth delay[7]. Vitamin A has an important role in maintaining health and survival. Vitamin A deficiency in children will increase the risk of infectious diseases, increase mortality, and cause growth delay. Vitamin A content in breast milk is influenced by maternal vitamin A intake, both in terms of quantity and quality.

Vitamin A also supports the function of vision, reproduction, growth, immunity, and plays an important role in the differentiation, proliferation and delivery of signals in cells. Vitamin A, protein and zinc are related to one another in order to support the process of growth and development[2]. Research on breastfeeding mothers in Brazil, showed that serum retinol was higher in the group given vitamin A intake than the group that carotenoid intake[9]. In his research, Zakaria reported that referring to recommended daily needs, breastfeeding mothers' intake of vitamin A was in the less category[10].

The results showed that all mothers experienced a lack of zinc intake. Similar results were reported by Chen Halijao that zinc consumption in the nursing mothers group was lower than the nutritional adequacy rate[11]. In his research, Zakaria also reported that zinc intake in nursing mothers was lower than recommended daily needs[10].

Zinc has an important role in various functions in the body. In the metabolic process, zinc plays a role in reactions related to the synthesis and degradation of carbohydrates, proteins, fats, nucleic acids, and vitamin A. Zinc acts as an integral part of the enzyme DNA polymerase and RNA polymerase. Zink is needed to stabilize the DNA binding protein structure by regulating gene expression. Zinc is part of the collagenase enzyme, which plays a role in the degradation of collagen[12].

Zinc deficiency due to lack of food intake and bioavailability is still a problem in developing countries including Indonesia. The result will affect the composition of nutrients in breast milk which ultimately affects the quality of the milk.

The results showed that the frequency of infection was the most twice (59.8%). Problems with malnutrition and malnutrition are directly affected by food consumption and infectious diseases; and indirectly by parenting, food availability, socio-economic, cultural and political factors[13].

Nutrients are very important for life. Nutrient deficiency in children can cause several negative effects such as slow body growth, more susceptibility to disease, decreased health status and mental disruption of children. Lack of consumption of nutrients can cause serious problems, namely death in children[14].

One nutrient that is very influential on the immune system is vitamin A and zinc. Both work together to help increase a child's immunity[8]. If the intake of vitamin A is given in sufficient quantities when the child is in an infectious condition, then vitamin A will fight the infection, resulting in a decrease in the degree of infection[14].

This is consistent with research conducted on children aged 6-24 months. The results of the study showed that there was a decrease in the incidence of diarrhea/infection in children who were given zinc supplementation, vitamin A and multi micronutrients, so that death could be prevented[16].

Zinc and beta-carotene supplements in pregnant women will affect the development of newborn immunity and significantly affect the decrease in the incidence of morbidity in infants[17].

CONCLUSION

Vitamin A intake can reduce the frequency of infectious diseases in infants in Paccerakkang Daya Village, Makassar, Indonesia.

Source of Funding: Authors

Ethical Clearance: Yes

Conflict of Interest: No

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Knowledge, Attitudes towards Health Insurance, Eradication of Mosquito Breeding Places and the Incidence of Dengue Hemorrhagic Fever in Badung Regency

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ABSTRACT

People who have health insurance feel comfortable and safe because their health is protected. If they are hospitalized, there is an institution that pays, so that efforts to prevent themselves from becoming sick are forgotten. People are reluctant to take preventive measures, such as being lazy to eradicate mosquito nests. The purpose of this study was to analyze the relationship between knowledge, attitudes towards health insurance, eradication of mosquito breeding places, and the incidence of dengue hemorrhagic fever in Badung Regency. This type of research was observational, involving 330 people as sample selected by cluster sampling. The cluster number was 10, each cluster consisted of 33 respondents. The cluster was selected using the Probability Proportional to Size (PPS) technique. Data were collected through filling out questionnaires and then analyzed using multivariate statistics. The results showed that there was a positive correlation between knowledge and attitude and the incidence of dengue hemorrhagic fever; negative correlation between knowledge and attitude with the act of eradicating mosquito nests; and a negative correlation between action and the incidence of dengue hemorrhagic fever. It is hoped that the community will be more active in doing voluntary work or cleaning the environment periodically, both weekly and monthly.

Keywords: *Dengue hemorrhagic fever, Mosquito breeding places, Eradication, Health insurance, Knowledge, Attitude*

INTRODUCTION

National Health Insurance provides several benefits for the community, namely affordable premiums, the existence of quality control and cost principles, is a social health insurance that guarantees the certainty of sustainable health service financing, as well as social health insurance that can be used in all regions of Indonesia[(1),(2)].

Community behavior is a person's response to stimuli related to illness and disease, health care systems, food, and the environment. There are passive human responses such as knowledge, perception, and attitude; some are active[(3)]. Public knowledge about the National Health Insurance is very minimal, especially in the periphery areas need to be solved gradually. In overcoming this problem, government policies on health must be carefully determined, so that investments made so far do not become futile[(4)].

In Indonesia, until now dengue haemorrhagic fever is still a major health problem. Since it was first reported in Jakarta and Surabaya in 1968, the incidence of this disease is increasing and spreading throughout Indonesia[(5)]. The regions with the highest morbidity are Java, Bali and parts of the island of Borneo. Aedes aegypti has several characteristics, which are only able to live at a temperature of 8 ^{0}C to 37 ^{0}C, on the body there are silvery white or yellowish white spots[(6)].

The Badung District Health Office reported that cases of dengue fever in Badung Regency were included in the high category, with 2178 cases in 2015, with deaths of 6 people, with IR 0.3%. As of the end of July 2016 there were 2751 cases, with 10 deaths, with IR 0.4%[(7)].

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People who have become members of the National Health Insurance program feel comfortable and safe because their health is protected or guaranteed, so in their thinking, if they are sick or hospitalized, there are institutions that pay. With the existence of such thoughts, then there is one aspect that is forgotten, namely prevention of self so as not to experience health problems or suffer from disease. The community becomes lazy to take actions that can prevent the occurrence of illness, such as lazy to eradicate mosquito breeding places in order to prevent the incidence of dengue fever.

The statement of the problem in this study is: Is there a correlation between knowledge, attitudes toward health insurance with the eradication of mosquito breeding places and the incidence of dengue hemorrhagic fever in Badung Regency? The purpose of this study was to analyze the relationship between knowledge, attitudes towards health insurance, eradication of mosquito breeding places, and the incidence of dengue hemorrhagic fever in Badung Regency.

MATERIALS AND METHOD

This research was carried out in Badung Regency, Bali Province, Indonesia in 2017. This study was observational research that examined programs that had been carried out by the government[8]. The sample was 330 people selected by cluster sampling technique. The cluster number was 10, each cluster consisted of 33 respondents. The cluster (Table 1) was selected using the Probability Proportional to Size (PPS) technique, using software[9].

Table 1: List of Selected Clusters

Cluster	Name of Village
1	Abiansemal
2	Bongkasa
3	Darmasaba
4	Mengwi
5	Kapal
6	Kuta
7	Kerobokan
8	Tibubeneng
9	Unggasan
10	Jimbaran

The independent variable in this study was knowledge and attitudes towards national health insurance, the intermediate variable was the act of eradicating mosquito breeding places, while the dependent variable was the incidence of dengue hemorrhagic fever. Data were collected through filling out questionnaires. The categorical data were presented in the form of frequency and percentage[10], then analyzed using multivariate statistics.

FINDINGS

Description of Knowledge and Attitude toward Health Insurance, The Act of Eradicating Mosquito Breeding Places and The Incidence of Dengue Hemorrhagic Fever

Table 2: Distribution of Knowledge about Health Insurance

Knowledge about Health Insurance	Frequency	Percentage
Good	309	93.64
Not Good	21	6.36

Table 3: Distribution of Attitude toward Health Insurance

Attitude toward Health Insurance	Frequency	Percentage
Good	273	82.73
Not Good	57	17.27

Table 4: Distribution of The Act of Eradicating Mosquito Breeding Places

The Act of Eradicating Mosquito Breeding Places	Frequency	Percentage
Good	127	38.48
Not Good	203	61.52

Table 5: Distribution of The Incidence of Dengue Hemorrhagic Fever

The Incidence of DHF	Frequency	Percentage
Not Occur	156	47.27
Occur	174	52.73

Referring to table 2 to table 5, the majority of people had a good level of knowledge and attitude towards

health insurance, but the act of eradicating mosquito breeding places tend to be not good, and more dengue fever occurs.

HYPOTHESIS TESTING RESULTS

Table 6: The Correlation between Knowledge about Health Insurance, Attitude toward Health Insurance, The Act of Eradicating Mosquito Breeding Places and The Incidence of Dengue Hemorrhagic Fever

Correlation	r	p-value
Knowledge–The Act of Eradicating Mosquito Breeding Places	-0.597	0.000
Knowledge–The Incidence of Dengue Hemorrhagic Fever	0.694	0.000
Attitude–The Act of Eradicating Mosquito Breeding Places	-0.545	0.000
Attitude–The Incidence of Dengue Hemorrhagic Fever	0.676	0.000
The Act of Eradicating Mosquito Breeding Places–The Incidence of Dengue Hemorrhagic Fever	-0.835	0.000

Table 6 shows that each correlation test produces p-value <0.05; so it was concluded that all correlation test results were significant.

DISCUSSION

The majority of respondents' knowledge about national health insurance is in the good category. This can be seen from the National Health Insurance participants who generally come from communities with sufficient economic levels, the community has a culture of saving in preparation for the occurrence of illness, there are still people who think that the National Health Insurance is not a government program to seek profits, and there are people who do not know about the principles of National Health Insurance that are applied such as mutual cooperation, without seeking profit, sustainable social security, and compulsory participation for all Indonesian people.

Knowledge is the result of knowing, which occurs after a person has sensed a particular object[11]. Knowledge is also an effort that underlies a person to think scientifically, while the level depends on the knowledge or basic education of the person concerned[12]. Thus, knowledge can be influenced by education, experience, age, economic status, information, environment and culture.

The results showed that knowledge of national health insurance correlated negatively with the eradication of mosquito breeding places. This shows that respondents' knowledge of national health insurance is good, the community feels comfortable and safe when they have health insurance, so they forget to take preventive measures to avoid dengue fever. With these findings, it is expected that the community will be more active in carrying out mutual cooperation activities to eradicate the breeding of mosquitoes.

Community attitudes towards national health insurance are generally in the good category. Most people who already have a national health insurance card. But there are also people who do not have a National Health Insurance card. They did not immediately register themselves as national health insurance participants, even though the conditions needed were easily obtained. There are also people who consider that it is still difficult to obtain national health insurance registration requirements. On the other hand there are also people who consider that national health insurance is not a public health insurance.

Actually, people already know about national health insurance even though there is little information that can be absorbed by the community. Many people still think that national health insurance can be taken care of suddenly when it is needed to get medical check up or to pay for expensive treatment; whereas national health insurance has 6 principles, namely mutual cooperation, non-profit, portability, mandatory participation principle, trust fund, and the results of the management of social security funds[1].

Attitude is a feeling of supporting (favorable) or not supporting (unfavorable) such as readiness to react in a certain way if the individual is faced with a stimulus that requires a response[13].

The results showed a negative correlation between attitudes towards national health insurance and eradication of mosquito breeding sites. This shows the attitude of the people who are lazy to carry out mutual cooperation activities to clean the mosquito breeding grounds. The community considers that if they suffer from dengue fever, there is already health insurance

that covers the funding at the hospital. It is hoped that the community will continue to increase its awareness through health education, so that they can prevent dengue fever by eradicating mosquito breeding sites.

With the national health insurance program, community actions to eradicate mosquito breeding sites are in the "not good" category. Perception is a process in a person in understanding the situation or situation in his environment, which involves organizing and interpreting as a stimulus in a psychological experience. Perception is formed in a process with sufficient time to produce a response. Perception can help someone to choose and interpret something that is felt or seen as a complete and meaningful form, such as an action that appears(14).

The results showed that there was a negative correlation between eradication of mosquito breeding sites and the number of people affected by dengue fever in one house. This shows that the eradication of mosquito breeding sites plays an important role in the prevention of dengue fever. The more inactive in carrying out mutual cooperation activities to clean the environment, the more chance for dengue hemorrhagic fever to occur.

Based on the results of this study, it is expected that the community will be more active in carrying out voluntary work activities to eradicate mosquito breeding sites, coupled with activities to close water reservoirs, bury containers and drain water reservoirs. Community service activities to clean the environment can be done in the yard, in public places, schools and others; periodically every week or monthly.

CONCLUSION

The results showed that in Badung Regency, the incidence of dengue hemorrhagic fever was related to the eradication of mosquito breeding sites. Knowledge and attitudes towards national health insurance have weakened the eradication activities of mosquito breeding sites, due to a tendency to rely on the existence of health insurance.

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Ethical Clearance: Yes

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The Anachronism of the Indonesian Social Security Policy in Health

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ABSTRACT

The rights for social security can be found in the 1945 Constitution of Republic of Indonesia, Article 34 section (2) which reads "The state develops a social security system for all citizens and empowers the weak and the poor according to the human dignity". With the purpose of achieving every citizen's rights for social welfare as stated in the Mandate of the Constitution, so the Constitution No. 40 year 2004 on the JKN (National Social Security) and the Constitution No. 24 year 2011 on the Social Security Administering Body are issued as the legal protection of the National Social Security System and the National Healthcare Security in Indonesia. The implementation of National Healthcare Security is rather problematic. Some complaints of the BPJS (Social Security Administering Agency) participants regarding the BPJS-Health include rejections form health facilities or health workers to the BPJS patients with various reasons. A protruding problem is the minimum activation number or the BPJS waiting period for social welfare participants. This results to the citizens' violation of rights in receiving healthcare services form the social security program.

Keywords: *Anachronism, Social security, Healthcare security, Indonesia*

INTRODUCTION

A country that adheres to social welfare is absolutely obliged to have an integrated system of social security for its citizens, this is because the welfare rights is one of the most pivotal aspects that one citizen can have[(2)]. The implementation of social security program is one of the responsibilities and obligations of the state, as mandated by the constitution, to provide social economic protection to its citizens[(3)]. Especially for those whose welfare reaches the minimum standard and even socially impoverished[(4)].

The state protects its citizens from social distresses which are caused by wage payment termination (unemployed), termination of employment, disability, aging, death, etc. The said protection is given to the community members through certain programs such as reimbursement of healthcare costs, child support, family allowances and others[(5)].

According to Anies Baswedan as quoted by Dinna Wisnu, "The state was established with a common promise to promote public welfare. The Social Security System is built to ensure that the said promise is able to be fulfilled to each citizen. The management of the social security system with the principles of good governance is the key" [(6)]. Some of the opinions of the scholars above always involve citizen welfare as one of the aims in establishing a particular state[(7)].

The Indonesian State Constitution has mandated the state administrators to carry out a particular social security on a national scale with the intention that each Indonesian citizen is able to reach the good standard of health and welfare for both themselves and their family and also the mandates regarding the implementation of the social security system.

Thus, one of the tasks of the state of Indonesia is the implementation of social security for each and every

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citizen as mandated in Article 28H section (3) regarding the rights to social security and Article 34 section (2) in the Constitution of the Republic of Indonesia of 1945, and Decree of The People's Consultative Assembly of the Republic of Indonesia contained in Number X/MPR/2001, which assigns the President to establish a National Social Security System in order to provide a comprehensive and an integrated social protection. The ratification of the Constitution Number 24, 2011 concerning BPJS is in the juridical formal manner a manifestation of the constitution mandate regarding social security for Indonesian citizens. The Constitution No. 24 year 2011 also stipulates that the National Social Security Policy will be held by a public organization named BPJS which consists of BPJS-Health (focusing in Healthcare Security) and BPJS-Labor (focusing in Labor Security) [(1)].

BPJS-Health as the sole provider of JKN turned out to run and work things in such a slow pace due to the huge workload it borne. Organizing JKN to hundreds of millions of people in an area as large as Indonesia is not an easy nor a simple matter. The state has obligations (State Obligation) to take a role in facilitating and securing each citizens' rights fairly to be able to implement social security to all citizens which would also be the dream of Indonesia's Founding Fathers[(8)].

The citizens are expected to obtain the JKN they deserve. JKN is expected to reduce health costs which is relatively expensive. To the citizens who are not supported by JKN and suffer from illness, it will bring them farther from prosperity and closer to the poverty instead[(8)].

The implementation of JKN by BPJS is problematic and full of conflicts. Among the complaints from BPJS participants to BPJS-Health is the occurrence of rejection from health facilities or health workers for various reasons. One of the prominent problems is the minimum activation number or the BPJS waiting period of social security participants, which causes violations to citizen rights in obtaining services from the social security program. Constitution of the National Social Security System mandates the state to be involved in this matter.

Asih Eka Putri, who is a member of National Social Security Boards believes that the seven-day waiting period as stipulated in the BPJS Health Regulation No. 4, 2014 needs to be criticized. Moreover, if the participant who has registered and paid the initial premium suffers an emergency situation which requires an immediate aid. "It is potentially resulting in the violation of rights and it is against the law regulations above it," she stated during the interview.

This waiting period is also highlighted by Nasruddin, "Public service is supposed to be able to be provided immediately. After the citizens register, they will be able to instantly obtain the service. A solution must be sought so that BPJS-Health program will be able to run continuously with no violation of the participants' rights," advised Nasruddin[(10)]. This issue is one small example of the problems of JKN which occurred in the field.

There is a difference between the BPJS policies as the JKN organizer and the citizens who are the JKN participants and also the providers of the health facilities. Upon setting the priorities between these three parties, the citizens are always put in a disadvantageous position which results in an imbalance of the citizens' bargaining position[(11)].

