Retrospective Autopsy based analysis of nature and prevalence of Fatal Injuries in Lahore.

Short Communication

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ABSTRACT

Backcground: Autopsy is a medical examination conducted after death to ascertain the cause of death. For Clinical autopsies, the permission of the next of kin is required. In suspicious deaths, an autopsy is a legal requirement and is performed by the coroner or medico-legal surgeon.

Methodology: Retrospective analysis of records of forensic medicine from January 1st, 2016 to December 31st, 2016, was done to observe fatal injuries causing death, their nature, and prevalence. The deaths, in which cause of death was Fatal Injury were included in our study. These cases were analyzed with respect to age, gender, cause and manner of death, number and location of injuries and the approximate time lag between injury and death. All data were entered into SPSS.

Results: A total of 785 autopsies were conducted at the Department of Forensic Medicine and Toxicology, King Edward Medical University, Lahore in 2016, 42.8% fulfilled our inclusion criteria and were included in the study. Cases of firearm injuries were maximum constituting 46.4%, followed by RTA (13.7%) and blunt trauma (11.9%). Most victims were in the age bracket of 21-40 (55.1%) with a male to female ratio of 4.09:1. Head was the predominant site involved.

Conclusion: Fatal injury deaths are mostly due to firearm injuries. Victims are more commonly males and majority cases die immediately after sustaining the injury. Manner of death is predominantly homicidal. Efforts should be made to prevent and properly manage fatal injuries.

Key words: *Fatal Injuries, Firearm, RTA, Homicide, Immediate death, Medicolegal Autopsy, Clinical Autopsy.*

INTRODUCTION

Death is the ultimate fate of human experience and is followed by respectable lawful burial of the deceased. In many cultures, an autopsy is performed in all cases to ascertain and establish the final cause of death. But in most of the countries, clinical autopsies require the permission of next of kin.[1] Autopsy, necropsy, and a post-mortem examination are synonymous and are used to elaborate the medical examination conducted after death to ascertain the cause of death. Autopsy starts by establishing the identity of the deceased. Owing to religious and cultural beliefs, different cultures have treated the deceased per their norms. From mummification to ornamental display, history is full of instances, but all cultures have one thing in common, their deceased have been treated with respect.[2] In cases where there is suspicion of foul play, homicide, suicide, drowning and any other death where mode of death is suspicious, autopsy becomes a legal requirement, and under Pakistani law, sections 174 & 176 of the Criminal Procedure Code of Pakistan make it a legal obligation of the law enforcement agencies to investigate all cases of unnatural deaths, conduct autopsies and exhume bodies to hold judicial inquests for establishing final cause of death and to provide justice. The cause of death in suspicious cases can only be given by a medico-legal surgeon who is a registered medical practitioner and is authorized by the law to perform autopsies.[3]

Ptolemy I Soter of Egypt (362-282 BC) legalized post mortem examinations and since then, it has become standard to perform an autopsy in every suspicious death case.[4]

Inflicting harm to the body by an outside force is defined

as injury. It can cause a breach of anatomical continuity of the body which may result in disability or fatality. The incidence of deaths due to injury is increasing gradually with time. Between 1990 to 2013, deaths due to injuries increased by 10.7%, from 4.3 million to 4.8 million globally.[5] According to estimates, road traffic accidents (RTAs), homicides and suicides; already three leading causes of unnatural deaths will jump-up the ladder, and would be enlisted in the top 20 causes of death with road traffic accidents holding 5th, suicide, and homicide being at 12th and 18th position respectively.[6]

Some of the highest death rates in the Eastern Mediterranean Region which also Includes Pakistan are due to injuries like RTAs and inter-personnel fights; ranging around 146,000 deaths and 2.8 million injuries from RTAs.[7]

Since the data regarding the frequency or incidence of injuries in Pakistan is limited; the major source of information on injuries is hospital records. In view of the above, the present retrospective study is designed to observe fatal injuries causing death, their nature, and prevalence on scrutiny of autopsy records.

METHODOLOGY

Study Design & Setting

It was a Retrospective analysis of autopsy records of autopsies conducted between 01.01.2016 to 31.12.2016 at the Department of Forensic Medicine and Toxicology, King Edward Medical University Lahore. The study was started after obtaining ethical approval from the institutional review board of King Edward Medical University vide letter number 184/RC/KEMU dated 06/10/2019.

