

STATISTICAL ANALYSIS OF AUTOPSY CASES OF HOMICIDES BY FIREARM PRESENTED IN FORENSIC MEDICINE DEPARTMENT, KEMU, LAHORE FROM JANUARY 2018 TO DECEMBER 2018 | A RETROSPECTIVE STUDY

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ABSTRACT

Objective: The ultimate goal of this research is to aggregate measurable and testable organized data on the topic of “Homicides By Firearm” to understand the major cause(s) of death and hence the true forensic nature of homicides by firearms in order to assist in general public and police understanding and in fact-based policy solutions for betterment in these scenarios.

Methodology and Data Collection: This is a Retrospective Descriptive Observational Cross-sectional study for year 2018 conducted at Record Room, Forensic Medicine and Toxicology Department of KING EDWARD MEDICAL UNIVERSITY, Lahore. Our Sample Pool consists of 88 registered cases (as per referenced PMR’s) under “Homicides By Firearm”. Sampling technique was non-probability purposive. All the PMR Firearm cases from 1-1-2018 to 31-12-2018 were included.

Results: 84% of the cases of homicides by firearm involve males. With 21-30 years being the major age group (31.8%) and with >10 years being the least affected group. Firearm attacks mostly occurred during 4-8 pm (25%). 43.18% of the victims die within a few minutes of attack whereas 36.36% die immediately. The major sites of injury are head & skull (20.71%), thorax (22.48%) and abdomen (18.9%) with brain, heart and lungs being the major organs affected in percentage of 22.3%, 8.6% and 16.7% respectively. Hemorrhage and shock was the cause of death in 57.8% cases. Mostly single shots (45.45%) were hit and exit wounds are present in 64% of the cases.

Conclusion: More than two third of the cases involve males. Young adults are more susceptible. Attacks mostly occur in the afternoon and evening. Head and trunk are the sites of injury in two third of the cases affecting brain, heart and lungs mostly. More than half the people die by hemorrhage and shock. Three fourth of the victims die immediately or within a few minutes of the injuries.

Keywords: Firearm, homicide, PMR, Analysis, site, Death, Wound, Organ, Firearm injury

INTRODUCTION

Killing of a human being by another human being is called Homicide.^[1]

A firearm is a device to propel a projectile (shot/bullet/missile) by the expansive force of gases generated as a result of combustion of the propellant (powder) in a closed space.^[2] A Firearm related injury is a penetrating injury or a gun shot wound from a weapon that uses a powder charge to fire a projectile.^[3]

Worldwide it was estimated that 251,000 people died from firearm injuries in 2016. Aggregate firearm injury deaths in 2016 were highest among persons aged 20-24 years (for men, an estimated 34700 deaths and for women, an estimated 3580 deaths).^[4] 58 percent of

American adults or someone they care for have experienced gun violence in their lifetime^[5]. The homicide by firearm in Pakistan in 2009 was about 12,492. In 2012, it mounted to 13,846. As in 2013, it was 13,937. Pakistan ranks no 6th with increasing rates of homicide^[6]. One-third of gun deaths are homicides^[7]. Access to a gun increases the risk of death by homicide by two times^[8]. According to a study in turkey where a total of 174 cases of homicides by firearm were identified, 86.8% were males while 13.2% were females^[9]. Nearly 1,700 children and teens die by gun homicide every year in USA^[10].

Thus it has become a major social, medical and criminal dilemma.

During 2015–2016, homicide was the 16th leading cause of death among persons of all ages in the United States and the third leading cause among youths aged 10–19 years; a firearm injury was the underlying cause of death in 74% of all homicides and in 87% of youth homicides ⁽¹⁴⁾.

Such a dilemma needs our attention and robust analysis on it and this paper serves the purpose.

OBJECTIVE

The ultimate goal of this research is to aggregate measurable and testable organized data on the topic of “Homicides By Firearm” to understand the major cause(s) of death and hence the true forensic nature of homicides by firearms in order to assist in general public and police understanding and in fact-based policy solutions for betterment in these scenarios.

For this purpose, our objectives were:

1. To determine the relative frequencies of different age groups involved.
2. To observe the gender distribution in such cases.
3. To find the time of death
4. To determine the number of firearm injuries
5. To know the major causes of deaths
6. To determine the time lapse between injury and death

METHODOLOGY AND DATA COLLECTION

This is a Retrospective Descriptive Observational Cross-sectional study for year 2018 conducted at Record Room, Forensic Medicine and Toxicology Department of KING EDWARD MEDICAL UNIVERSITY, Lahore. Our Sample Pool consists of 88 registered cases (as per referenced PMR’s) under “Homicides By Firearm”. Sampling technique was non-probability purposive. All the PMR Firearm cases from 1-1-2018 to 31-12-2018 were included and all other PMR cases were excluded in this study that had no relation to firearm cases. For the statistical analysis, following attributes were considered:

1. Age Group
2. Time of Incidence/Death
3. No. of injuries
4. Entry and exit wounds
5. Fatal Period
6. Hospital aid provided or not
7. Organs Affected
8. Cause of death

According to the above mentioned parameters, sample pool was analysed. Related tables and charts are drawn to visually represent the tabulated data.