The law and the authorities are misused in the implementation of JKN. This denies the principle of the National Social Security itself, namely the principle of equity as explained in the UU-SJSN Article 19 section (1), which states that, "The principle of equity is the equality in obtaining services according to one's medical needs regardless of how the amount of premium they pay." Which means, the citizens are served not based on the cost (premium) they pay but based on the health services they need.

MATERIALS AND METHOD

As a scientific endeavor, the method is a way of working which aims to understand the objects that is a subject of the said relevant science[(12)]. This research uses a mixed method approach or collaborative, with the normative or doctrinal juridical approach which is connected or which supports the sociological juridical approach (non-doctrinal). This researchuses secondary and primary data, through library research and field studies, and data analysis with qualitative analysis[(13)]. According to Denzin and Lincoln as quoted by Ayu[(14)] it is stated that qualitative research is the research which uses natural settings, aimed to interpret phenomena which occur and carried out by involving various existing methods.

Approaches on this research includes: Conceptual Approach, Statute Approach, Comparations Approach also Sociological Approach.

FINDINGS AND DISCUSSION

JKN policies and implementations in Indonesia have many problems, because the National Healthcare Security program, known as JKN, is a policy which violates the principle of equity. This principle means that citizens are served not based on the fees (premium) they pay, but based on the health services they need.

The problems of JKN participants are such as being denied by Health Facilities and having modestly treatments according to the JKN class they had. These are the excesses from the application of the INA CBG's policy (Indonesian Case Base Groups). Article 39 of 2016's Presidential Decree Number 19 concerning Healthcare Insurance contains provisions that BPJS-Health (which focuses on Healthcare Security) applies Indonesian Case Base Groups system (INA CBG's). The INA CBG's system follows the prospective payment system. It is a method of payment made for health services, which the amount is already known before the health services are provided.

Article 39 Paragraph 1 states that, "BPJS-Health makes payments to first-level health facilities pre-emptively based on the capacity of registered participants' amount at first-level health facilities". Article 2 states that, "BPJS-Health makes payments to first-level Health Facilities pre-emptively based on the capacity of registered participants' amount at first-level Health Facilities. Article 3 then states that, "BPJS-health makes payments to advanced level of Health Referral Facilities based on the Indonesian Case Based Groups (INA-CBG)'s method".

The policy concept of INA CBG's in the Presidential Decree itself brings a big problem regarding the citizens' constitutional rights. The problem is when there are patients who are required to be treated with better health services and it exceeds the amount of payment that must be paid by BPJS to Health Service Providers in INA CBG's.

These problems result in disruption of health services for BPJS patients to undergo maximum treatment because the BPJS budget limit is lower than the health care needs. Yet the citizens have the right to obtain good service and it is the government's obligation is to provide the best quality of public services[15].

This indicates that private health services have not received nor served the health social insurance owners provided by the government. Therefore, to support social security, there needs to be a synergy between government-owned and private-owned health services. There needs to be a legal protection and incentive awards to attract private-owned health services to actively support the SJSN-Health[16]. So far, it appears that private institutions tend to be reluctant in getting involved because there is a range of gaps between the real needs that are spent and the costs that can be claimed through INA CBG's, which causes losses to private health facilities.

The application of INA CBG's with a minimum tariff range certainly makes the people as BPJS users the victims. Health facilities and hospitals often refuse JKN-BPJS patients with reasons such as the treatment room is full. It is caused by the JKN fees determined through the INA CBG's policy which cannot meet the real costs of patient treatment.

Another problem is the JKN system. This is the matter of fact that the JKN system is still based on premium payments and it has caused the Constitution No. 40/2004 on the National Social Security System to have its constitutionality criticized. The provisions for compulsory premium payments to obtain social security are considered as a harm to JKN's constitutional rights and equity principles.

The premium payment to JKN organizers can be considered as an exploitation of the people. Moreover, JKN services are no longer based on health service needs but based on the amount of premium payments. Compulsory premium payments for all citizens, regardless of their socio-economic status, for all social security programs held by the government have obscured the social security and the social insurance[17].

The next problem that cannot be resolved is that the coverage of JKN participants cannot reach the UHC (Universal Health Coverage)'s expected target, which is all residents should be covered by JKN as of January 1st, 2019. In fact, the participation of JKN users only reached 77 percent nationally[18]. This is because the JKN system follows an active registration system (meaning citizens must register and it is not automatically granted by the state) which is based on contributions. Hence, residents

in remote areas, who are far from the city, are not yet covered by JKN, as they do not know about the JKN program. Furthermore, Indonesia's social security system will run more effectively if the government or the state implements an automated system and uses the service of coming for citizens to join the JKN registration.

Health insurance or health care insurance is an effort to create a risk pooling, which is to transfer personal risk into group risk so that there is a sharing of risk. In health insurance, the community shares the costs through a system of preemptive contributions[19]. The state's responsibility in developing a national social security system is really off the hook. The national social security system implemented with an insurance scheme or social insurance releases the state obligations and is then charged to the people.

It is ironic when the people are burdened with the obligation to develop JKN, and on the other hand the government is reluctant to give or to allocate more budget for health. The health budget in the APBN is only about 0.84% - 1.85% from 2002-2012 from the total of the state budget[20]. The small allocation indicates that the government actually does not have serious intentions in developing the JKN system. Hence, they choose a system or policy that transfers obligations from the government to citizens

CONCLUSION

Indonesia's policy of national social security system, especially the National Healthcare Security is an anachronism because INA CBG's policies are not in accordance with the Cost Recovery Rate (CRR) or the real cost of health services given by hospitals or health facilities. This condition makes JKN participants being rejected or being given modestly services by hospitals or health facilities. The application of INA CBG's also violates the rules and principles of JKN, namely equity or JKN participants are given services not based on the amount of payment contributions yet based on the services required.

Another problem is that UHC coverage is only 77% as of January 2019 even though the target given by law is 100% UHC as of January 1st, 2019. The UHC target is missed because JKN applies an active registration system in which citizens must register for JKN services and not an automatic system where every citizen is automatically registered in JKN.

The contribution-based JKN system and policy, and INA CBG's were implemented in order to cover the small commitment of Indonesian government in implementing JKN. The government is reluctant to provide or to allocate a higher budget for health. The health budget in the national budget is only about 0.84% to 1.85% from 2002-2012 from the total of the state budget. The small allocation indicates that government does not actually have serious intentions in developing the JKN system. Hence, they choose a system or policy that transfers obligations from the government to citizens.

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Effect of Alkaline Water Consumption on Decreasing Blood Sugar Levels of Diabetes Mellitus Patients

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ABSTRACT

Day by day the number of patients with diabetes mellitus is increasing. In this case, patients must always take medication in order to control their blood sugar levels. In the community, it was found that there were still many patients who were unable to control their sugar levels because they were bored to take medical drugs. One alternative therapy that has become a trend now is to consume alkaline water (pH = 8.5 - 9.5). The purpose of this study was to determine the effect of alkaline water consumption on blood sugar levels of diabetes mellitus patients in the working area of Tulang Bawang 1 Health Center, Tulang Bawang Regency. This research was a pre-experimental study with one group pre-post test design approach. The population of this study were all people suffering from diabetes mellitus in the work area of the Tulang Bawang 1 Health Center, with a population size of 86 people. The sample size was 50 people selected by purposive sampling technique. The collected data was presented descriptively in the form of mean values, then the hypothesis was tested using T-Test. The mean blood sugar levels of the patients before being given the intervention were 285.58 gr/dl. The mean blood sugar levels of the patients after being given the intervention (2 liters of alkaline water for 1 week) were 233.34 g/dl. It was known that there has been an average decline in blood sugar levels of 51.84 gr/dl. T-test shows that p-value was 0.000 (<0.001), so it was interpreted that alkaline water consumption can reduce blood sugar levels in diabetes mellitus patients in the working area of Tulang Bawang 1 Health Center, Tulang Bawang Regency. It is recommended that further research be carried out to find out more about the most effective fluid time and volume. In addition, people are expected to consume alkaline water as an alternative therapy in order to control blood sugar levels.

Keywords: *Diabetes mellitus, Blood sugar, Alkaline water*

INTRODUCTION

Indonesia is currently experiencing a double burden of diseases, namely non-communicable diseases and infectious diseases. The main non-communicable diseases include hypertension, diabetes mellitus (DM) cancer and chronic obstructive pulmonary disease (COPD)[(1)]. According to the World Health Organization (WHO) report, from the estimation of the International Diabetes Federation (IDF), there were 382 million people living with diabetes in 2013. By 2035, this number is expected to increase to 592 million[(2)]. The prevalence of DM in Indonesia is based on the results of Basic Health Research in 2012 which was 1.1% and in 2013 increased to 2.4%. In addition, mortality due to diabetes mellitus in the 45-54 year age group in urban areas is ranked second, namely 14.7%, while in rural areas, DM is ranked sixth, namely 5.8%[(3)]. DM prevalence in Lampung Province based on the results of Basic Health Research has increased. The prevalence of DM for ages> 15 years according to a doctor's diagnosis or according to existing symptoms, based on the results of Basic Health Research is 0.5% percent in 2012, then increased to 0.8% in 2013[(3)].

DM complications can be either acute complications or chronic complications. Acute complications include hypoglycemia, diabetic ketoacidosis and non ketotic hypermolar, whereas chronic complications include macrovascular complications, microvascular

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complications and neuropathy[4]. Complications of DM have started early before the diagnosis of DM is established. About 50% of patients when diagnosed with DM, have suffered one chronic complication, 21% of them have retinopathy, 18% have abnormal ECG images and 14% have impaired blood flow to the legs so that the pulse of the leg is not palpable or ischemic in the limbs arises. Various complications of DM will reduce life expectancy by about 15 years, 75% of them die from macrovascular complications.

Apart from complications, another problem faced by DM patients is high maintenance costs. According to Hartini, in developed countries such as the United States in 2011, the total health budget spent on dealing with DM was US $ 174 billion for 25.8 million people suffering from DM. WHO estimates that the majority of countries around the world spend 2.5 to 15 percent of their health budget for DM. In 2006, the ROSSO study (Retrospective Study Self-Monitoring of Blood Glucose and Outcome in People with type 2 Diabetes) by Weber, reported that expenditure by DM patients increased year by year, along with the rate of complications experienced. In the first year after being diagnosed, DM patients spend IDR 18.3 million a year, up to IDR 49.1 million in the eighth year[5].

To avoid complications and expensive maintenance costs, it is necessary to manage DM in an integrated manner called the pillar for managing diabetes. The four pillars of DM management are: 1) diet, 2) physical exercise, 3) pharmacology or drug use, 4) education. DM management aims to provide support for DM patients to live with a risk of minimal or no risk of complications, with specific targets for blood sugar, fat and body weight. For pharmacological management of DM, chemical drugs or herbal medicines can be used. Herbal medicines that are well-known to the public include pare/*Momordica charantia*, Garlic/*Allium sativum*, Lager flower/*Lemia stroemia speciosa pers*), acupunctur, acupressure, therapeutic aroma and alkaline water.

Herbal therapies using alkaline water are currently in great demand by the public, because they only drink water. Alkaline water or hydrogen-rich water, is currently a trend in medical practice in Indonesia. The basis used in this therapy is that hydrogen contained in water will enter the body and bind various harmful substances such as free radicals[6].

Ionized alkaline water is known to act as an antioxidant because it can prevent oxidative stress from the body's cells by exposure to oxidants every day, which can continue to damage various levels of cells[7].

Tulang Bawang 1 Health Center is one of the health centers in Tulang Bawang Regency, Lampung Province, Indonesia, with the highest number of DM diseases compared to other health centers in the Tulang Bawang Regency. This disease is always included in the top 10 non-communicable diseases that people often complain about. Based on data from Tulang Bawang 1 Health Center, it was found that the number of DM patients in 2015 was 67 and increased in 2016 to 86[8]. Based on the results of interviews with 20 DM patients who came for treatment at the Tulang Bawang 1 Health Center in July 2017, all patients said that they had to take DM drugs and inject insulin continuously. This causes boredom, so patients sometimes ignore the obligation to take DM medication, which results in uncontrolled blood sugar levels. They want another alternative treatment to control blood sugar levels easily, cheaply and practically.

MATERIALS AND METHOD

The type of this research was quasi-experimental with the design of "The One Group Pre-Test and Post-Test". This research was conducted on 13 to 20 November 2017 in the working area of Tulang Bawang 1 Health Center, Tulang Bawang Regency, Lampung Province, Indonesia. The population of this study was all DM patients in the working area of Tulang Bawang 1 Health Center, with a population size of 86 people[8]. The sample size was 50, which was calculated based on the unpaired categorical analytic formula. The sample was chosen by purposive sampling technique. The collected numerical data was presented descriptively in the form of mean scores[9], then the hypothesis was tested using T-Test.

FINDINGS

The results of random blood sugar levels were explained before and after alkaline water therapy was given (Table 1 and Table 2).

Table 1: Distribution of results of random blood sugar levels before alkaline water therapy

Variable	Mean	SD	Min	Max
Random Blood Sugar	285.58	87.462	201	570

Based on table 1 it is known that the average random blood sugar level was 285.58 mg/dl. In general, before

being given alkaline water therapy, people with DM had blood sugar levels ≥ 200 gr/dl.

Table 2: Distribution of results of random blood sugar levels after alkaline water therapy

Variable	Mean	SD	Min	Max
Random Blood Sugar	233.74	79.378	96	460

Based on table 2 it is known that the average random blood sugar level was 233.74 mg/dl. It appears that there was a decrease in blood sugar levels after being given alkaline water therapy.

Table 3: Distribution of Random Blood Sugar Check Results Before and After Given Alkaline Water Therapy

Random Blood Sugar	Mean	SD	SE	P-value	n
Before	285.5	87.46	13.36	0.000	50
After	233.7	79.37	11.226		

Based on table 3, it can be seen that the mean results of random blood sugar examination after being given alkaline water therapy were lower than the average blood sugar level before being given therapy. The t-test results showed p-value = 0.000 so it was concluded that there was an effect of giving alkaline water to random blood sugar levels of DM patients.

DISCUSSION

The results showed that before being treated with alkaline water, all DM patients had random blood sugar levels> 200 mg/dl. Price and Wilson state that DM is a chronic hyperglycemia condition that affects the entire body system. This situation is caused by factors that inhibit the work of insulin or the amount of insulin decreases[4]. According to Smeltzer and Bare, DM is a group of heterogeneous disorders characterized by hyperglycemia or increased levels of glucose in the blood. Glucose normally circulates in a certain amount in the blood. Glucose is formed in the liver from food consumed. DM is characterized by an increase in random blood glucose ie > 200 mg/dl (11.1 mmol/L). In DM patients, the body's ability to react to insulin can decrease, or the pancreas can stop insulin production altogether. Insulin is a hormone produced in the pancreas, which functions to control glucose levels in the blood by regulating its production and storage[4].

Based on the results of one study it was also known that the average blood sugar level of DM patients before being given alkaline water therapy was 285.58 mg/dl, while the average blood sugar level after being given alkaline water therapy for one week with a volume of 2 liters per day was 233.74 mg/dl. It was seen that there was a decrease in the average blood sugar level of 51.84 mg/dl.

According to Angela, alkaline water with a pH of 8.5 to 9.5 produced by ionizers can help alkalizing body tissues so that it can improve overall health. This alkaline water helps rinse acidic waste from around the pancreas and from inside the body. In addition, alkaline water also provides ionized calcium, which can prevent excess buildup of protein in the blood vessels. Alkaline water serves as an alternative therapy in managing DM patients with high blood sugar levels[11]. According to Jatmiko, complementary therapies that can be used for the treatment of DM are alkaline water, which is currently a trend in medical practice in Indonesia. The basis used in this therapy is the entry of hydrogen contained in water into the body and binding various harmful substances such as oxygen radicals[6].

The results of this study are in line with the results of a study conducted by Gadek, which provides alkaline water to DM patients[12]. The results of this study indicate that 45% of patients experienced improvements in HbA1c and blood sugar. In fact, he reported that Number Need to Treat (NNT) is 4, which means that it requires the consumption of alkaline water in 4 patients to reduce HbA1c levels and blood sugar in 1 patient. The results of this study are also in line with the results of a study conducted by Li et al., that alkaline water is able to protect pancreatic β cells from damage after consuming alloxan. He concluded that alkaline water might be useful for preventing Type I DM[13].

In this study, consumption of alkaline water is done by using it as a substitute for daily drinking water for 1 consecutive week, with a dose of 2 liters per day will cause changes in blood sugar levels. The majority of DM patients after being given alkaline water experienced a decrease in blood sugar levels, 40% of respondents even the results of examination of blood sugar levels showed normal values (<200 mg/dl). This shows that consumption of alkaline water has a positive impact on decreasing blood sugar levels in patients with diabetes mellitus.

The results of this study are in line with Wahyuningtiyas's statement that alkaline water is an antioxidant because it can reduce and prevent oxidative stress from body cells by exposure to oxidants every day,

which can continue to damage various levels of cells. Apart from being an antioxidant, because the content of water molecules is relatively smaller, water molecules will be easier to diffuse into cells. Thus, the cell hydration process will be easier to occur[7].

Kajiyama conducted a study of DM patients who were given alkaline water. He concluded that alkaline water supplementation may have a beneficial role in the prevention of Type 2 DM and insulin resistance[14].

It is assumed that alkaline water can help regulate the absorption of blood sugar into the body through the work of the pancreas. Alkaline water has a high pH, which means it can neutralize acidic conditions in the body because the size of small molecular clusters of water in alkaline water is easier to use by cells in order to help hydrate and remove acidic toxins. At the same time, alkaline water contains bicarbonate ions which are very easy to use by the pancreas to help work the pancreas. The pancreas plays an important role in helping to maintain the alkalinity in the body, alkaline water can help the pancreas work, namely by helping maintain the pH balance of body fluids and improve the work of the pancreas in producing insulin, resulting in a decrease in blood sugar levels.