Inclusion & Exclusion Criteria

Only those cases were included in this study in which the cause of death was “fatal injury”. All other causes of death were excluded from the study. The injury was defined as per section 44 of the Pakistan Penal Code.

Study Subjects

This retrospective analysis encompassed the records of 785 autopsies which were performed in 2016. The samples were selected by non-probability purposive sampling. All the cases where death was attributed to fatal injuries were included in the study. All the other cases, where the cause of death was other than fatal injuries, were excluded.

Data Collection Procedures

The archives of the Forensic Medicine Department of King Edward Medical University were accessed and various parameters were noted from autopsy reports, Police inquest reports and death certificates of the subjects. These parameters included age, gender, cause of death, manner of death, number and location of injuries and probable time between injury and death. All the collected data was the Statistical Package for Social Sciences (SPSS Version 20) was used to analyze the said data.

Data Analysis Procedures

The data was analyzed to see the frequency of cause and mode of death and was further classified age wise & gender-wise among the study population.

RESULTS

During the year 2016, total deaths from the fatal injuries were 336, accounting for 42.8% of the total autopsies conducted. In our study, the Incidence of firearm victims was the highest being 46.4% of the total fatal injury cases followed by RTA with 13.7% just ahead of blunt trauma (11.9%) lying on 2nd and 3rd places respectively. Stab wound took fourth place with 9.8%. The percentage of injuries that were attributed to mechanical asphyxia cases (smothering, gagging, strangulation, throttling, and hanging) altogether was 7.2%. No cause was attributed as unknown or unspecified[Figure 1].

Males were far ahead of females with 80.4% of all the injuries with an overall male to female ratio of 4.09:1. Most of the injuries were suffered by people in the age group 21-40 years, sustaining more than half of these injuries (55.1%). The third decade showed the maximum incidence (30.4%) with a maximum of 102 cases while the age group 1-10 years suffered the least. Twenty-six percent of the deaths occurred in the hospital, while the rest occurred at the site of the incidents, on the way to the hospital or were not mentioned[Table 1].

The most common age group in our study was 21-30 years (n=102, 30.35%) followed by 31-40 years (n=83, 24.70%) and 41-50 years (n=52, 15.47%).The leading reason of fatal injuries among the males was firearm (n=141, 52.2%), followed by RTA (n=38, 14%), while in females the leading cause of fatal injury was firearm (n=15, 22.7%), followed by blunt trauma and strangulation and throttling (each accounted for n=9, 13.6% of the total victims). Firearm, blunt trauma, burns and RTAs were seen in all the age groups. No fatalities due to smothering/gagging and electrocution were recorded in males and females of any age group, respectively. Victims of mechanical asphyxia had a female predominance with female to male ratio of 2.42:1 despite the overall male prevalence in our study[Table 2].

Homicides accounted for 255 (75.9%), 57 deaths were accidental (17%) and only 24 deaths were suicidal (7.1%) in nature[Table 3]. No autopsy was labeled undetermined during the period of study. Top body parts affected by single-site fatal injuries with their comparison in males and females are shown in figure 2.

CHARACTERISTICS		Count(N)	Percentage%
Gender	Male	270	80.4%
	Female	66	19.6%
	Total	336	100.0%
Age	1-10	9	2.7%
	11-20	43	12.8%
	21-30	102	30.4%
	31-40	83	24.7%
	41-50	52	15.5%
	51-60	32	9.5%
	60 above	15	4.5%
	Total	336	100.0%
Place of death	Pre-hospital	248	73.8%
	Hospital	88	26.2%
	Total	336	100.0%

Table 1: Demographic Characteristics of Fatal Injuries.

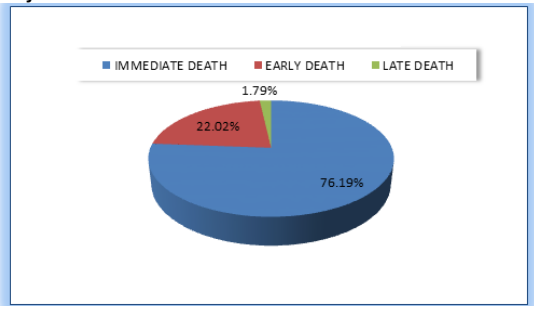

Figure 3: Tri-modal mortality model for time of death estimation.