RESULTS

A total of 88 cases of homicide by firearms were studied at Department of Forensic Medicine and Toxicology, KEMU, Lahore.

The gender distribution among such cases is shown in figure 1.

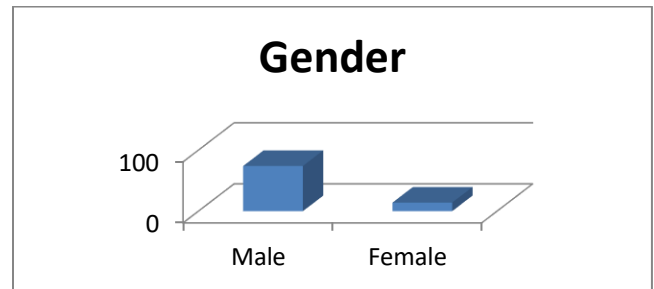


figure 1.

In a total of 88 cases, the males were predominantly affected with male victims in 84.09% of the total cases. Whereas, females affected were 14 (15.9% of the total cases).

Gender	Cases	%
Male	74	84.1
Female	14	15.9

Table A.

The age group epidemiology in such scenarios is depicted in figure 2. The age groups were divided in 7 groups as shown in the figure 2

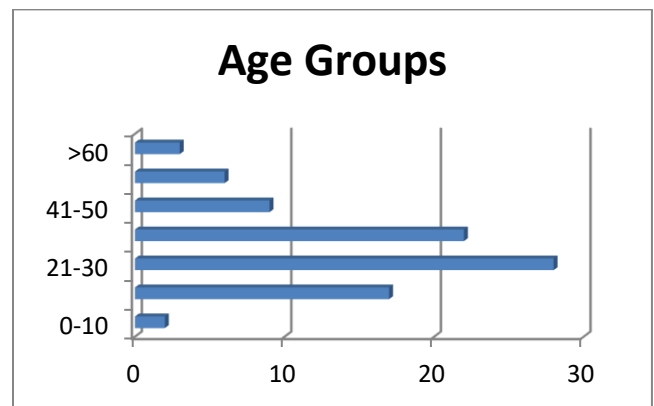


Figure 2.

As it is quite obvious, the Age Group 21-30 years was more prone to homicides by firearms with a total of 28 cases comprising 31.81%. Similarly, 25% of the victims were in their 4th decade of life. About 10.23% of the victims were of the age group 41-50. Age group

with victims of 0-10 years, 11-20 years and older than 60 years were less susceptible.

Homicides by firearm were studied regarding the time of the day in which the incidence of attack occurred. For this the 24h day was divided into 6 zones of 4hrs each (as shown in fig.3)

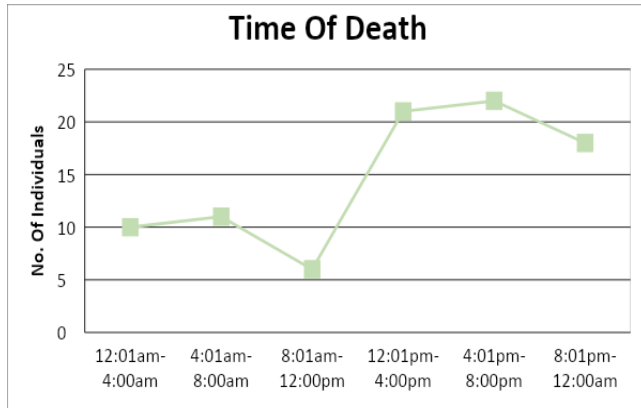


Figure 3: Between 12:01pm and 4:00pm a total of 21 cases of firearm attack were reported. In between 4:01pm-8:00pm, 22 cases of firearm occurred. From 8:01pm-12:00am, a total of 18/88 (20.45%) firearm incidences were reported. So, 12:00pm to 12:00am was the time of the day in which maximum cases occurred.

The number of firearm injuries is also a parameter of our study as shown in chart 4.