Based on the results of the study, it is known that some DM patients after being given alkaline water still have high blood sugar levels. This may be caused by several factors: 1) the blood sugar level before therapy is already too high, so that the time of 1 week and the liquid volume of 2 liters per day is insufficient to reduce blood sugar levels to normal conditions; 2) non-compliance with DM patients in maintaining their diet, this can be caused by low educational background and advanced age, so that there is difficulty in absorbing the information given; 3) inability to cope with stress, as described above that stress will trigger the organs of the body to improve its work, thus affecting the imbalance of acid base and fluid in the body.

CONCLUSION

Based on the results of the study concluded that alkaline water therapy can reduce blood sugar levels in DM patients. Thus, consumption of alkaline water can be considered as an alternative therapy for DM patients.

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Family Support for Diabetes Self-care Behavior in T2DM Patients who Use Herbs as a Complementary Treatment

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ABSTRACT

This study aims to identify family support for the use of herbs as complementary treatments based on diabetes self-management in regulating blood sugar levels in patients with Type 2 Diabetes Mellitus (T2DM) in Surabaya City East Java Indonesia, using cross-sectional approach. Participants were collected from 7 public health center in Surabaya using simple random sampling with a sample size of 230. Data were collected with a questionnaire, then analyzed using PLS. The indicator of characteristic of disease and family support had factor loading >0.6. There was influence of disease characteristics and family support on the use of herbs. The use of herbs had an effect on blood sugar regulation. Family support was necessary for patients to keep diabetes self-management when T2DM patients use herbs.

Keywords: *Complementary treatment, Diabetes self-management, Family support*

INTRODUCTION

Patients with T2DM aware of his illness after his body was damaged due to an increase in blood glucose levels. They are often diagnosed with T2DM after complications occur. Some of the major risk factors that can trigger T2DM disease include obesity, incorrect diet, and lack of activity[1]. DM can lead to macrovascular and microvascular disorders such as cardiovascular disease, nephropathy, retinopathy and neuropathy[2].

The prevalence of DM in Indonesia was ranked seventh along with China, India, USA, Brazil, and Mexico. The percentage of deaths due to DM in Indonesia is the second highest after Sri Lanka[1]. T2DM patients should carry out the treatment relating to the control of blood sugar. Medical treatment given to T2DM patients are oral hypoglycemic medications that can trigger insulin secretion, improve insulin sensitivity, gluconeogenesis inhibitors and alpha glucosidase inhibitors. In addition to oral hypoglycemic drugs, patients may also be given an insulin injection as indicated[3].

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Treatment of T2DM patients should be implemented for life. Medications used by T2DM patients, not only in conventional medicine, but there are patients using complementary medicine. There is a growing trend around the world for patients with T2DM to use or choose complementary and alternative medicine (CAM) in order to improve their health status. Complementary medicine is used together with conventional medicine, not as a substitute for conventional treatment[4],[5]. Ching research results showed the prevalence of CAM use in Malaysia is still high[5]. Research Niswha et al.[6] shows the results of the high use of herbs as a complementary treatment by diabetic patients in outpatient departments Hospital of Banda Aceh Indonesia.

CAM in Indonesia has been regulated in Regulation of the Minister of Health of the Republic of Indonesia No.1109/MENKES/PER/IX/2007. Complementary medicine is currently applied to public health center in Surabaya which already has a traditional treatment that is in 20 public health centers and Dr. Soetomo hospital. Health care center provided is socialization about the use of herbs, acupuncture and acupressure. Nurses as part of health professionals authorized to conduct complementary and alternative nursing management in performing their duties as a nursing care provider in the field of public health efforts[7].

Treatment is part of a component of self-care behaviors, in addition to diet, activity, self-monitoring of blood sugar levels, and reduced risk of complications behavior. Diabetes self-management behavior should be conducted regularly to prevent acute complications and long-term complications, so it needs the support of relatives of patients with T2DM[8]. Factors affecting the implementation of self-care are called basic conditioning factors, such as age, gender, developmental status, health status, socio-cultural orientation, health care system, family system, lifestyle, environment and availability of resources[9],[10].

Family support is attitudes, actions and family acceptance of family members. Family support, consisting of emotional support, informational support, tangible support, appraisal support[9],[11],[12]. Hensarling divides family support into 4 dimensions: empathetic, encouragement, facilitative, and participative. Referring to Misra & Lager[13] on 180 adult patients with T2DM in Texas found that high levels of social support can increase patient acceptance of the disease and may reduce the perceived difficulty in self-care behaviors ultimately leads to improved quality of life of patients.

In relation to complementary medicine, family support affects a person to choose CAM on the type of biological treatment and body manipulation[14]. People with a positive attitude to CAM and those with a high family support were more likely to use CAM and more involved in self-care behaviors[15]. Joeliantina et al. showed that family support for T2DM patients who used herbs as complementary medicine was to give patients permission to use herbs as a treatment, to remind their medication schedule and control, to deliver patients to health facilities, and to help prepare herbal preparations[16]. Social support is an important thing that encourages one to behave in a positive manner and perform effective treatment in acute and chronic diseases[17].

The purpose of this study was to identify family support for diabetes self-care behavior in T2DM patients who use herbs as a complementary treatment to regulate modified blood sugar levels from self care nursing theory developed by Dorothea Orem. Family support and disease characteristics as the basic conditioning factors that affect the implementation of self-care.

MATERIALS AND METHOD

This study used cross sectional approach. Sample size was 230 T2DM patients, based on the rule of thumb (5-10 times the number of parameters studied), selected using simple random sampling. The first step in taking the samples were randomly select 7 public health centers that have a traditional treatment services in Surabaya, then determine the sample according to predefined criteria. The inclusion criteria were patients with T2DM >1 year, in stable condition, age: 30-70 years, and using herbs for ≥2 months.

Data were collected in 2016 by a questionnaire. The instrument consisted of: disease characteristics, family support, diabetes self-care behavior, and blood sugar levels. Disease characteristics were about the complications, complaints, duration of disease, hereditary history, and drug administration. The family support was developed from the Hensarling Diabetes Family Support Scale (HDFSS)[18] and Nursalam[9], consisting of emotional support, informational support, and facilitative support. The diabetes self-care behavior developed from The Summary of Diabetes Self Care Activities (SDSCA) from Toobert[19]. The SDSCA was including diet, exercise, blood glucose testing, medication, and foot care. Data were analyzed using Partial Least Square (PLS).

FINDINGS

Outer Model: Convergent validity can be seen from factor loading and t-value. Based on Table 1, indicators that did not meet the convergent validity was X1.5 (factor loading <0.6).

Table 1: Outer Model

Indicators	Factor Loading	Description
X1.1 (Complication)	0.792418	Valid
X1.2 (Complaints)	0.789718	Valid
X1.3 (Duration of disease)	0.769163	Valid
X1.4 (Hereditary history)	0.666363	Valid
X1.5 (Drug administration)	0.204204	Not valid
X2.1 (Emotion)	0.912298	Valid
X2.2 (Informative)	0.914639	Valid
X2.3 (Facilitative)	0.908323	Valid
X3.1 (Diet)	0.770285	Valid
X3.2 (Activity and exercise)	0.745200	Valid
X3.3 (Monitoring)	0.808843	Valid

Conted…

X3.4 (Complementary treatment)	0.783761	Valid
X3.5 (Decreasing risk of complications)	0.768219	Valid
Y (Blood glucose level)	1.000000	Valid

All the indicators that make up each construct X1, X2, and X3 had a value greater than the factor loading with other constructs. This shows that the latent constructs predict the indicator on the block they are better than the indicator in the other blocks.

The construct validity can be seen from AVE (Average Variance Extracted). The adequacy of good validity if it >0.5. The reliability of the constructs was measured using the composite reliability or Cronbach's alpha. All composite reliability were >0.70 and Cronbach's alpha were >0.6, so it can be concluded that X1, X2, and X3 had good reliability (Table 2).

Tabel 2: AVE, Composite Reliability, and Cronbach's Alpha

Constructs	AVE	Composite Reliability	R Square	Cronbachs Alpha
X1	0.465786	0.795344		0.680040
X2	0.831301	0.936641		0.898629
X3	0.601466	0.882911	0.555243	0.834216
Y	1.000000	1.000000	0.666465	1.000000

The indicators of disease characteristics (X1.1, X1.2, X1.3, X1.4), family support (X2.1, X2.2, X2.3), and the use of herbs (X3.1, X3.2, X3.3, X3.4, X3.5) have met the requirements of convergent validity, construct validity, discriminant validity, and reliability.

Inner Model: Structural model analysis (Figure 1) was done through 2 stages: goodness of fit and hypothesis testing.

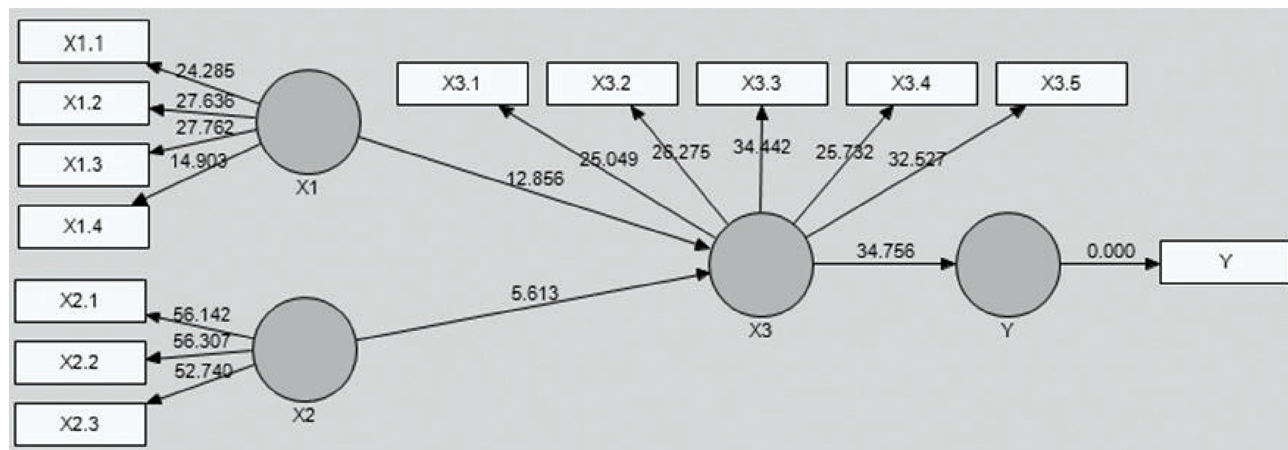

Figure 1: The Inner Model

Goodness of fit test can be seen from: coefficient of determination (R^2), Predictive Relevance (Q^2), and Goodness of Fit Index (GoF). R Square, which means variability X3 (The use of herbs) which could be explained by X1 and X2 was 55.5%, while 45.5% was explained by other variables. Predictive relevance test aims to determine the predictive ability of the family support model for the use of herbs based on diabetes self-management to regulate blood sugar levels. $Q^2 = 1 – (1-R^21) (1-R^22) = 1 – (1-0.555243) (1-0.666465) = 0.851658$ (the prediction results from the model of family support for the use of herbs based on diabetes self-management has a good predictor ability, because 85.17% this model can be explained by the variable characteristics of disease and family support). The calculation of GoF result was AVE average (0.725) and R^2 average (0.611). After calculation, the result of GoF=0.665. The result of T-test were 12.856, 5.612, and 34.756 (>1.96), so it could be concluded that disease characteristics, family support had an effect on the use of herbs as complementary medicine based on diabetes self-management, and the use of herbs as a complementary treatment affect the regulation of blood sugar levels.

DISCUSSION

This study identified disease characteristics and family support as a factor that influences the use of herbs as complementary treatments that are integrated into diabetes self-management to regulate blood sugar levels.

Complications experienced were hypertension, cataracts, gangrene, increased-cholesterol, hypoglycemia, mild-stroke, coronary-heart and nerve-disorders. Patients with complications had good herbal treatment behaviors. This is consistent with the study of Gao et al. that complicated DM patients have an increase in self-care behavior because of better physician communication with those without complications. DM patients usually require a doctor's advice to treat the disease[20]. According to Khalil et al., the history of complications affects patients in choosing complementary and alternative treatments[21].

Patients who have complications carrying out complementary herbal remedies by trying herbs of more than one type. In accordance with the healer shopping theory developed by Kroeger, during illness, the patient is likely to seek a second healer, without reference from the first healer[22]. Similarly, T2DM patients have a tendency to do complementary herbal[4],[5].

Patient complaints in this study have an effect on the behavior of herbal use. Complaints experienced is the body felt weak or tired, trembling, pain in the body, unable to sleep at night, chest thumping and tingling in the legs. Patients who have a complaint tend to use self-care based complementary herbs, as patients consider complications, so they have high vigilance to manage the disease. Basity and Iravani Research showed that the presence of complaints affecting DM-patients in implementing disease management. Complaints that often felt by DM-patients are frequent urination, extreme thirst and hunger, difficulty working or walking for long periods, stiffness, tingling, numbness, feeling tired and weak, heaviness in the head, and slow wound healing[24].

The results of this study are consistent with previous research conducted by Ceylan that diabetes duration affected the use of CAM[25].

T2DM patients who have a family history of T2DM had an effect on herbal use behavior. Hereditary history was 56.4% from mothers, 26.4% from fathers, and 17.2% from both. Patients with a family history have a tendency to choose a self-care based complementary herbal, because the patient feels a serious problem. This is in accordance with research Vazini & Barati, that family history with DM associated with increased self-care. The presence of family history resulting in the involvement of the patient's family in managing the disease and being alert in observing the possibility of DM complications[24].

Adherence to the use of herbs as a complementary treatment has an effect on the regulation of blood sugar. Compliance of patients to use herbs is based on the dosage of medicinal drug use coupled with the use of herbs. The regularity of medical treatment should be used according to the dosage prescribed by the doctor, while the regularity of herbal use is based on the frequency of use that is consumed daily according to the rules. The combination of conventional and complementary treatments was believed to produce better results than conventional therapy, especially the reduction of negative side effects[26].

T2DM patient response was a feeling of change such as the body feeling good, healthy, blood sugar go down, do not feel weak, feet do not pain, and do not tingling. This is consistent with the previous studies that the response of DM patients using herbs is feeling healed, no complications, increased health status, and lower blood sugar levels[5],[29].

T2DM patients use herbal medicine as their 2nd choice. According to Kroeger, the behavior is known as healer shopping conducted by patients to overcome the complaints of the disease. Patients with chronic disease have a tendency to seek treatment for more than one treatment regardless of the first treatment[22],[30].

T2DM patients who received family support when using herbs had good blood sugar. Delamater shows that families have an important role in the management of DM. Family involvement in mentoring, giving input and reminders of patients to obey the management of DM. Family members will more easily receive information, if the information is supported by other family members[31].

CONCLUSION

Family support influence the behavior of the use of herbs as a complementary treatment based diabetes self-management need to be developed to achieve the regulation of blood sugar levels of T2DM patients.

Regulation of blood sugar levels of T2DM patients optimally can be achieved if the patient can use herbs that is integrated into diabetes self-management comprehensively, precisely and regularly. Family support is indispensable for patients to continue to implement diabetes self-management when T2DM patients use herbs.

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The Influence of Knowledge, Attitude and Action on Family Health Tasks in Controlling Hypertension through the *Germas* Approach

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ABSTRACT

One of the government's efforts in controlling hypertension, among others, is by launching the *Germas* (Healthy Living Movement) through activities: increasing physical activity, consumption of vegetables and fruits, regular health checks and not smoking. Through its tasks in the health sector, families are expected to be able to apply early to all family members about how to control hypertension through *Germas*. This study was to analyze the effect of knowledge, attitudes and actions on the implementation of family health tasks in controlling hypertension. This study used a cross sectional design conducted where subjects consisted of 120 family heads/family members. Data on knowledge, attitude, action, implementation of family health tasks in controlling hypertension through the *Germas* approach were obtained. Almost all subjects had good knowledge in the category, most of them had an attitude in the good category, most of them had an action in the sufficient category. This study shows a significant influence of knowledge, attitude and action on the implementation of family health tasks in controlling hypertension.

Keywords: *Germas, Knowledge, Attitude, Action, Family health tasks, Hypertension*

INTRODUCTION

Family as the smallest unit in community is an important component in the effort to succeed the government program in realizing a healthy Indonesian society. Through its duties in the field of health, families are expected to be able to apply early to all members of their families regarding healthy lifestyles, especially those related to improving health and preventing disease. In addition, the family also plays a role in providing support to sick family members through environmental modifications and facilitating relationships with health facilities.

Hypertension is a condition where there is an increase in blood pressure in the arteries and is one of the conditions that usually precedes heart and blood vessel disease. In the early stages of the course of hypertension, often have no symptoms even though they have been diagnosed with hypertension. This causes the patient not to seek treatment immediately, resulting in hypertension will develop and cause heart disease, blood vessels, kidney failure and stroke. This in addition to causing prolonged suffering to the sufferer will also cause high health costs to be incurred. WHO[(1)] reports that among non-communicable diseases the burden of heart and blood vessel disease ranks highest at 36.7 trillion USD. The increase in the prevalence of hypertension from year to year is caused by an increase in the population, also due to unhealthy lifestyles such as an unhealthy diet where there is a lack of fruit and vegetable consumption, lack of physical activity, smoking habits and lack of public awareness to check health and control blood pressure if you have been diagnosed with hypertension. Hypertension control aims to help lower blood pressure and maintain blood pressure under normal circumstances[(2)].