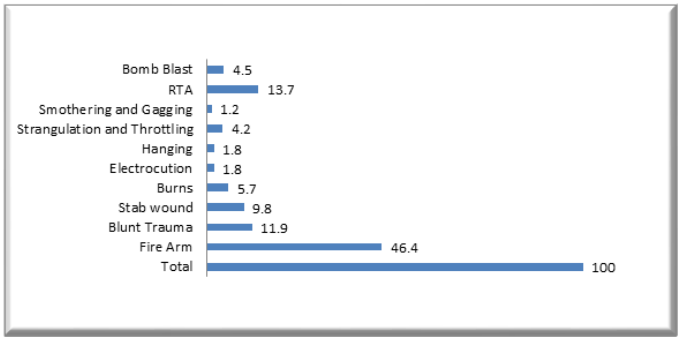

Figure 1: Mechanisms of Fatal Injury.

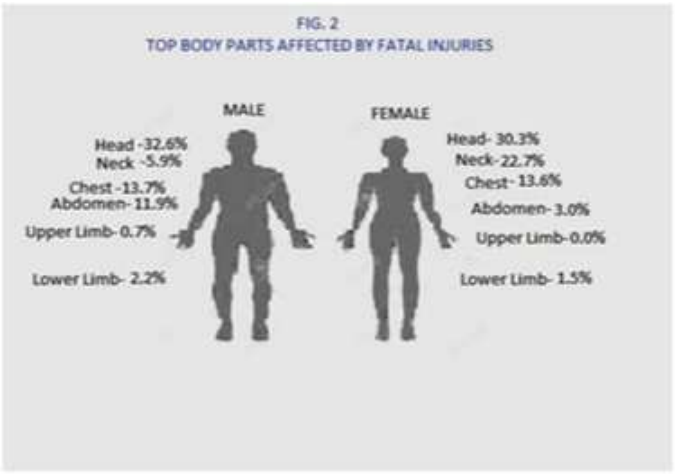

Figure 2: Top body parts affected in fatal injuries.

TYPE OF INJURIES	Age															
	1-10		11-20		21-30		31-40		41-50		51-60		60 above		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M (%)	F (%)
Fire Arm	2	1	12	3	41	7	42	2	26	1	12	1	6	0	141(52.2)	15(22.7)
Blunt Trauma	0	2	1	1	11	2	10	0	5	2	2	1	2	1	31(11.4)	9(13.6)
Stab Wound	0	1	8	0	9	4	4	1	3	0	3	0	0	0	27(10.0)	6(9.0)
Burns	1	0	2	1	0	4	4	0	1	1	2	0	1	2	11(4.0)	8(12.1)
Electrocution	0	0	1	0	3	0	2	0	0	0	0	0	0	0	6(2.2)	0(0.0)
Hanging	0	0	1	2	0	2	0	0	0	0	1	0	0	0	2(0.7)	4(6.0)
Strangulation and Throttling	0	0	0	0	2	4	1	4	0	1	2	0	0	0	5(1.8)	9(13.6)
Smothering and Gagging	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0(0.0)	4(6.0)
RTA	0	2	7	0	9	1	9	0	7	2	5	1	1	2	38(14.0)	8(12.1)
Bomb Blast	0	0	3	1	1	0	4	0	1	0	0	2	0	0	9(3.3)	3(4.5)
Total	3	6	35	8	76	26	76	7	43	9	27	5	10	5	270(100)	66(100)

Table 2: Type of Injury, Age & Gender wise distribution of victims of fatal injuries.

In both male and female cases, head injuries accounted for major fatalities, 32.6%, and 30.3% respectively. A significant portion of victims including 89 males (32.9%) and 19 females (28.9%) with a total of 108 cases (32.14%) sustained multiple site injuries at the time of death. The whole body was affected in 21% of female subjects whereas only 7% of male subjects suffered total body injuries at the time of death. By utilizing the tri-modal mortality model, the timing of deaths in this study was distributed as immediate death, early

death and late death[Figure 3]. The majority of the cases (n=256, 76.19%) died within minutes of injury (immediate death), at the scene or within one hour while 74 (22.02%) people were expired within 24 hours of trauma (early death). Only 6 (1.78%) deaths were "late deaths", occurring days to weeks after injury.