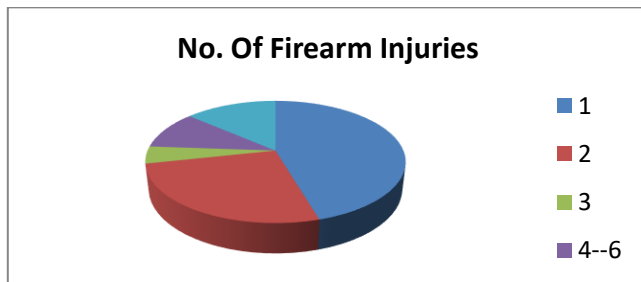


Chart 4.

Single firearm shots causing deaths were 45.45% of the total cases. In 26.13% of the cases, number of firearm injuries to the victim were 2. In 4.54% of the cases, victims had 3 firearm injuries. Whereas, 10.23% of the victims had 4-6 firearm injuries. Greater than 6 firearm injuries were sustained in 13.64% of the total cases.

The other parameter of study was time lapse between injury and death as shown in Figure-5

Victims with immediate death after the firearm injury were 36.36% of the total of 88 cases. 43.18% of the total victims died within a few minutes of firearm attack. In 10.23% of the cases, victims were able to

reach the hospital but could not cope up with their injuries and died in the hospital. Similarly, 10.23% of the victims died Post Operation.

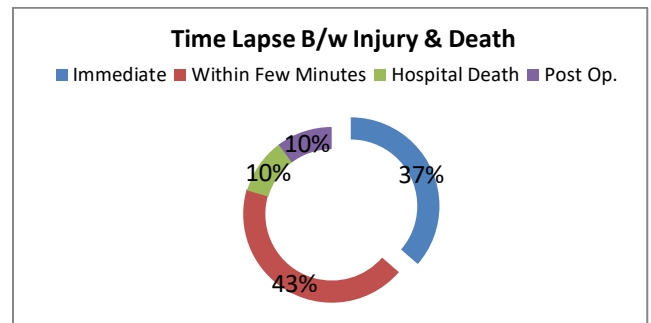


Figure 5.

Site of injury is a major parameter of study to know the exact forensic nature of homicides by firearm and related data is tabulated in the table.

Site Of Injury	%
Head & Skull	20.71
Face	8.87
Neck	5.91
Thorax	22.48
Abdomen	18.94
Upper Limb	10.65
Lower Limb	12.44

Table B.

Site of injury in majority cases was thorax (22.48%), followed by injury to head and skull (20.71%). Neck was the site of injury in rare cases (5.91%)

Autopsy cases were studied considering the absence or presence of exit wound. In 56 of the total 88 studied cases which is 63.63% of total, exit wound was "present". In 32 out of 88 cases which is 36.63% of total, the exit wound was "absent".

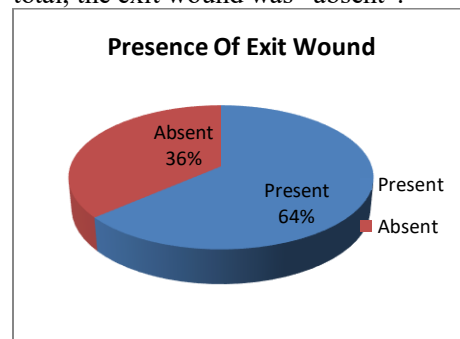


Figure.6

Cause of death as mentioned in the autopsy findings was also studied and analyzed. Some cases had a single cause of death while some had more than one cause of death. Data is analyzed regarding 4 causes of death.

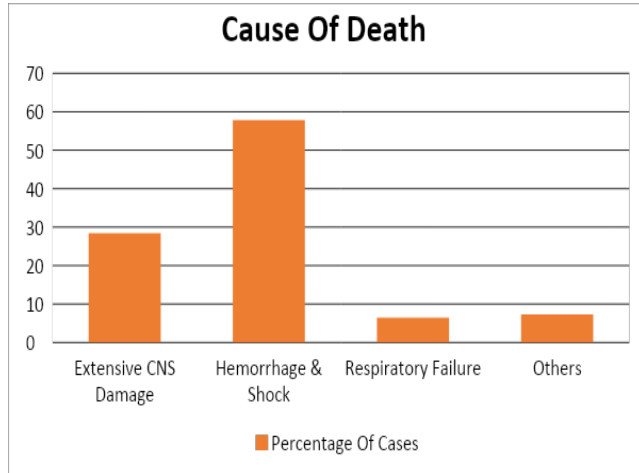


Figure 7.

Hemorrhage & Shock (57.8%) was the leading cause of deaths in the above mentioned cases. While, respiratory failure was least catered in such cases as the cause of death.

The major organs and vessels affected are portrayed in the table.

Major Organs/Vessels Affected	%
Brain	22.3
Heart	8.6
Lungs	16.7
Liver	8
Spleen	3.7
Kidney	3.1
Stomach	4.9
Pancreas	1.2
Intestines	6.2
Vessels Of Neck	6.8
Vessels Of Thorax	4.3
Vessels of Abdomen	6.2
Vessels Of Upper Limb	2.4
Vessels Of Lower Limb	4.9

Table C.