One of the government's efforts in controlling hypertension is by launching the *Germas* through activities: increasing physical activity, consumption of vegetables and fruits, regular health checks and not smoking. *Germas* to control hypertension is packaged in the form of integrated and conceptual activities that must be carried out by all members of the community so that hypertension can be prevented, and if it has been diagnosed with hypertension, blood pressure can be

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controlled so as not to cause more severe complications. As the smallest unit of the community, the family has responsibility for controlling hypertension through the implementation of family health tasks including knowing family health problems, deciding on appropriate actions, caring for family members who experience health problems, modifying the environment that supports health and utilizing health facilities[3]. Through his duties in the field of health, the family is expected to be able to apply early to all family members about how to control hypertension through the *Germas* by: increasing physical activity, consumption of vegetables and fruits, regular health checks and not smoking. This study aims to explain the model of the implementation of family health tasks in controlling hypertension through the *Germas* approach.

MATERIALS AND METHOD

The design of this study was a cross sectional, conducted in the general polyclinic and elderly *posyandu* (Integrated Service Post) in the Pucang Sewu Health Center in July 2018. The population were all families who went to the health center in July to August 2018. The sample size was 120 people, selected by non random sampling. Data of knowledge, attitude, action and family tasks in controlling hypertension were obtained by interview using a questionnaire. The data collected was categorical data so it was presented in the form of frequency and percentage[4], then analyzed using Partial Least Square (PLS).

FINDINGS

Table 1 shows that some families had good levels of knowledge, good attitude and action in enough categories.

Table 1: Distribution of Knowledge, Attitude and Action toward Hypertension

Variable	Frequency	Percentage
Knowledge		
Good	112	93.3
Enough	7	5.8
Less	1	0.8
Attitude		
Good	62	51.7
Enough	52	43.3
Less	6	5.0
Action		
Good	30	25.0
Enough	66	55.0
Less	24	20.0

Table 2: Dristribution of Family Tasks in Controlling Hypertension through the *Germas* Approach

Family Task	Frequency	Percentage
Physical activity		
Good	50	41.7
Enough	61	50.8
Less	9	7.5
Consuming fruit vegetables		
Good	51	42.5
Enough	65	54.2
Less	4	3.3
A routine control approach		
Good	57	47.5
Enough	57	47.5
Less	6	5.0
A non-smoking approach		
Good	52	43.4
Enough	61	50.8
Less	7	5.8

Table 2 shows that the results of the PLS between knowledge, attitude and action towards the implementation of family tasks through the *Germas* approach showed a significant effect with t-value of 10.614 (>1.96).

DISCUSSION

Family Knowledge, Attitude and Action Toward Hypertension: The level of knowledge about hypertension tends to be in the good category, not different from the report of Sinuraya, that the trend is in good category[5], while different from the report of Omoyeni et al.[6] and Kiliç et al.[7], which tended to be in the enough category. The level of knowledge about hypertension is the ability to mention, explain correctly about hypertension. Knowledge is influenced by, experience, level of education and sources of information[8]. The level of knowledge about hypertension that tends to be

high in this study, can be related to the characteristics of respondents who are mostly over 50 years old, the level of education is dominated by high school.

Family attitudes toward hypertension tend to be dominated by good categories, these results do not different from the report of Susiati et al, that attitudes tend to be positive[9]. Karamoy et al. got different results, that attitudes tended to be in the enough category[10]. Attitude is a reaction or response that is still closed from someone to a stimulus. Attitude is a level of affection that has a tendency to be both positive and negative. Attitudes cannot be directly seen, but can only be interpreted in advance of closed behavior[8]. The tendency towards a positive attitude in this study is probably due to the age of the respondents who are mostly >50 years old. Things that relate to one's psychological attitude towards the stimulus that is available, are the level of maturity.

Family actions towards hypertension tend to be in enough category, different from the report of Angkawijaya et al.[11] and Firmansyah et al[12], mostly in the good category. Another trend is the most dominant factor associated with family support in primary prevention of hypertension is a factor of family practice. Actions are responses to active and observable stimuli. To be able to realize an action, supporting factors or a condition that is needed include facilities and support from other parties. To be able to take good action it is necessary to get support for both facilities and family and environmental support. Support from health facilities is mostly good, but support from family and environment is still in sufficient category, so that family actions in controlling hypertension are mostly sufficient.

Implementation of Family Duties in Controlling Hypertension through *Germas* Approach: Controlling hypertension through physical activity shows that the results are mostly enough. Physical activities carried out by workers <600 MET (Metabolic Equivalent Task)/week, risk 1.25 times greater suffering from hypertension than workers with physical activity >600 MET/week. MET score is a physical activity carried out continuously for 10 minutes or more in each activity. Physical activity reduces the risk of hypertension by reducing vascular resistance and suppresses the activity of the sympathetic nervous system and the reninnensin system[13]. Physical activity for >30 minutes every day of the week is a major protective factor against the development of hypertension[14]. Increasing the number of sufficient categories on family duties in controlling hypertension through physical activity, due to age characteristics family that is mostly >50 years old. Physical activity requires great intention and will, besides having to have a strong physique. Another possibility is that the family does physical activity but the type, frequency and duration of physical activity are not the same as those written on the research instrument.

Controlling hypertension through consuming vegetables shows that most results are enough. Lack of consumption of vegetables and fruit is a factor that contributes to the development of hypertension. This is related to the level of Potassium which serves to prevent narrowing of the arteries (atherosclerosis). Thus the artery wall remains elastic and optimizes its function so that it is not easily damaged due to increased blood pressure. An increase in potassium levels can increase intra-cellular fluid concentration and then attract extracellular fluids which have an impact on decreasing blood pressure[15]. Consumption of fruit <2 servings/day at 1.01 times the risk of hypertension. Consumption of vegetables <3 times a day has a risk of 1.04 times suffering from hypertension[13].

Controlling hypertension through a routine control approach is in the good and enough category. Overall, almost 37% of Indonesian adults with hypertension are aware of their condition, significantly more women (43%) will have hypertension compared to men (30%). Greater awareness in urban areas than in rural areas. Among all hypertensive sufferers, 25% have taken hypertension drugs and significantly more women than men. Of all hypertensive patients who received treatment, blood pressure control was reached 25% (27% male, 24% female). Overall adequate blood pressure control is reached around 9%, occurs more in women than men[16]. Health facilities in this case the health center is a technical implementing unit that has authority and responsibility for public health maintenance in the area it works. Health services provided by health center are comprehensive health services which include curative, preventive, promotive and rehabilitative. The function of the health center in addition to providing direct health services to the community also provides guidance to the community[17].

Controlling hypertension through the no smoking approach tends to be in the sufficient category. Dwi Jatmika found a different reality where the results of the study were dominated by less behavior (66.67%).

Negative attitudes were also shown by respondents in research on smoking behavior in hypertensive patients in Sidokarto village, Yogyakarta[18]. If you have a smoking habit 52.2% suffer from non-smoking hypertension 27.7% suffer from hypertension[19]. Every day smokers are at risk of hypertension 1.38 times compared to nonsmokers. Whereas ex-smokers have OR 0.66 which means quitting smoking is a protective factor against the development of hypertension[13]. Smoking cessation behavior is influenced by: education and history of other diseases[20]. The high prevalence of hypertension is lack of awareness of treatment, low level of education, lack of consumption of fruits and vegetables, lack of physical activity[21]. General risk factors for hypertension: age, sex, smoker, drinking alcohol, lack of physical activity, time and sleep quality, diet, obesity[22]. Family health workers in controlling hypertension through a non-smoking approach, are generally sufficient. This is related to the sex characteristics of the family, most of whom do not generally have a smoking habit. Ideally the family health task in controlling hypertension through a non-smoking approach is good, but there are still families who do not understand the dangers of smoking for patients with hypertension in particular and for the community at large.

There is an influence between predisposing factors on family duties in controlling hypertension through the *Germas* approach. Predisposing factors consist of personal knowledge, attitudes, beliefs, skills and references. Knowledge plays an important role in building a person's behavior. Knowledge of respondents can be obtained both internally, namely knowledge originating from itself based on others. One way to obtain knowledge according to Notoatmodjo is based on personal experience. This experience is a source of knowledge or experience that is a way to obtain the truth of knowledge. Personal experience which is a way to gain knowledge, then experience can be a reference for acting in health. Respondents can see other people affected by hypertension.

To be able to carry out family duties in controlling hypertension, knowledge from the family is needed, if the family has good knowledge then it can administer family duties. Judging from the factors that influence knowledge, one of them is the educating factor, from 120 respondents almost half of them educated high school, the higher the level of education, the easier it is for someone to understand knowledge.

CONCLUSION

Knowledge, attitude and action affect the implementation of family tasks in controlling hypertension through *Germas* approach in Pucang Sewu Health Center, Surabaya.

Source of Funding: Authors

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Conflict of Interest: No

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Student Centered Learning as a Method to Increase Clinical Competencies of Nursing Students at Health Polytechnic of Jakarta I, Indonesia

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ABSTRACT

Competency of the fresh graduate nursing school remain got complains from the user of nursing services, especially in the hospital. This study aimed to identify the dominant factor upon the clinical competency of student of Nursing School of Health Polytechnic of Jakarta I. The research design was quasy-experimental with t-test and linear regression. Sample were 72 students. Data were collected using questionaires, then analyzed using the paired sample t-test. Based on t-test result, there was a significant difference in clinical competencies between pre and post intervention of clinical coaching in the hospital. It could be concluded that student centered learning method is significant in increasing clinical competencies of students.

Keywords: *Nursing, Student centered learning, Clinical competencies*

INTRODUCTION

The development of clinical knowledge and nursing skills depends on learning process and clinical experience[(1),(2)]. Students achievement in clinical learning process was influenced by methods of clinical teaching methods[(3)]. Students have higher motivation and satisfaction upon the application of Student Centered Learning (SCL) method[(4)], furthermore SCL method could increase the comprehension and retention upon the subject of study[(5)].

The improving of skills and attitude needs clinical learning experience to be conducted in proper way on the setting of professional nursing care as real condition. In addition, its necessary to provide constructive environment for supporting learning process for the candidate of nursing. All of the factors above need a supporting set for achieving skills and competency as the previous setting goal.

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Learning practice provided students an opportunity to gain learning experience in proper setting of clinical environment as the theory expectation. Current technology and the ability to bring learning to the students offer a platform for providing alternative learning approaches[(6)]. The students need to get real clinical experience of becoming a nurse in the clinical setting through actual activity in the clinical setting[(7)]. The students willing to be able to practice their skills to develop the future role in the ward, develop the comperehension about the health regulation system and develop the relationship among the nurse and patient.

MATERIALS AND METHOD

Quasy experiment was used as design of this study. The population of this study were the nursing students in Health Polytechnic of Jakarta I in 2016. The sample size was 72 students. The intervention was clinical coaching with SCL method. Before and after giving the intervention, testing the competency of students through filling out the questionnaire. The collected data were in the form of competency score (numerical) so that they were presented in the form of the mean, minimum, maximum and standard deviation[(8)], then hypothesis testing was done using the paired sample t- test.

FINDINGS

Table 1: The Distribution of Characteristics of Respondents

Variable	Intervention		Control		Total	
	f	%	f	%	f	%
Sex						
Male	1	2.8	1	2.8	2	2.8
Female	35	97.2	35	97.2	70	97.2
Type of School Background						
Science	25	69.4	22	61.1	47	65.3
Social science	2	5.6	5	13.9	7	9.7
Health	9	25	9	25	18	25
Hospital Homebase						
Pasar Minggu Hospital	13	36.1	0	0	13	18.1
Persahabatan Hospital	23	63.9	0	0	23	31.9
RSCM Hospital	0	0	36	100	36	50.0

Based on Table 1, the most of the respondents were female and had school background of science.

Table 2: Competence of Nursing Students Before and After Administration of SCL Method

Competence of Nursing Student	Mean	SD	Paired Sample T-test			
			Mean	SD	t	p-value
Pre-test Score	56.43	9.52	-2.76	10.74	-0.24	0.032
Post-test Score	59.19	8.76				

Based on Table 2, it is known that the p-value of the T test results was 0.032, so it was interpreted that there was a significant difference between the competency scores before and after being given coaching using the SCL method.

DISCUSSION

The results showed that there were differences in nursing student competencies between before and after being given coaching using the SCL method. In this case the post coaching competency score is higher than the previous score. This shows an increase in clinical competency scores after the implementation of the SCL method. The results of this study are in line with Biggs' report that students who undergo clinical learning are student-centered and can get learning processes and results in depth[9]. Tiwari et al. also reported the same thing that the SCL method made students get a deep learning experience so that they could improve the development of their abilities[10].

In his research on the implementation of student-centered learning for students in nursing schools in Maryland, Distler concluded that students need to do a lot of preparation to enter the clinical practice environment, so that there is no gap between on-campus nursing education and hospital nursing practice. In this case, one important method is to give pre-test to nursing students before conducting clinical practice activities. Distler also recommends the need to inform all components of educational organizations that will change the learning method in the curriculum, so that changes can occur constantly[11].

The limitation of this study are: 1) Researcher could not control the equation of hospital homebase which used for a period of 4 weeks clinical practice; there are 3 differents hospital which has different facility and equipment, where as the control hospital homebase is level "A" with has predicate as national referral hospital, well organized management and advance case of patient if compared with the intervention hospital homebase; 2) Perception of the clinical coach about the evaluation of

clinical competency are not same, emerging difference of perception of students about the role of clinical instructor along their clinical practice.

CONCLUSION

Based on the results of the study it can be concluded that SCL is an effective learning method to improve the clinical competence of nursing students as a preparation for practice after graduation later.

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Conflict of Interest: All authors jointly state that there is no conflict of interest relating to part or all of the research and publication activities.

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The Factors Making the Law Protection for the Patients of Esthetic Beauty Clinic in Indonesia not fulfilling Citizen's Constitutional Right

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ABSTRACT

Considering Article 28 H of the fourth amendment to the Republic of Indonesia's 1945 Constitution, there is citizen's constitutional right, the right to health and to get healthcare service. Therefore, all healthcare services should fulfill right and obligation of service provider and patient, and medical service standard. Esthetic beauty clinic as a private health service should fulfill it compulsorily. This article studied the factors making the law protection for the patients of esthetic beauty clinic in Indonesia not fulfilling yet the citizen's constitutional right. This study was conducted on stakeholders of esthetic beauty clinic in five provinces in ten cities of Indonesia, using empirical qualitative method. The result of research showed that the factors the law protection for the patients of esthetic beauty clinic in Indonesia not fulfilling yet the citizen's constitutional right.

Keywords: *Law protection, Esthetic beauty clinic*

INTRODUCTION

Considering Article 28 H of the fourth amendment to the Republic of Indonesia's 1945 Constitution[(1)], there is citizen's constitutional right, the right to health and to get healthcare service. Trend and standard applying to women today isto have bright white face and thin or slim body. Women become afraid of being apparently old. It is relevant to the finding of study in China, showing *that 80% of Asian consumers consider skin whitening to be the most important property of skincare cosmetics, and more than 50% considers their anti-aging effect to be important*[(2)]. It makes investors compete for opening beauty clinic business to bring the wish to follow trend into reality.

In addition to global beauty trend, metrosexual phenomenon with its consumptive behavior now triggers the development of body treatment business as well[(3)]. Metrosexual men are *women-oriented men*[(3)]. Furthermore,metrosexual man is described as the man loving not only himself but also the big city's lifestyle he is undertaking on his last leg. Metrosexual men are also depicted as a normal or straight, sensitive, and educated figure but they emphasize more on their feminine side. Kartajaya[(4)] suggested the characteristics of metrosexual men: generally living and staying in big cities where it is of course related to the opportunities of accessing to information, having intercourse and lifestyle undertaken clearly affecting their existence; coming fromthe rich class and having much money because they need much money to support the lifestyle they undertake

MATERIALS AND METHOD

The objective of research was to study the factors making the law protection for the patients of esthetic beauty clinic in Indonesia. This study employed empirical qualitative method and sociolegal research. The author collected primary data through observing and interviewing owners, managers, physicians, beauticians, nurses, pharmacists, clients (users) and government institutions.

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FINDINGS AND DISCUSSION

Healthcare Service: The word service in the 5th edition of Online Indonesian Language Big Dictionary (KBBI) [5] is defined as a way of serving or service, a business of catering to others' need with (monetary) reward; service, the facilities provided in relation to product or service buying and selling. Meanwhile, medical service is defined as the service an individual receives in relation to prevention, diagnosis, and treatment of health disorder.

Considering the national health system, cosmetic service is a part of the first stratum individual health attempt. The Ministry of Health of Republic of Indonesia is actually aware of such condition recalling the problem development and the tendencies of health development in the future and bringing the Ministry of Health's vision into reality, i.e. to create independent community who lives healthily with a mission to make the people healthy.

To achieve the goals above, there should be rearrangement and rebuilding of beauty clinic organization. For that reason, a guideline of beauty clinic organization should be developed in order to be a reference for beauty clinic organizer, government, and related professional organization.

The government obligatorily guarantees "the organization of beauty clinic as an attempt of improving the healthcare service in order to be useful, high-quality, and accountable for, providing a reference in giving operational permission for beauty clinic organization, providing guidance to implement building, supervision, and control over the organization of beauty clinics in province and regency/city, protecting patient/service user and executive staffs including medical workers.

In addition, healthcare service, according to Law Number 36 of 2009 about Health as mentioned in its elaboration, is that providing healthcare service to either individual or community is highly guaranteed in the law achieving healthy. Meanwhile, healthcare service facilities consists of several types as included in Article 30[6] including Individual Healthcare service.

This individual healthcare service is implemented by physician or health worker practice with both local government and private's help. This individual healthcare service should keep getting permission from the government corresponding to Law Number 36 of 2009 about Health, Public Health Service[7]. The individual healthcare service, according to Article 30 clause 1, is intended to heal disease and to recover individual and family's health. Meanwhile, public health service is intended to maintain and to improve health and to prevent disease from infecting a group of individual and community. This healthcare service focuses more on helping to save the patient's life than on other interests. The organization of health service is conducted responsibly, safely, in high quality and evenly, and non-discriminatively, in this language (regulation) government is highly responsible for healthcare, according to Law Number 36 of 2009 about Health.