DISCUSSION

In the present study, deaths due to fatal injuries constituted 42.8% of the total autopsies conducted during the year 2016. This is highly in-contrast to 7.1% and 8% incidence found by other researchers.[8,9] That indicates the high rate of medicolegal autopsies of unnatural deaths in this part of the world, highlighting law and order fiasco, uncontrolled and undisciplined traffic and overall mental stress prevailing in the society.

Out of the 336 cases in the present study, 46.4% (n=156) were caused by firearm injuries that are significantly high to 2.09% incidence quoted by Sachan R et al. and low in comparison to 85% found by Chotani et al.[10,11] This is a pointer towards the poor control of the state over possession of firearm weapons, an alarming problem that needs to be addressed vigorously by the authorities to decrease the incidence of fatal injuries caused by firearm leading to death.

The occurrence of deaths as a result of fatal injuries due to RTAs was comparable to the incidence found by Alonge et al. in Bangladesh in 2011 and Gopalakrishnan et al.[8,12] This finding is evidence of overall poor traffic discipline in the whole of that area including India and Bangladesh and the incidence of fatal injuries due to RTA leading to death can be significantly decreased by educating the masses about traffic and implementation of traffic rules.

In the present study, Deaths from injuries caused by stab wounds were found to be 9.8% that is in contrast to 3% found by Chotani et al. in Karachi, Pakistan and to 0.3% found by Swann et al. in Glasgow, Scotland.[11,13] This finding indicates that the use of sharp edge or pointing weapons to produce fatal injuries to cause death is more in Lahore as compared to Karachi.

Mechanical asphyxia cases contributing 7.2% of the total injury fatalities in the present study that correlate well with that found by Aamer R et al. in Lahore, Pakistan whereas Blunt trauma victims, in the present study, with a percentage of 11.9% were comparable to that found by Clark C et al. in 2013 and 2014.[14,15] Bomb Blast cases constituting 4.5% are in accordance with Chotani's study.[11]

In the present study, incidence of fatal injuries was found to be more in males (80.4%) as compared to females (19.6%), similar to that found in other studies

Manner of death	Count (N)	Percentage (N %)
Homicidal	255	75.9%
Suicidal	24	7.1%
Accidental	57	17.0%
Total	336	100.0%

Table 3: Manner of Death in Fatal Injuries.

while the occurrences of burn injuries and mechanical asphyxia were more common in females, similar to that found by He S et al., Latif M et al. and Aamer R et al. respectively.[8,11-13-14,16-18] This finding points towards the relevance that death due to burns and asphyxia caused by hanging is more common in females in this part of the world.

The peak incidence of fatal injuries was in the third decade of life which is comparable to the studies of other authors.[11,13,18] Incidence of homicide was more than accidental and suicidal deaths which are in contrast to other studies.[8,14,18] The third decade is more vulnerable to deaths due to fatal injuries, prima facie, indicating aggressive and extrovert trends of young in this part of the world, so need to be addressed by counseling through a massive campaign by media to reduce the frustration prevailing in the young.

The topmost body part affected by fatal injuries in this study is the head region, followed by the chest and abdomen, this finding of the present study is similar to that narrated by Clark et al.[15] That highlights the use of helmets and other safety measures like seat belts.

As far as the timing of death is concerned, the frequencies of early, immediate and late deaths found in the present study are in accordance with that found by Sobrino J et al. but are in contrast to the study by Sachan R et al.[10,19] These differences may be attributed to the anatomical region of the body suffered injuries, sample size, socioeconomic and culture of the area.

CONCLUSION

Injury fatalities are much more common in our country than in other regions of the world. Deaths by firearm injuries account for the largest form of fatal injury mortalities. Deaths due to fatal injuries are greater in males than in females while the occurrence of burn injuries and mechanical asphyxia is found to be more in females as compared to males. Homicide is the manner of death in most cases. Most of the victims died immediately within an hour. These conclusions should help the organizations working for socio-economic development, justice and security to reduce the incidence of fatal injuries and to accurately measure the burden of

fatal injuries in Pakistan, the issue must be analyzed at a national level. Practical actions that should be taken include raising awareness in the community to prevent injuries, training at all health care levels for better management of fatal injuries and building injury research groups at research institutes.

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CONFLICT OF INTEREST

The Authors declared no conflicts of interest.

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