Brain was more prone to damage in most cases (22.3%), followed by lungs (16.7%).

DISCUSSION

Tendency of Homicides by firearm is prevalent in Pakistan. However, there is scarcity of available literature on this issue. Hence, the goal of this study is to provide with more data and for the better understanding of the true forensic nature in these scenarios. Our study constituted 88 cases of homicides by firearms. It comprised of autopsy cases of year 2018 at Department of Forensic Medicine and Toxicology, KEMU, Lahore.

Our study came up with findings that in overwhelming majority 84.1% of the victims in such cases were males. Only 15.9% were female. Thus, it is evident that males are more susceptible to homicides by firearms. This finding is comparable to another study in Turkey where a total of 174 patients were identified. Where 86.8% were males and 13.2% were females.^[9]

According to our findings, the most susceptible age groups to homicides by firearm were 21-30 (31.81%) and 31-40 (25%). Whereas, the age group 11-20 was the third most prone group with 19.31% of the victims. This is comparable with a previous study at KEMU in which age parameter was such that the age ranged from 0 to above 60 years. The maximum numbers 42/110 (38%) were found between 21 to 30 years.^[11]

The time of incidence portrays that homicides by firearms are most prevalent during noon till midnight (69.31%). And the peak of incidences is between 4:01pm – 8:00pm (25%). This may also be related to the behavior of the murderer, the law enforcement and better policies to prevent such cases.

The number of firearm injuries may depict the psychological behavior of the murderer and his intent to kill. Most homicides resulted from a single firearm shot (i.e. 45.45%). There were 2 firearm injuries in 26.13% of the victims. 13.64% had greater than 6 shots fired upon them.

The time lapse between injury and death suggest the time available to the victim to receive any emergency measures. 36.36% of the victims had no time for such measures and died immediately after injury. Such victims mostly had head shots. About 43.18% victims had a few minutes between their injury and death and emergency measures taken by the ambulance in such time may have been life-saving. The presence of a doctor in the ambulance also may favor the life of the victim more in such scenarios and 10.23% of the other scenarios where victim dies in hospital because he was either too late, lost too much blood or because of some other infections in the way or in the hospital. About 10.23% of the remaining victims die post operation due to surgical complications,

nosocomial infections or due to an underlying disease exacerbated by his situation of being a firearm victim.

The most common sites of injury were Thorax (43.18%), head and skull (39.77%) and abdomen (36.36%). Shots to such sites are more imminent to cause death. This also shows the behavior of the murderer to aim the most vital sites and portrays his intent to kill. This is quite comparable to another study in which the most commonly targeted parts of the body in order of frequency were head 44.17% (n=417), chest 28.49% (n=269), abdomen 7.83% (n=74), head and chest in 3.49% (n=33) (and head chest and abdomen in 4.66% (n=44) cases. The study concluded that homicidal firearm injuries contributed as one of the foremost cause of death.^[12]

In another study conducted in Bahawalpur, it was concluded that in most of the cases the regions involved were trunk and head.^[13] In 40.0% of cases of homicide by firearm, brain was affected, in 30.68% lungs, in 15.9% cases heart and 14.77% cases liver was the major organ affected. This links the major organs affected in homicide to the most recurrent sites of injury.

Another interesting study is about the presence or absence of exit wound. Presence of exit wound was reported in 63.63% of the cases, which means that mostly high velocity bullets are used. Only 35.36% of bullets stay in body and there is no exit wound. It may be due to the use of low velocity bullet or due to a hard bone coming in the path of a high velocity bullet.

The most significant cause of death is hemorrhage and hypovolemic shock 62.5%. This shows that in most cases of homicide by firearm, the victims life can be saved by using emergency first aid measures catering the issue of extensive blood loss.

LIMITATIONS

Our study is retrospective observational study that does not enquire into the mental health status of the murderer. It also not includes the personal history of the victim with the assailant. The details of the weapon used were also not available in the scrutiny of autopsy cases.

CONCLUSION

In cases of homicides by firearm, mostly male population is affected (84.1%). Most susceptible age group being 21-30. Time of incidence is mostly during the afternoon and evening. Time lapse between injury and death is mostly only within a few minutes 43.18%. Head, thorax and abdomen are the most common sites of injury with brain, lungs, heart and liver being the most common vital organs affected. Mostly single shot 45.45% is used and exit wounds are present in most

63.63% of cases. The results show that the cause of death in homicide by firearm is mostly hemorrhage and hypovolemic shock 62.5%. In accordance with this study, better policies can be made and the issue of extensive blood loss and first aid of a firearm victim may be managed.

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