Therefore, returning to the main provider of healthcare service, Law Number 36 of 2009 about Health has confirmed that it is the government that is responsible mostly for the as high as possible health degree for all citizens; the responsibility includes the availability of environment, order, both physical and social healthcare facilities, the evenly and justly distribution of health resource to all people[8]. Health services intended in this study is the one in esthetic beauty clinic, the health service organized by private and or government dealing with body treatment product and service.

The regulation of Esthetic Beauty Clinic organization in Indonesia: The regulation related to Esthetic Beauty Clinic as mentioned in health law includes, among others:

1. Constitution of 1945
2. Law Number 29 of 2004 about Medicine Practice
3. Law Number 25 of 2004 about National Development Planning System.
4. Guideline of Esthetic Beauty Clinic organization from Medical Service Building Directorate General of RI's Ministry of Health in 2007.
5. Law Number 36 of 2009 about Health
6. Law Number 8 of 1999 about Consumer Protection
7. Government Regulation Number 32 of 1996 about Health Workers
8. Presidential Regulation Number 72 of 2012 about National Health System
9. Minister of Health's Regulation 920/MENKES/PER/XII/1986 about Private Health Service Attempt in Medical Area.

10. Minister of Health's Regulation Number 363/ Menkes/Per/IV/1998 about Health Equipment Testing and Calibration in Health Service facilities;
11. Minister of Health's Regulation Number 269/ Menkes/Per/III/2008 about Medical Record;
12. Minister of Health's Regulation Number 290/ Menkes/Per/III/2008 about the Agreement for Medical Action;
13. Minister of Health's Regulation Number 411/ Menkes/Per/III/2010 about Clinical Laboratory;
14. Minister of Health's Regulation Number 001 of 2012 about Referral System of Individual Health Service
15. Minister of Health's Regulation Number 36 of 2012 about MedicalSecret.
16. Minister of Health's Regulation Number 46 of 2013 about Health Worker Registration
17. Minister of Health's Regulation Number 9 of 2014 about Clinic

Government's Responsibility: The responsibility of government related to esthetic beauty clinic as mentioned in legislations of health sector, particularly the guideline of esthetic beauty clinic organization and the consumer protection law, the state organs authorized in organizing esthetic beauty clinic related to beauty clinic, and the authorized institutions related to beauty clinic.

Health Ministry includes supervising, building, monitoring and evaluation, drug production and cosmetics and equipment used, nuclear power use, drug and cosmetic circulation, halal status of drug and substance used, consumer protection, dispute settlement, and licensing and supervision and building at city/regency level. Meanwhile, the responsibility of esthetic beauty clinic involves fault, risk, product and professional[(9)].

Citizen's Constitutional Right in Health Service: The users of esthetic beauty clinics those that should be protected for their constitutional rights called patient or health consumers, because they get health service and product or service in the clinic. The protection of citizen's constitutional right in esthetic beauty clinic's service in Indonesia includes the right to protection guarantee and law certainty corresponding to Articles 28D clause 1 and 28H clause 1 of the 1945 Constitution related to Health Rights and the right to get health service[(10)].

Thus, the right to health is the right to obtain various facilities, services, products, and other requirements in order to bring the highest health standard into reality and the state should guarantee its availability[1]. The right to health has economic and social aspects because this right tries to safeguard individual as much as possible from receiving social and economic injustice related to his/ her health[(13)]. The right to health also has cultural aspect because this right attempts to guarantee the compatibility of available health service to cultural background of each individual.

Law No.36 of 2006 about Health:

1. **Article 4 states that "Everyone is entitled to health":** (Explanation of Article 4: the Right to Health is the right to get health service from health service facility in order to realize the degree of health as high as possible)
2. **Article 5 clause 3:** Everyone is entitled to get safe, high-quality, and affordable health service.
3. **Article 16:** Government is responsible for the just and even availability of health service in order to achieve the maximum degree of health.

Factors Making the Law Protection for Patients of Esthetic Beauty Clinic in Indonesia not fulfilling the Citizen's Constitutional Right: Generally, as suggested by Soerjono Soekanto, there are five factors affecting law enforcement:[(11)] law itself, law enforcement or those creating or applying law, facilities supporting law enforcement, community or environment where the law is enacted, and culture or the product of work, creation, and feeling based on human's willingness in life intercourse.

The factors making the Law Protection Model for Esthetic Beauty Clinic's Users applying today not fulfilling yet the Citizen's Constitutional Right are explained below.

a. **Substance:** The result of previous studies have reported that substantially, esthetic beauty clinic has been governed specifically in Guideline of Esthetic Clinic Organization issued by Medical Service Building Directorate General of RI's Ministry of Health in 2007 and generally there have been other legislations related to health and consumer protection law and its implementation in regions has been governed with the local government of respective Municipals/Regencies.

   The data shows that the regulation is less strong as it is a guideline only, thereby cannot be included

into the legal foundation of local regulation development. The sanction imposed is less resolute, considering the result of study on the Court's verdict on esthetic beauty clinic case. Substantially, the guideline does not mention the severe punishment threat, related to product and service provide to the users.

Some matters have not been governed in guidelines applying today: physician course legalization and beautician standardization and education. The findings show many course organizing institutions and cooperation with the producer of beauty clinic equipment and medical equipment usedincluding among others: health service, health worker, pharmacy industry, health equipment, and health insurance.

Esthetic beauty clinics as one of areas in health world start to compete for improving the quality of service given to their users because in the presence of health globalization using most sophisticated equipments and medicines, they can provide the best result in order to attract the users as many as possible.

1. Minister of Health's Regulation No 1419 of 2005 about the Organization of Physician and Dentist Practices replaced with Minister of Health's Regulation No. 512 of 2007 about Practical Permission and Medicine Practice Implementation.
2. Minister of Health's Regulation No 1184/Menkes/Per/X/2004 about the Security of Household Health Equipments and Supplies replaced with Minister of Health's Regulation No. 1190/Menkes/Per/VII/2010 about the License of Household Health Equipments and Supplies Circulation.

b. Structure

1. There is disharmonization of law protection jurisdiction between RI Minister of Health and BPKN related to predicate and position of beauty clinic user as consumer or patient
2. Less maximal supervision and monitoring conducted by Provincial/Regency/Municipal Health Service Office including the Lisence
3. No regulation issued by Ministry of Education and Culture related to training and education institution and certification and standardization of executive staffs in esthetic beauty clinics.

c. Culture: In consumptive community, women's body is created to be commodity and put amid the promotion of consumptive product, and it is published through mass media either directly or indirectly. Considering this mass media's perspective, a standard is created that beautiful women are those tall, slim, young, and having good looking, so that Indonesian women follow this trend as well [12]. It of course inspires majority Indonesian women to be the followers of present trend beauty and the investors and esthetic beauty clinic business performers read the opportunity to support this trend.

In consumer society, female body is formed as commodity, and placed at the centre of the consumption. In consumer society, female body, therefore, is a kind of investment according to capitalist ideology. Capitalist ideology bearers such as advertising, billboards, posters and TV fashion reality shows do not only show ideal body image, but also show how to reach and consume those images. From the perspective of these mass media, women are portrait to be tall, slim, young attractive and charming for social approval. These mass media, women are portrait to be tall, slim, young attractive and charming for social approval[13].

Therefore women are forced to follow the fashion products, which are advertised commodities for beatification of her body. Consequently, body parts of woman (hair, eye, nose, lips, ear, neck, breast, arm, hand, nail, back, waist, belly, legs, feet, skin color) are indispensable for the sustainability of capitalist system. Firstly, portraits all problematic female body images and then to overcome these deficiencies it creates new commodities to preserve its continuity [14].

According to Greenthe behavior of an individual or society about health is determined by the level of knowledge in which the person has. Furthermore, a person who has fair economic and earnings will likely have a good education and knowledge.[8] Limited education and socialization about healthy and safe cosmetics conducted by local government and BPOM in region make the people consumptive and selecting beauty clinic less selectively as they can be tempted easily by advertisement or others' persuasion to undertake treatment in esthetic beauty clinic not consistent with standard medical service. The supervision should be conducted over cosmetics before circulation just like that of food and drug as preventive measure to ensure that food and drug circulating have fulfilled the standard and required safety, benefit and quality of product as specified.

CONCLUSION

The factors making the law protection model applying today to the users of esthetic beauty clinics not fulfilling yet the citizens' constitutional right. substance factor in which there is disharmonization of law at central and local levels.

Incomplete and less firm guideline existing presently, some legal foundation no longer prevailing and guideline no longer fulfilling the citizen's constitutional right. structure in which there is disharmonization of structure between ministry of health, ministry of education and culture, and National Consumer Protection Agency (BPKN), BPOM, and Ministry of Trade and Industry related to the status of user as patient or consumer and the use of dangerous chemical tool and material in the product; and finally community culture, in which government and majority stakeholders not prioritizing yet the law protection for the patients.

RECOMMENDATION

a. Government as leading sector and regulation developer should change the guideline of beauty clinic prevailing today immediately in order to fulfill the citizen's constitutional right

b. Esthetic beauty clinics should reform and improve their service system by prioritizing not only profit but also law protection for their patients.

c. Community and stakeholders should improve their understanding on dangerous chemical materials in cosmetics by attending seminar/socialization and educating themselves.

Source of Funding: Authors

Ethical Clearance: Yes

Conflict of Interest: No

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The Application of Cyclone Ventilator Modification for Indoor Air Sanitation

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ABSTRACT

There was a need to conduct research on the trial use of cyclone ventilator modification using active carbon as CO adsorbent in an indoor area so that its air fulfills the indoor air sanitation condition. This research was intended to put on cyclone ventilator modification to reduce the temperature, humidity, CO gas level and PM10 dust in indoor area so it can fulfill indoor health sanitation standard. The research used One Group Pretest Posttest Design. Cyclone ventilator modification could reduce indoor mechanic temperature by 10.919% in average, air humidity in average by 28.64%. The ability to reduce CO gas level was 28.65% in average and PM10 dust for about 52.80% after 2 hours the instrument works. Cyclone ventilator modification takes 2 hours to reduce temperature, humidity, CO gas level, and PM10 dust accumulated for 4 hours inside of mechanical room. Cyclone ventilator modification worked effectively operated inside of the room with 115.6m 3 volume and was able to create a quality standard circumstances. The performance of Cyclone Ventilator Modification as an air sanitation instrument can be evaluated from energy and economical aspect in general. Secondly, those aspects shows that indoor air sanitation instrument can only works (moves) using the wind breeze.

Keywords: *Implementation, Cyclon, Modification, Indoor, Temperature, Humidity, CO, PM100 dust.*

INTRODUCTION

The reduction of CO gas level after going through indoor air sanitation instrument with the suction using charcoal/active carbon of coconut shell as big as 185.3 ppm with 73.9% reduction. There is also significant different reduction of carbon monoxide[(1)]. The reduction precentage of CO gas level by using active carbon of coconut shell is 81.54%. The effectiveness evaluation of air sanitation stated to be effective because it can reduce CO gas level more than 75%[(2)]. Life time active carbon as CO adsorbent as long as 388 hours. This instrument is very effective because it can reduce CO gas level more than 60% in 352 hours. While, the efficiency of this instrument can be showed by the effectiveness of this instrument in reducing CO and its relatively small cost aspect because it doesn't use electricity energy to operate it[(2)].

Based on the above explanation, there is a need to conduct further research for the trial use of cyclone ventilator modification by using active carbon as CO adsorbent in an indoor area so that its air fulfills the indoor air sanitation condition based on the Decree of Minister of Health No. 1405/MENKES/SK/XI/2002 concerning Health Requirements for Office and Industrial Work Environment[(3)].

MATERIALS AND METHOD

The design of this research was One Group Pretest Posttest. Materials used was coconut shell active carbon by the size of 125 um (got from sieve of 120), glue glass (sealent Seal), reagent gas absorption (CO) to collect CO sample, reagent to examine CO gas, plastic interval (diameter 0.3 cm), glass bottle, and aluminium gauze. Research instruments used in this research were Cyclone Ventilator Modification, Migget Impinger, Flow Meter, Stopwatch, Handscoon, and mask.

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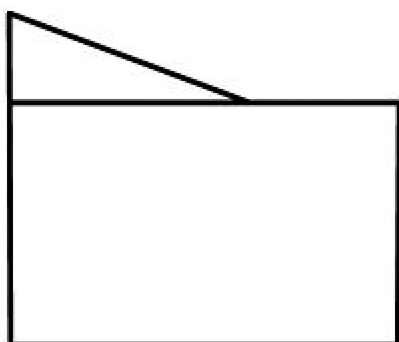
Sample to meassure CO gas level was determined based on purposive sampling. Sample was taken by doing measurement as much as 10 times, to detect the average CO gas level, PM10 dust, temperature and indoor wind velocity before and after the treatment (installing cyclone ventilator modification). Data analysis process used paired sample t-test

FINDINGS AND DISCUSSION

The Room Volume of Research Spot: The volume of Mechanical Research Spot was measured by calculating room volume added by roof volume. Here was the detail calculation:



Structure Volume:

Room Volume + Roof Volume

= (p × l × t) + (½ × a × t × p)

= (4 × 6.5 × 4) m + (1/2 × 4 × 1.45 × 4) m

= 104 m^3 + 11.6 m^3

= 115.6 m^3

Figure 1: Research Spot Volume Scetch

Air temperature, air speed, humidity, CO gas degree, and PM10 dust measured before and after cyclone ventilator modification was installed and operated, so that there was air temperature comparison inside of the room before and after cyclone ventilator modification was settled and operated. Data collection was done in two hour duration before the operation of cyclone ventilator modification operated (09.00 and 11.00 WIB) and in two hours after the operation of cyclone ventilator modification operated (13.00 and 15.00 WIB), in one day for 10 days.

The Ability of Cyclone Ventilator Modification to Reduce Temperature, Humidity, CO Gas and PM 10 Dust Inside of Mechanical Room: The ability of cyclone ventilator modification to reduce temperature inside of mechanical room in average was 10.919% in every 2 hours operation, its ability to reduce air humidity in average was 28.64% in every 2 hours operation, and the ability to reduce PM10 dust in average was 52.80 % in every 2 hours operation. It concurs the previous research about the effectiveness of cyclone ventilator modification instrument to reduce CO gas and PM 10 dust level[(2)]. Air flow speed inside of the tmechanical room increases was 48.71% in every 2 hours operation.

The use of active carbon in cyclone ventilator modification was effective to absorb CO gas as same as Nurullita & Mifbakhuddin in their research about Monoxide Carbon Gas Absorption (CO) inside the coconut shell active carbon and durian shell explains that the presentage of CO gas reduction by using coconut shell adsorbent is 62.6%, while durian shell is 70.6%[(4)]. This concurs and strengthens the previous research[(2)] that life time carbon is active as adsrobent CO as long as 388 hours, while the life time (saturated point) for filtering the dust has not been achieved. This instrument is very effective because it can reduce CO gas more than 60 % for 352 hours. Whereas, the efficiency of the instrument is shown from the effectiveness reduce CO gas and dust and the low non electricity operating cost. The most used adsorbent is active carbon becuase it has big surface. So, it absorbs bigger energy than another adsorbent. The application of adsorption energy is mostly used in industry. The example of adsorption application vapour phase is the restoration of organic solvent used by substance, printing ink and textile coating. While the adsorption of liquid phase used to seperate organic components from liquid and water waste from the substance of organic liquidd[(5)].

Jaya et al. stated that emission gas NO and Nox that are adsorbted was 70%. That proves the effectiveness of active carbon used to reduce air pollutant[(6)].

The Ministry of Health Decree No. 1405/MENKES/SK/XI/2002 requires that the room temperature has to be 18^oC-26^0C, the humidity is 40%-60%. Maximum dust content inside the room in average 8 hours meassurement is 0.15 mg/m^3. Ventilation air flows is 0.15-0.25 m/s and CO gas pollutant is 25 ppm/8 hours. This research has answered that the existance of cyclone ventilator modification in mechanical room has created and proven that it can be used to fulfill the requirement as air controller instrument inside the room, so that the mechanical room fulfill the requirement/quality standards.

The paired sample t-test in temperatue, humidity, CO gas level and PM 10 dust parameter, inside the room

resulted p-value of 0.000 (there was significant difference between of parameter before and after installing and applying cyclone ventilator modification).

While the air flow speed inside the room increases fluctuatively as shown in Figure 2.

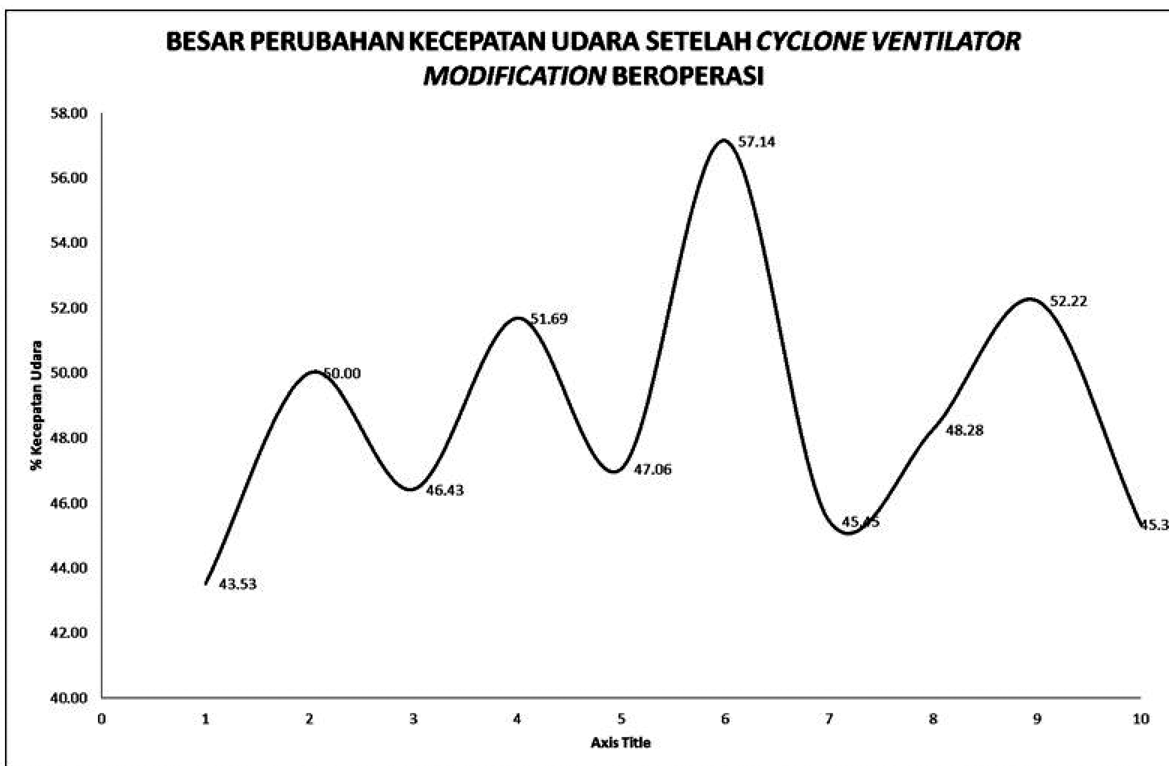


Figure 2: The Increase of Indoor Air Flow Speed After Installing/Operating Cyclone Ventilator Modification

The problem of Cyclone Ventilator Modification application is there should be preliminary test if the instrument will be installed in another place which has higher pollutant variation with the width and volume that is as same as 115.6 m^3

Time needed for cyclone ventilator modiication to reduce temperature, humidity, CO gas degree and PM10 dust until optimum limit of certain room: The meaning of optimum limit is fulfill quality standard of working area based on The Ministry of Health Decree No.1405/MENKES/SK/XI/2002[3] that is 18^0C-26^0C for room temperature, 40%-60% for humidity. Maximum dust content inside of air temperature in average measurement in 8 hours is 0.15 mg/m^3. Ventilation air flows is 0.15-0.25 m/s and CO gas pollution is 25 ppm/8 hours.

Time needed by cyclone ventilator modification to reduce temperature, humidity, CO gas degree and PM10 dust in this research was 2 hours. This is as same as the result of parameter massurement in first length of time, that is 2 hours after being installed and applied. It has accomplished qualification standard of working environment. However, in this research the specific time, in which minute in particular, the parameter reduction will reach the standard cannot be determined. It is because the measurement is done in the 2 hours length of time. It is not a continous measurement which can get more specific data of time. Cyclone ventilator modifivation can reduce indoor mechanical temperature in average by 0.919% and reduce air humidity in average of 28.64%. While the ability to reduce CO gas level in the average of 28.65% and decrease PM10 dust in average of 52.80% after 2 hours the instruments operates.

In this research, after the instruments operates for 10 days, the ability to reduce CO gas level was 4.55% in the first day and becomes 62.88% in the tenth day. While, for the PM10 dust was 24% in the first day and becomes 82.68% in the tenth day. The longer the instrument operates, its ability to reduce CO gas and PM 10 dust will increase. Whereas, the temperature parameter and humidity creates fluctuative result.

The Effectiveness of cycolne ventilator modification towards the room area/volume: The use/instalation of 1 unit cyclone ventilator modification in a room with the volume of 115.6m^3 becomes effective by looking at

the ability in reducing temperature, humidity, CO gas and PM10 dust level until fulfill the quality standards of workimg room in 2 hours operational of cyclone ventilator modification, it can also maintain the condition of the working condition in further hours. It is because there is an active carbon as cyclone ventilator modification which has a life time of l388 working hours[2].

The implementation of 1 unit cyclone ventilator modification in 115.6 m^3 room volume can be recommended and proven effectively to be applied in industry which has working area potentially producing CO gas and PM10 dust level.

In this research, cyclone was operated after having pollutant parameter accumulation with 2 hours mesassurement in 115.6m^3 room volume which has accomplished quality standards. If it is assumed, cyclone ventilator modification operational simulation done in the same time with operational machine in mechanical room. It can be sured that the condition of the working room with that width will not exceed the determined limit (further research).

The excess of active carbon in the cyclone ventilator modification is strengthen by the research of Raso et al. They stated that we demonstrate two steps process where air sanitation system based on active carbon can be regenerated by "in situ" and eliminate volatil organic compound (VOC) from indoor air by using energy efficiently[7].

Performance of Cycolne Ventilator Modification: Performance of cycolne ventilator modification as an indoor air sanitation in general can be evaluated by its energy and economical aspect. Those two aspects show that indoor air sanitation operates (moves) by wind breeze and because of the different air pressure inside and outside of the room. Naturally, higher temperature air inside the room will scientifically flow/move to the lower air temperature outside the room through cyclone ventilator modification fin, so the additional energy is not needed to operate the instrument. This is efficient in the instrument operation.

The suction power of cycolne ventilator modification depends on air speed that hits instrument fin. Cyclone ventilator modification can handle hot temperature problem, stuffy and dirtyn in the room, reducing humidity and freshen working room (normal air circulation). Cyclone ventilator modification is anti-rust product which is suitable for tropical climate, durable and flexible, doesn't need special treatment, efficient, and very quick and easy in the installation process.

CONCLUSION

1. Cyclone ventilator modification could reduce indoor mechanical temperature in average of 10.919%, air humidity in average of 28.64%, CO gas level in average was 28.65% and PM10 dust in average of 52.80% after 2 hours of operation.
2. Cyclone ventilator modification in 2 hours of operation could reduce temperature, humidity, CO gas and PM10 dust level that were accumulated in 4 hours inside the mechanical room.
3. Cyclone ventilator modification was effectively operated in a room with the volume of 115.6 m 3 and was able to produce the condition that meets the quality standards.
4. The performance of cyclone ventilator modification as air sanitation instrument was proven to be able to solve hot temperature, stuffy and dirty problem in the room, reducing humidity, to make the working space more comfortable, anti-rust product which was suitable for tropical climate, durable and flexible, doesn't need special treatment, efficient, and is very easy and fast in the instalation process.

RECOMMENDATION

1. The application of cyclone ventilator modification can be done by considering the instrument ability, room volume, and pollutant level in that room to get optimum formulation to fulfill quality standards inside the room.
2. The research of the application of cyclone ventilator modification can be a reference for another researcher to develop further step, such as the application of cyclone ventilator modification to other parameter in this research.

Source of Funding: Authors

Ethical Clearance: Yes

Conflict of Interest: No

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Efficiency Effort of Inpatient Service for BPJS-Health Participants with Lean Method at Surabaya Islamic Hospital

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ABSTRACT

Hospital is required to provide effective and efficient health services in accordance with hospital service standards, including Surabaya Islamic Hospital. It actively carries out quality improvement services through managing the existing resources effectively and efficiently, evaluating and improving all installations, including inpatient service. This study aimed to perform efficiency effort of inpatient service for BPJS-Health participants at Surabaya Islamic Hospital, in the form of operational research. The samples were 30 inpatients of BPJS-Health participants. There were 8 waste found. Effort made to reduce the waste was by completing SIMRS with the data and information needed by the management for each work unit of inpatient service for BPJS-Health participants.

Keywords: *Inpatients, BPJS-Health Participants, Service efficiency*

INTRODUCTION

Hospital is a health service institution which organizes individual health service in a comprehensive manner providing inpatient, outpatient and emergency services[(1)]. Inpatients are patients who enter the hospital and stays one day or more for the purposes of observation, diagnosis, therapy or rehabilitation as well as other medical supports[(2)]. Patients who categorized in inpatient service will experience some levels of service processes, such as the stages of admission, diagnosis, treatment, examination until control. Inpatient activity process in inpatient ward requires several services, including nursing care, medical care, pharmacy service, laboratory service, radiology service, nutrition service and services from other professions according to the needs and conditions of the patient. In fact, the process of inpatient service requires a standard time for each activity. However, there are several activities which exceed the arranged standard time and do not have added value or categorized as waste.

Waste is all problems or disturbances which arise and hinder work and patient service consisting of 8 types, including defects, overproduction, transportation, waiting, motion, over processing and human potential[(3)]. Waste is any activity which adds cost or time but does not add value[(4)]. One effort to minimize inefficiencies for inpatient service is by applying lean[(5)]. Lean is a continuous effort to eliminate waste and increase the value added of goods and services to provide value to customer[(6)].

Surabaya Islamic Hospital is a type-C-class hospital in collaboration with the Healthcare and Social Security Agency (BPJS-Health). The activity process in the inpatient ward of the Surabaya Islamic Hospital was found to be in waste time, waste motion or waste material, especially in patient discharge service. If calculated, either waste time or waste motion will inflict a financial loss to the hospital.

Research problem in this study was about how the waste in the process of inpatient service for BPJS-Health participants, how to assess the waste with rupiah, and how to improve the effectiveness and quality of services using lean hospital approach in the inpatient ward of the A.Yani Islamic Hospital of Surabaya.

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Research objective of the study was to identify the waste in the process of inpatient service for BPJS-Health participants, analyze the waste, and give recommendations to improve the effectiveness and quality of services using lean method.

MATERIALS AND METHOD

This study was operational research, conducted in the Inpatient Ward of the Old Building of A.Yani Islamic Hospital of Surabaya. The data were collected through survey and documentation study. In addition, interviews were conducted with related parties, namely ward officers, radiology officers, pharmacy officers, laboratory officers and hospital management to make value stream mapping. Value stream mapping is an integrated journey of patient from the beginning to the end which describes the service process of the patient from coming to the hospital to returning home[7].

Documentation study was conducted to obtain regulatory data in the form of policies, standard operating procedures or others. The sample size were 30 inpatients of BPJS-Health who were followed their service process from handing over the patients to the inpatient ward until discharging the patients. This was carried out to find out the standard time needed for each activity. Besides, it observed waste which occurred in the process of inpatient service activities.

FINDINGS

Value Stream Mapping (VSM) of Inpatient Service: VSM describes a series of service activities, the flow of patients and officers, and the flow of material and information in the inpatient room (Figure 1).

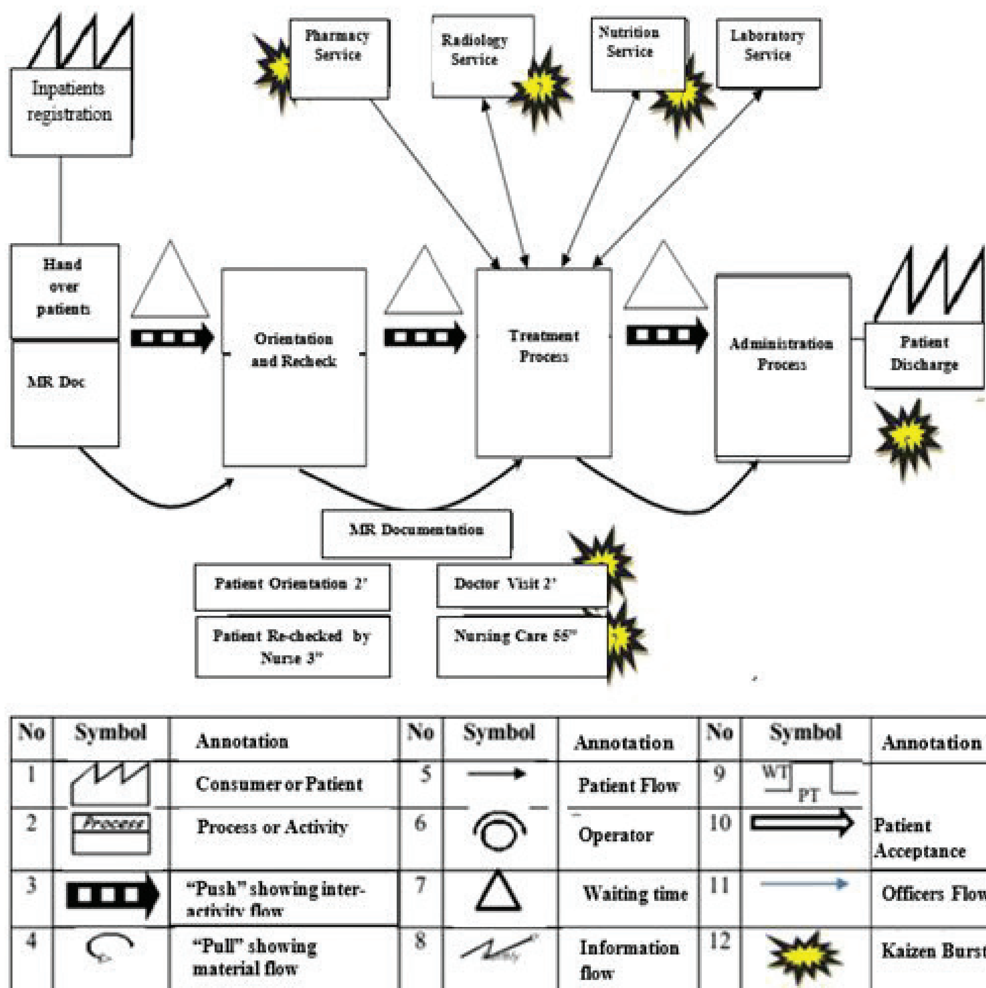

Figure 1: The Value Stream Mapping

Figure 1 describes the process of inpatient activities from handing over patients until discharging. There are 8 waste in the health service process which described by Kaizen Burst (Table 1).

Table 1: Waste category in the inpatient ward

No.	The Existence of Waste	Waste
1.	Repetition the report writing on the patient's capacity book and nursing handover book	Waste of Over Processing
2.	The implementation of prescription is not in accordance with Unit Dose Dispensing (UDD)	Waste of Over Processing
3.	Waiting time for reading critical results by radiologist is not in accordance with Operational Procedure Standard (SPO)	Waste of Waiting time
4.	Waiting time for reading non-critical results by radiologist is not in accordance with Operational Procedure Standard (SPO)	Waste of Waiting time
5.	Provision of ready-to-eat foods which are not consumed	Waste of Over Production
6.	Doctors visit outside the specified time	Waste of Waiting Time
7.	The length of the process for sending BPJS claim files to internal verifiers by inpatient nurses	Waste of Motion
8.	Patients wait to pick up by the family in the inpatient room	Waste of Waiting Time

There were 8 waste in the inpatient ward based on the VSM, which had been grouped as in Table 1. The waste was in nursing service. There was a repetition of report writing on the patient's capacity book and the nursing handover book, the length of the process of transferring BPJS claim files to the internal verifier by the inpatient nurse, and patients who were waiting for the family in the inpatient ward. Waste in the medical service is in the implementation of prescriptions which were not in accordance with Unit Dose Dispensing (UDD) and the doctors who had a visit outside the specified time. Waste in the radiology service was in waiting time for reading critical and non-critical results by radiologist which not in accordance with Operational Procedure Standard. Waste in nutrition service was in the provision of unused portion of ready-to-eat food (not consumed).

Observation Results of Inpatients Service

Table 2: Time and Motion on the Process of Nursing and Medical Care

No.	Service	Category	Activity	Average of time (minutes)	Standard of time (minutes)
1.	Nursing Care	Pre	Preparing TT	9	10
			Preparing Equipment	4	5
			Handwash	1	1
			Preparing Wound Care	6	7
		During	Receiving Patients	3	5
			Handover patients	5	5
			Physical Check up	3	5
			Vital Signs	3	3
			Consulation to doctor in charge	3	2
			Meeting the needs of intravenous fluids	3	2
			Performing drug	7	10
			Accompanying Doctor's visit	6	5
			Meeting the need of oxygen	3	5
			Preparing injection	2	2
			Administering medication (Injection & Oral)	2	5
			Surgical Injury Care	12	20
			Obsevation Patient	2	5
		Post	Nursing Documentation	15	15

Conted…

2.	Medical Care	During	Taking patient's medical record	1	1
			Visit	3	5
			Educating patient	2	3
			Medical record documentation	8	10
		Post	Prescribing	1	3

Table 3: Time and Motion on the Process of Radiology, Pharmacy and Nutrition Service

1.	Radiology	Pre	Ordering via e-billing	1	3
			Confirming to radiology officer	1	1
		During	Educating action preparation	2	3
			Transfering patient to Radiology	30	28
		Post	Radiology officer brings the result to the particular room	180	60
2.	Pharmacy		Recapitulating prescription in the medical record	3	4
			Providing medication	9	15
			Educating patient about medication	9	10
			Distributing drugs	5	5
3.	Nutrition	Pre	Ordering via e.billing	3	3
			Confirming to nutrition officer	1	1
		During	Assessing nutrition	10	5
			Socializing nutrition	5	4
		Post	Documentation in the integrated patient development record (CPPT)	12	5

Table 4: Time and Motion on the Process Laboratory and Administration Service

1.	Laboratory	Pre	Ordering via e-billing	2	3
			Confirming to laboratory officer	1	1
		During	Taking sample	5	5
		Post	The officer brings the results to the particular room10/ward	-	10
2.	Administration	Pre	Completing administration of patient dischare, filling discharge planning	5	5
		During	Taking BPJS file form medical record documentation	3	2
			Delivering BPJS file to internal verificato for scan	11	5
			Returning the file medical record	3	2
			Performing discharge planning	5	3
		Post	Escorting patient to the hospital exit	11	5

Table 2, 3 and 4 shows the calculation of actual time was compared to standard time. Difference over time between the actual time of treatment and the standard time of treatment categorized as time waste. Time waste happened mostly in radiology service especially when delivering patients to conduct radiological examination. There was time waste of 10 minutes and 120 minutes for waiting for the results. The activity of delivering BPJS claim files to the verifier carried out by nurses also had time waste of 6 minutes.

Table 5: Waste Value (in Rupiah)

No.	Service	Waste Value in Rupiah
1	Handover patient	Rp.397,-
2.	Room orientation dan recheck	Rp.2,758,-
3.	Medical treatment	Rp.1,634,-
4.	Medical treatment documentation	Rp.4,348,-
5.	Nursing care	Rp.8,391,-
6.	Nursing care documentation	Rp.17,656,-
7.	Patient's billing documentation	Rp.461,-
8.	Patient discharge process	Rp.22,365,-
9.	Nutritional care	Rp.20,650,-
10.	Nutritional care documentation	Rp.978,-

Table 5 shows that waste which caused the biggest loss was in the patient discharge process amounted to Rp.22,365.

DISCUSSION

In the inpatient ward, nurse reassesses the condition of the patient, conducts room orientation to family and patient regarding regulations and facilities. Then, nurse inserts inpatient billing and delivers it to the doctor in charge stated that the patient has entered the room. The nurse in charge of the room carries out nursing care to the patient for 24 hours.

In the process of inpatient nursing care of BPJS-Health participants in the inpatient ward at A.Yani Islamic Hospital of Surabaya, waste is still found, including material, time, and process waste. In the material and process waste, nurse repeats the procedure of recording patient's condition in the report book and in the CPPT. This requires a material namely book, and a process in the recording duplication. While time waste is found when the nurse delivers BPJS claim files to the verifiers. Nurse must wait for the verification process to complete which causing main tasks of the nurse are reduced and nursing care to the patient are delayed.

Medical care to patients is carried out by doctors in charge (DPJP) by conducting a visit once a day. In addition, the doctor provides education to patients regarding their disease and prognosis. Furthermore, the doctor will prescribe medication if there is a change in therapy and documentation. The hospital policy states that doctor's visit cannot be more than 12 AM. However, since many doctors in charge (DPJP) in the Islamic Hospital of Surabaya are contract doctors, there are still many doctors visit above 12 AM. As a result, many patients' services including patient discharge are delayed. The delay in discharging patients results in waste in the process of inpatient care.

Nutrition service is carried out by nutritionists by conducting nutritional assessments and counseling on patients about the types of foods which are allowed and those which are not, and then they document patient's status/medical records. In addition, inpatient will get a diet in accordance with the conditions and after a nutritional assessment. Waste in nutrition services occurs in the process of documentation of nutrition care and ready-to-eat leftovers which are not served because the patient has already been discharged. This can be possibly happened because the room officers do not confirm if the patient has already been discharged and can also be caused by the nutrition officers who do not see the patient billing. Thus, they do not know if the patient has left the hospital.

The pharmacy service in the inpatient ward conducted by pharmacists includes educating patients, especially those who take drugs from home and take medication for a long time. The pharmacy officer distributes the medicine to the patient and records the patient's status about the drug reaction and the type of drug given to the patient. If there is a new patient or additional drug and the pharmacy officer is not in his place, the distribution of the drug is carried out by the charge nurse.

Waste occurring in pharmacy services is the residual drug which is not used by patient. The drug will be returned to the pharmacy after the patient discharge, so that further sales are delayed.

Laboratory service for inpatients is carried out to support the patient's diagnosis and performed according to the patient's needs. Blood sampling for inpatients is carried out in the morning shift at 11 AM, afternoon shift at 3 PM, and night shift at 7 PM. When the examination order in the morning shift is more than 11 AM, the laboratory results are delivered to the room after 3 PM. Then, the further treatment to the patients is delayed.

In case that inpatients need radiology examination, nurse performs e-billing to request for radiology examination and confirm to the radiology department

by telephone room. If the examination does not need to involve a radiologist, then the patients can immediately be transferred to the radiology department for examination. However, if the radiology examination must be performed by a radiologist, then the examination must wait for the radiologist in charge to come. This will delay the examination and further action to the patient. Furthermore, reading the radiology results must wait for the radiologist. However, the standard time policy of the reading the results is 60 minutes. The delay in radiological reading includes time waste and will postpone further treatment.

The results above show that there are still many aspects of inpatient care which include to waste.Waste is everything which is not a value[8]. Value is anything consumers want to pay for a product[9]. Waste can be categorized as Value Added (VA), Non Value Added (NVA), and Non Value Added but Necessary (NNVA).

Waste in the process of inpatient care at A. Yani Islamic Hospital of Surabaya can be minimized by using lean method[10]. All waste must be eliminated or minimally reduced in order to reduce hospital costs, increase patient satisfaction, and improve patient and employee safety.

Graban[8] defines lean as 2 simple parts:

1. **Total elimination of waste:** Waste is any activity which does not reflect assistance in the healing process of patients
2. **Respect of people:** Respect in the lean context means to encourage employees to be motivated and do better work in a constructive way.

To minimize waste in nursing care, it is necessary to have clear arrangements regarding the duties of nurses and verifiers about BPJS Kesehatan claim files so that nurses do not need to wait for long time in the verifiers' office. In addition, to avoid duplication of recording the patient's condition, it is necessary to simplify the system of integrated patient development record (CPPT) that the charge nurse does not write the same notes in different forms. In the medical care, it is emphasized to the doctor in charge to conduct timely visit and make daily prescriptions according to the drugs needed in a day. It is suggested to consider reward and punishment policy to control the condition.

To minimize or eliminate waste in laboratory service, it is necessary to use technology that the results of the examination are immediately discovered, while waste in nutrition service can be minimized by increasing the coordination with the room related to each patient' s nutritional needs and predicting the patient discharge.

CONCLUSION

From the above discussion it can be concluded that:

1. There are 8 waste found in the inpatient ward of A.Yani Islamic Hospital of Surabaya with 4 categories of waste including waste of over processing, waste of waiting time, waste of over production, and waste of motion
2. Lean method is applied as an effort to overcome waste occurred.
3. To minimize the occurrence of waste, some efforts are carried out including reviewing CPPT registration procedures, considering the existence of reward and punishment systems, utilizing technology, and increasing coordination among staff.

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Stirring Chamber Design Development to Increase the Potention of Chicken Egg Shells to Decrease Cadmium (Cd) Level in Blood Cockle (*Anadara Granosa*)

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ABSTRACT

A study about chicken egg shells as an adsorbent to decrease Hg level in blood cockle (*Anadara granosa*) has been done by Suryono in 2017, its results showed that chicken egg shells could decrease Hg level in blood cockle. The lowest level of Hg (0.545 ppm or 93.64%) was using 45 minutes of stirring process with 75 grams of chicken egg shells, there was a significant difference of Hg level in blood cockle before and after the process. The Hg level decrease from 0.582 ppm to 0.037 ppm. Those processes include the use of chicken egg shells as adsorbent cannot reduce all the level of Hg. This study used One Group pretest-posttest Design. Samples were blood cockle (*Anadara granosa*). Stirring chamber was a food sanitation tool, it had ability to decrease heavy metal level such as Cd in blood cockle using the stirring and adsorbent temperature principles. Samples were taken using purposive sampling. There were 9 treatments and 3 replications. The stirring process was done in 15 minutes using 50 rpm, 150 rpm, and 250 rpm of speed. The adsorbent temperature were 35°C, 50°C and 65°C, it used 50 grams of chicken egg shells (adsorbent) in 1 liter of water. The results showed that blood cockle (*Anadara granosa*) which was taken from Kenjeran coastal area, Surabaya contain 0.93 ppm of Cd level in average. The level of Cd in the control group was 0.82 ppm. While the average level of Cd in the blood cockle in the treatment groups were 0.15 ppm. The amount of Cd level decreasing in treatment groups were 82.1% (0.67 ppm). The stirring speed and adsorbent temperature were contributed to give significant difference of Cd level in blood cockle. From the results we could conclude that the intervention stirring and adsorbent temperature can decreased Cd level. We suggest that societies can use stirring and heating using chicken egg shells as an adsorbent to control food contamination of Cd.

Keywords: *Stirring chamber, Stirring speed, Adsorbent temperature, Chicken egg shells*

INTRODUCTION

Food quality that is not fulfil health requirements was a main problem of food safety. It needs awareness to understand that this was some parties responsibility. They were governments, food industries, food producer, and also consumer[1]. The regulation in Indonesia (UU No.18, 2012) mention that farmers, fishermen, fish farmers, and food business actors are obliged to apply food safety norms, standards, procedures and criteria. Food safety intend to prevent the possibility of biological, chemical and other contaminants that can interfere, harm and endanger human health. Seafood was potential to contaminate by heavy metal[2].

Suryono et al. reported that blood cockle that was taken from Kenjeran coastal area in Surabaya contain 0.620 ppm of Mercury (Hg). Mercury contamination also was found in Asian green mussel (*Mytilus viridus)* [3]. Trisnawati mention that the level of Cadmium (Cd) in Asian green mussel was 50.23-70.39 pmm inside its gill, 31.08-44.53 pmm in its liver, and 6.73-7.37 ppm on the sea water[4]. Fransiska et al. also proved that there were 0.76073 mg/kg of lead (Pb) in blood cockle that was taken from Kenjeran coastal area, Surabaya[5].

Simple and inexpensive efforts to decrease the level of heavy metal that can be done were using chicken egg

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shells. Suryono found that the use of 75 grams chicken egg shells powder and 45 minutes of stirring process can decrease 93,64% of Hg level[3]. Aimi et al. mention that this due to chicken egg shells contains CaCO3. It can absorb metals[6].

Besides Hg, blood cockle also contain Cd. The level of Cd in blood cockle which was taken from Kenjeran, Surabaya was 0.93 ppm[3]. This level is still safe based on SNI No.7387, 2009. But consume food that is contaminated by Cd have potential to damage the organs or death due to the accumulation of Cd inside the body. The aim of this research is to analyse the difference of Cd level in blood cockle (*Anadara granosa*) after it is given a treatment by using the stirring speed and adsorbent temperature principles.

MATERIALS AND METHOD

This was experimental research using one group pretest-posttest design. Independent variables were the speed of stirring and adsorption temperature. We used 50 rpm, 150 rpm, and 250 rpm of speed. The adsorption temperature was 35°C, 50°C, and 65°C. The dependent variable was Cd level. Samples were blood cockle from Kenjeran coastal area, Surabaya.

The stages to make the chicken egg shells adsorbent were: 1) Washed the chicken egg shells then take the membrane and all the dirt, 2) Soaked with hot water in 15 minutes then let it dry, 3) The egg shells then be mashed using blender, 4) Sifted the chicken egg shells powder with 120 mesh sieve, 5) Put the powder in the oven for 15 minutes 100 ºC, 6) Activated the powder using 0.1 M of HCl in 48 hours, 7) After 48 hours drain well and wash until the pH 7 or neutral, 8) Put the powder in oven again to make it dry for 30 minutes 100 ºC.

If the chicken egg shells powder as adsorbent was ready, put 50 grams of the powder to a liter of water and 250 grams blood cockle inside the stirring chamber. Adjust the adsorbent temperature and stirring speed, then analyze the Cd level in blood cockle using Atomic Absorption Spectrophotometry.

FINDINGS AND DISCUSSION

The results of Cd level test in blood cockle (*Anadara granosa*) with 50 grams of chicken egg shells as adsorbent before and after the treatment using stirring speed and adsorption temperature can be seen below. We use three replication.

Table 1: The average Level of Cd in Blood Cockle (*Anadara granosa*) with 50 grams of chicken egg shells as adsorbent before the treatment

Samples Code	Stirring Speed (rpm)	Adsorption Temperature (°C)	Results Cd (ppm)
KAT1		35	0.93
KAT2	50	50	0.87
KAT3		65	0.75
KBT1		35	0.79
KBT2	150	50	0.80
KBT3		65	0.80
KCT1		35	0.82
KCT2	250	50	0.82
KCT3		65	0.79
Total			7.37
Average			0.82

Based on SNI (Indonesian Standard) No. 7387, 2009, the level of Cd in blood cockle after it soaked with adsorbent chicken egg shells powder was below the maximum allowable threshold value (1 ppm). But we need to consider the effect of blood cockle consumption continuously in short time.

The accumulation of heavy metal in seafood can be happen due to food chain cycle. Palar explained that in the body of aquatic biota, the amount of heavy metal will accumulated and continue to increase (biomagnification) in the food chain, where biota at the higher level in the food chain will experience more accumulation[7].

Table 2: The average level of Cd in Blood Cockle (*Anadara granosa*) with 50 grams of chicken egg shells as adsorbent after the treatment

Samples Code	Stirring Speed (rpm)	Adsorption Temperature (°C)	Results Cd (ppm)
AT1		35	0.48
AT2	50	50	0.31
AT3		65	0.15
BT1		35	0.12
BT2	150	50	0.09
BT3		65	0.08
CT1		35	0.07
CT2	250	50	0.04
CT3		65	0.03
Total			1.37
Average			0.15

The average difference of Cd level in blood cockle before and after the treatment using stirring speed and adsorption temperature was 0.82 ppm in before treatment group and 0.15 ppm in after treatment group. While the amount of Cd level decreasing can be seen in table 3.

Table 3: The amount of Cd level decreasing in Blood Cockle (*Anadara granosa*) with 50 grams of chicken egg shells as adsorbent before and after the treatment

Samples Code	Stirring Speed	Adsorption Temperature	Cd Results (ppm)		Decreasing Total	Decreasing Total
	(ppm)	(°C)	Before	After	(ppm)	(%)
AT1		35	0.93	0.48	0.45	48.4
AT2	50	50	0.87	0.31	0.56	64.4
AT3		65	0.75	0.15	0.60	80.0
BT1		35	0.79	0.12	0.67	84.8
BT2	150	50	0.80	0.09	0.71	88.75
BT3		65	0.80	0.08	0.72	90.0
CT1		35	0.82	0.07	0.75	91.5
CT2	250	50	0.82	0.04	0.78	95.1
CT3		65	0.79	0.03	0.76	96.2
Total			7.37	1.37	6.00	739.2
Average			0.81	0.15	0.67	82.1

The difference of average Cd level before and after treatment was 0.67 ppm (82.1%). It indicated that there was Cd level decreasing that is caused by stirring speed and adsorption temperature. This is the graphic which shows the percentage of Cd level in blood cockle (*Anadara granosa*) after the treatment using 3 variations of stirring speed and adsorption temperature with 50 grams of chicken egg shells as adsorbent.

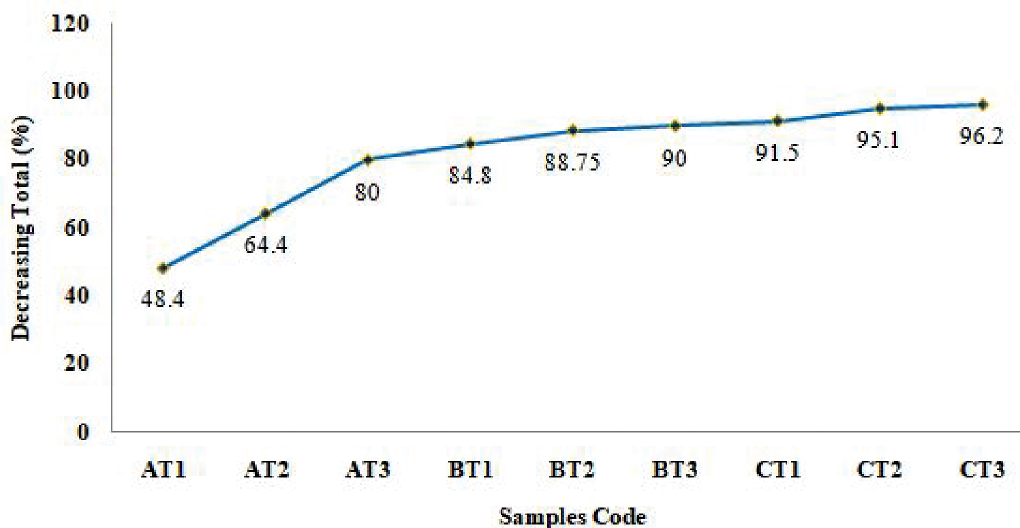

Figure 1: The Graphic of Cd Level Percentage in blood cockle (*Anadara granosa*) after the treatment using 3 variations of stirring speed and adsorption temperature with 50 grams of chicken egg shells as adsorbent.

From the Figure 1, we can understand that the highest decreasing total was CT3 sample using 250 rpm of stirring speed and 65°C. The total decreasing in sample CT3 was 96.2%.

Ancova test was used to assess the difference of each stirring speed and adsorption temperature variation. This test also was used to know the amount of difference of Cd level before and after the treatment. The decreasing

of Cd level has a positive correlation with the increasing of stirring speed and adsorption temperature. This means that the higher the speed of the stirring and adsorption temperature, will lead to the increasing of Cd level in blood cockle (*Anadara granosa*).

Table 4: Tests of Between-Subjects Effects

Dependent Variable: Cd Level After Treatments								
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[b]
Speed	0.163	2	0.081	568.125	0.000	0.985	1136.250	1.000
Adsorption Temperature	0.084	2	0.042	293.468	0.000	0.972	586.937	1.000
Speed * Adsorption Temperature	0.072	4	0.018	125.149	0.000	0.967	500.595	1.000

a. R Squared =. 995 (Adjusted R Squared =. 993)

b. Computed using alpha = 0.05

Table 5: Pairwise Comparisons

Dependent Variable: Cd Level After Treatments						
(I) Stirring Speed	(J) Stirring Speed	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
50 RPM	150 RPM	0.222*	0.010	0.000	0.201	0.243
	250 RPM	0.272*	0.008	0.000	0.254	0.289
150 RPM	50 RPM	-0.222*	0.010	0.000	-0.243	-0.201
	250 RPM	0.049*	0.006	0.000	0.037	0.062
250 RPM	50 RPM	-0.272*	0.008	0.000	-0.289	-0.254
	150 RPM	-0.049*	0.006	0.000	-0.062	-0.037

Based on estimated marginal means

*. The mean difference is significant at the 0.05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

This test shows that chicken egg shells can be use as heavy metal adsorbent. Chicken egg shells can decrease Hg level in blood cockle. This indicates that activated chicken egg shells can absorb heavy metal. Napitapulu explain that physical activation can enlarge chicken egg shells pores. It happened due to chemical bonds breaking or surface oxidizing molecules so that the surface area increases and affects the adsorption potency[8].

HCl as activator in chicken egg shells activation process can clean up the pores surface, remove impurities (non-carbon) compounds and rearrange the location of atoms exchanged. We can said that chemical activation was a process to add certain reagents to clean and eenlarge the surface of the chicken egg shell so that it can be used as an adsorbent.

Chemical activation method was the best way for adsorbent, in that research zeolite was used as adsorbent. It can adsorb water up to 13.77% after it is activated by chemical method[9]. Fitriyana & Safitri reported that chicken egg shells adsorbent potency test to ion, it results shows that non-activated chicken egg shells can adsorb 18.73% while physical activated chicken egg shells can adsorb 31%. This result indicated that activated chicken egg shells can adsorb ion better than non activated chicken egg shells[10].

Aidha explained that activating adsorbent using HCl for 80 minutes can decrease up to 78.99% of calcium. Acid adding lead to cation exchange with H^+ thus enlarges the cavity in the adsorbent zeolite and increases the adsorbent power due to the increased porosity of the adsorbent[11].

Beside of that, stirring speed and adsorption temperature contribute to decrease Cd level in blood cockle. Statistic analysis shows that there was an influence of stirring speed and adsorption temperature to the Cd level decreasing. The increasing stirring speed and adsorption temperature lead a greater decrease of Cd level in blood cockle. Stirring causes turbulent liquids which is containing adsorbents. The faster the stirring will cause the greater movements so that it will make the film layer that surrounds the adsorbent particles thinner which makes the adsorption process run fast.

Webber explained that adsorption was limited by film diffusion and pore diffusion process, it depent on movements in the system. If the movements was slow, the film which is coating the particles will be thick so adsorption will be slow. If the stirring process was enough, the film diffusion process will run faster[12].

Syauqiyah et al. explained that increased temperature causes the energy and reactivity of the ions to increase so that more ions are able to pass through the energy level to interact chemically with the active layer on the surface, so that more ions can be adsorbed on the surface. The heating treatment in this process can increase the adsorbent power to decrease Pb and Cd level in blood cockle[13].

Heating or adsorbent activating would increase adsorbent power due to the adsorbent's pores will be larger. But if the temperature was too high it could damage the adsorbent[12]. Flores et al. stated that adsorption power in chicken egg shells will increase on 15-35°C due to endotermic process. The absorption of Cd (II) occurs mainly in the calcareous layer (which contains $CaCO_3$) and slightly in the membrane layer. This shows that the absorption of Cd (II) is irreversible and the main absorption mechanism is ion precipitation and exchange.

CONCLUSION

Stirring speed and adsorption temperature can increase the potention of chicken egg shells to decrease Cd level in blood cockle by develop stirring chamber tool.

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Ethical Clearance: Yes

Conflict of Interest: No

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Querying the Dataset from the Developed Ontology for Swineflu Disease

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ABSTRACT

Ontology design and querying the data set to obtain accurate results has been a topic of research. The aim of the paper is to represent ontological knowledge in the field of Medical Information Systems to store the knowledge about Swine flu disease and thereby querying the data and formalize the knowledge base development. The developed knowledge from RDF is converted to rules and then querying is done through different methods and performance analysis has been done on the retrieved query. The results predicted determine the suitability of the method where querying gives the accurate result for swine flu disease ontology.

Keywords: *Querying; Ontology; Swine-flu; Protégé; SPARQL;*

INTRODUCTION

Semantic Web a layer of existing web enables machines to operate better and share meaningful knowledge. Semantic Web provides technology stack where key part is standardized information exchange. As part of Semantic Web, Computers should have access to structured collection of documents and sets of inference rules so that they conduct automated reasoning. Semantic web can otherwise be referred as Linked Data. Aristotle defined the term Ontology[1,8,9] in his Metaphysics. In 1998, Studer etal.[2] defined the term Ontology as : "An ontology is a formal, explicit specification of a shared conceptualization." Conceptualization denotes abstract model being representing some phenomenon identifying Knowledge in detail with individual relationships. In our paper, We present our application for searching on appropriate semantic information on Swine flu in respiratory disease ontology which is a domain ontology. This we have done using Classes and Objects and the inter individual relationships which gives the information to patient or any person searching the Web such as what drug is suitable for a patient given his symptoms. Explicit states that type, constraint and their use is explicitly stated. Shared echoes the perception that Ontology represents consensual knowledge refers to some group and not individual. Features are described by Classes and attributes are represented by data properties. Instances are represented by individual classes and querying to retrieve semantic information is done with the help of SPARQL. The main purpose of the paper is to communicate information retrieval, querying through SPARQL and make an analysis of performance of web based applications to predict the query evaluation that gives accurate results when queried. The remaining part of the paper is organized as follows. Section 2 describes about the different tools used for Semantic Web and Section3 describes about the framework for the development of swine flu ontology and section4 presents analysis of NASA TLX INDEX[3,4] on applying SPARQL[5], Ontograf[6], SWRL[7] Queries on the ontology that is retrieved and the evaluation is presented in the form of graph and Section 5 concludes our work.

Tools used for Semantic Web in our Case Study: Respiratory diseases are the diseases caused due to the disorder of the air and lungs that affect the human respiratory system. These respiratory diseases may cause damage to the organs and the other internal structures that deal with the breathing, and may include nasal cavities, the throat, the bronchitis and many other organs present. Identification of these respiratory diseases and taking the correct predicate is a difficult task for a normal individual affected. Respiratory diseases cause the malfunction of the internal organs that block and cause damage to the lungs which may cause severe health issue. There are many diseases which are caused on the respiratory

system. Some of them namely, Asthma, Pneumonia, Upper respiratory tract infection, Infant respiratory distress syndrome, Cystic fibrosis, Shortness of breath, Obstructive lung disease, Bronchitis, Obstructive sleep apnea, Influenza-like illness, Acute severe asthma. These diseases may affect the human structures and organs directly. Knowledge of these diseases to the individuals is very much less rather than the experts in that domain. To get the knowledge about the diseases is very much difficult and that may happen only when the expertise help is provided to the user. To get the preventive measurements for a user without expertise help may end up in the wrong cause. To understand the content and to provide the better knowledge about the diseases ontologies provide an accurate representation to the user without the help of the expertise in that domain.

There may be various characteristics and different issues related to the diseases. Each of them are classified into the specific categories in the domain those are affecting different organs or the structures. Sufficient knowledge about the diseases and the corresponding precautions or about the diseases through the ontologies can help in removal of unnecessary damage and less spread of the wrong information through the web. Technologies that help to build a content oriented system is possible using semantic web[10,11]. By using semantic web which provide information using the ontology help to show the related issues in the respiratory diseases, how it is caused and how it can be prevented. Much of the related information can be seen on the web rather than having the misguided information.

METHODOLOGY

Tools for Ontology Development

Protégé[12,13]: Protégé is developed by Stanford University as a tool for Semantic Web and it is a framework for building Intelligent Web Systems. It can be adapted to build both simple and complex ontological applications where the concepts used are classes, objects and the inter individual relationships established among them. Protégé provides us meta modeling an the best part is that there is no syntax involved and domain ontologies can be developed easily with this.

Jena: Apache Jena is open source framework based on Java. It provides framework to extract data from and write to RDF and graph which is represented as abstract model. Data can also be populated from databases, Files, URLs and also it has the API for creating and accessing RDF data.

RDF: A Resource Description Framework, is used as model for interchange of data on the Web. URIS are assigned to data objects and then RDF is used to create statements about them. RDF is used for serializing triples and RDF consists of Subject-Predicate-Object triple. This makes data easier to store and interchange.

SPARQL: An Acronym for SPARQL Protocol and RDF Query Language is used for querying, retrieving and manipulating data stored in RDF format. It allows us to search the Web and discover relationships among the classes and individual objects. SPAQRL takes text in the form of queries and return the results. SPARQL consists of SELECT queries which are similar to SQL thereby it is easy for the user to write if he has knowledge on the SQL queries. SPARQL produces results in three formats XML,JSON and CSV formats.

Ontograf: Ontograf provides support for navigating relationshipsofOWLontologies.Thevariousrelationships that can be supported are subclass, individual, domain/ range object properties, and equivalence. It provides zooming, spring layout, searchable relationship filters, configurable tooltips, pinning tooltips, OWL Imports View for better enhancement of views.

SWRL: SWRL rules can be executed through a tab in protégé SWRL Tab.It supports interoperating with other rule engines and there are other user-defined libraries and various built-in libraries are also provided mathematical, temporal and string operators. This language provide a powerful means extracting OWL Ontologies.

FRAMEWORK FOR SWINE FLU DISEASE ONTOLOGY

A framework for Swine Flu disease ontology is developed where ontology is created with the help of Protégé. Protégé helped in modelling of ontology classes. Classes used for development of Swine Flu disease are demonstrated in Fig. 1.

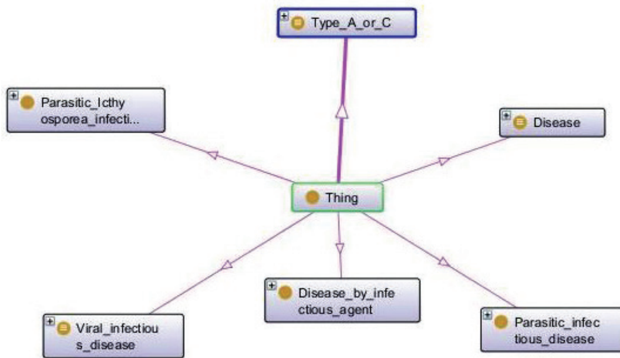


Fig. 1: Display of Term Candidates in an Unstructured List

Classes used are highest occurrence of Disease and its diagnosis,Symptoms of individuals,Causes of disease, Its prevention and Vaccines,Etiology. Relationships used are Named_Disease,Caused_By,Used_to_diagnose, Types, Has_severity, Managed_To, Disease_Name, Managed_by, Used_to_cure,Inter individual relationships are represented in the following Fig2.

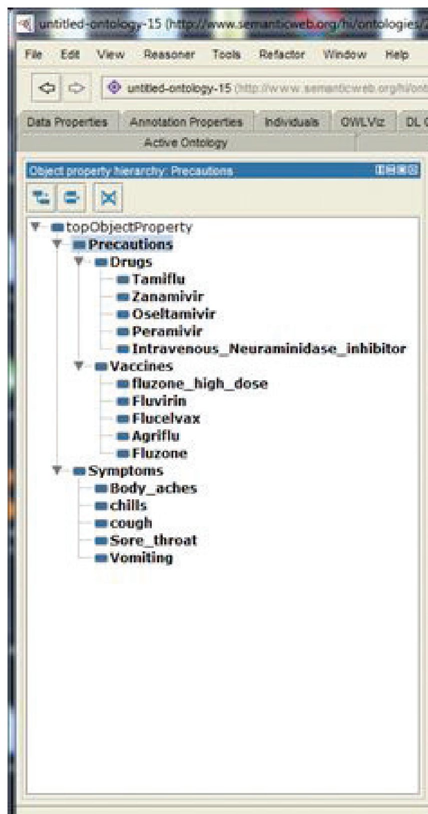


Fig. 2: Snapshot of inter individual relations in swine flu diseases

After SwineFlu disease ontology is developed, the next step is we evaluated our ontology using a Fact++ Reasoner which verified the ontology by executing each class and their properties.

RESULTS & DISCUSSION

Performance Evaluation: Our paper deals with SwineFlu ontology to disseminate knowledge to the user regarding SwineFlu the symptoms risk factors vaccines drugs Type_A/Type_c. we conducted one experiment to gather information regarding SwineFlu on two sets of users. One set of users has awareness on SwineFlu and the other does not have any awareness on SwineFlu. Taxonomy on SwineFlu ontology was shown in fig 1 where it comprised of classes, objects and instances. Various queries are posed on ontology and performance was evaluated as such which query gives the better performance. The type of queries used here are SPARQL Ontograf and SWRL.

1. User is asked to find the term “Fever” from Disease ontology

```
SPARQL query:
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX ab: <http://semanticweb.org/chandana/ontologies/2018/2/untitled-ontology-54#>
PREFIX ns: <http://semanticweb.org/chandana/ontologies/2018/2/untitled-ontology-54/swineflu#>
SELECT ?subject
WHERE {
?subject ?predicate ?object FILTER
regex(str(?subject),"Fever","i")
} order by ?subject
```

Fig. 3: Query 1

2. User is given the SwineFlu details and is asked to find the drug which is used to cure “Cough”.

```
SPARQL query:
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX ab: <http://semanticweb.org/chandana/ontologies/2018/2/untitled-ontology-54#>
PREFIX ns: <http://semanticweb.org/chandana/ontologies/2018/2/untitled-ontology-54/swineflu#>
SELECT DISTINCT ?object
WHERE {
?subject ?predicate ?object
FILTER regex(str(?predicate),"curedBy","i")
FILTER regex(str(?subject),"Cough","i")
} order by ?subject
```

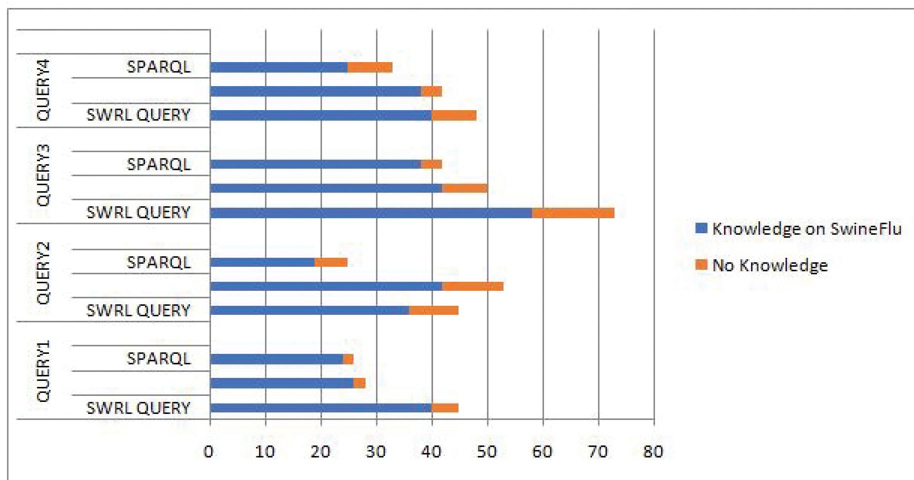
Fig. 4: Query 2

3. Query for the user about the year of attack of disease like “In which year particular patient affected with swineflu disease”.

```
SPARQL query:
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX ab: <http://semanticweb.org/chandana/ontologies/2018/2/untitled-ontology-54#>
PREFIX ns: <http://semanticweb.org/chandana/ontologies/2018/2/untitled-ontology-54/swineflu#>
SELECT DISTINCT*
WHERE {
 ?subject ab:PatientID=50.
 ?subject ?predicate ns:hasSymptom swineflu
}
```

Fig. 5: Query 4

Different users tried to find out the information regarding swineflu disease on the basis of results retrieved by SPARQL, Ontograf, SWRL. There after NASA TLX(Task Load Index) As been used for query analysis and time need to perform execution. A comparative study on the results obtained by using different queries is done from this study. The SPARQL query has given higher efficiency and performance in retrieving the results when compared to other tools like ontograf, SWAL Query. This comparison states that SPARQL is far better suited than other tools in giving optimal results.



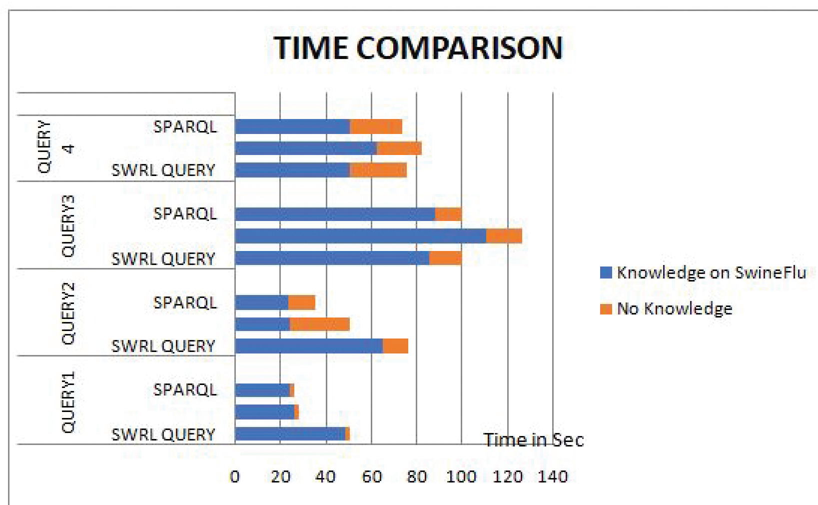


Fig. 6: SPARQL, Ontograf, SWRL Query TLX and Time Comparison

CONCLUSION

This paper gives knowledge on the creation of domain ontology for SwineFlu Disease and the queries are done using SPARQL. This gives performance analysis on ontological evaluation based on ontological tools. The analysis results state that SPARQL method is efficient method and it outperforms the other querying methods. Semantic web being intelligent web is used for developing ontology for swineflu that is useful for medical information systems that provides a linked data for the benefit of health care systems. This can be extended with machine learning to train the patterns so that ontology for other respiratory diseases can be developed in future.

Ethical Clearance: This research was approved by the Research and Ethics Committee of the ESI Hospital, Pulmonology center, Chest Diseases, ESI, Hyderabad,India.

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Conflict of Interest: None declared

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