The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 7, 2025

PATTERN OF FIREARM INJURIES AMONG POPULATION OF RAWALPINDI DISTRICT

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DOI: https://doi.org/10.5281/zenodo.17365140

Keywords
Firearm, Forensic medicine, Injuries, Emergency.

Article History
Received: 01 July 2025
Accepted: 11 July 2025
Published: 15 July 2025

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Abstract

Background: *Pattern or manner of injuries due to firearm weapon includes homicidal, suicidal and accidental. The distribution of injuries is described as the part of different body area injured due to firearm.*

Objective: *To determine frequency of types of firearm injuries.*
To determine frequency of distribution and demography of patients presenting with firearm injuries.

Study Design: *This is cross sectional study*

Settings: *This research was carried in District head quarter hospital in Rawalpindi.*

Duration: *Six months*

Methodology: *All the firearm injury cases regardless of age and gender were included in the study. While cases of other injuries like accident emergency, explosive injuries, stab wound etc. had been excluded from this study. The data entered and analyzed in SPSS, version 23.*

Results: *Total 105 different firearm cases were admitted or brought to the emergency unit during the study duration. Mean age of most (30.1%) of the cases belongs to the age group 30-39 years. Majority (86.57%) of them were male. While the mean age of cases was 34.33±13.5 years. More than half of fire arm injury or gunshot cases were homicidal in origin followed by accidental and suicidal. Homicide and accident cases predominantly belongs to age range of 20-29 years while suicidal origin injury cases were prominently from 15-30 years. Upper and lower extremities (50.35%) are the most common injury location and a single bullet hole was the most common as majority (62.62%) cases had single hole entry wounds. The mortality rate in the study was 13.67%.*

Conclusion: *The high incidence of young age adults between age (20 to 39 years) with male predominance is common in firearm injury cases. Homicidal origin of firearm injuries is very common. Limbs are the most commonly injuries regions of the body.*

INTRODUCTION

Firearm or Projectile injuries are violent, complex and physical traumatic injuries that are generally encountered in the forensic practice.[1] Wound ballistics is another name for the study of these

injuries. similar ejected gunshot penetration may cause harm to the tissues around the permanent cavity, which is prone to radial acceleration, stretch, and compressions, as well as the tissues along the path followed (the permanent cavity)[2] An essential component of forensic ballistics is wound ballistics which is associated with terminal ballistics.[3] Investigating the angle, impact, range of fire, direction of impact, and type of firearm weapon used is made easier by looking at the wound. In turn, this information helps determine the cause, nature, type, mode and manner of firing.[4]

Firearm wound characteristics vary greatly depending on the type of firearm weapon, ammunition used, site of entry and exit, range and direction of firing, and the presence or absence of clothing, among other factors. The pattern of firearm injuries varies by country, region, and locality. [5]

Firearm injuries pose a significant threat to everyone's health and safety, and they are more common in developing and underdeveloped countries. Every year, hundreds of thousands of people die as a result of gunshot injuries.[6]

Firearm injuries can be intentional (assaults, homicides, suicides) or unintentional (e.g., accidental discharges, mishandling of weapon), and they account for a significant proportion of trauma cases admitted to emergency rooms around the world.[7] Around 250,000 people globally lose their lives annually due to firearm related incidents.[8]

The mortality and morbidity of firearm injuries are very high, depending on factors such as type of firearm, caliber of the cartridge or bullet, range or distance from which the weapon is fired, and anatomical location of the injury.[9]

The Forensic experts examining a gunshot wound should document the type, size, nature, shape, site, and anatomical location like in any other injury. Also, they are required to investigate the cause and mode or manner of the injury, the entry and exit wounds characteristics, distance and direction of firearm, and the vitality of the wound.[10]

Gunshot injuries causes death due to hemorrhage, organ damage, bone fractures, internal bleeding and wound infection. This information is very important in the determination of the manner of injury, especially in fatal wounds, to assist in the medico-legal and criminal investigation on whether it is suicidal, self-deliberate or homicidal and accidental. [11]

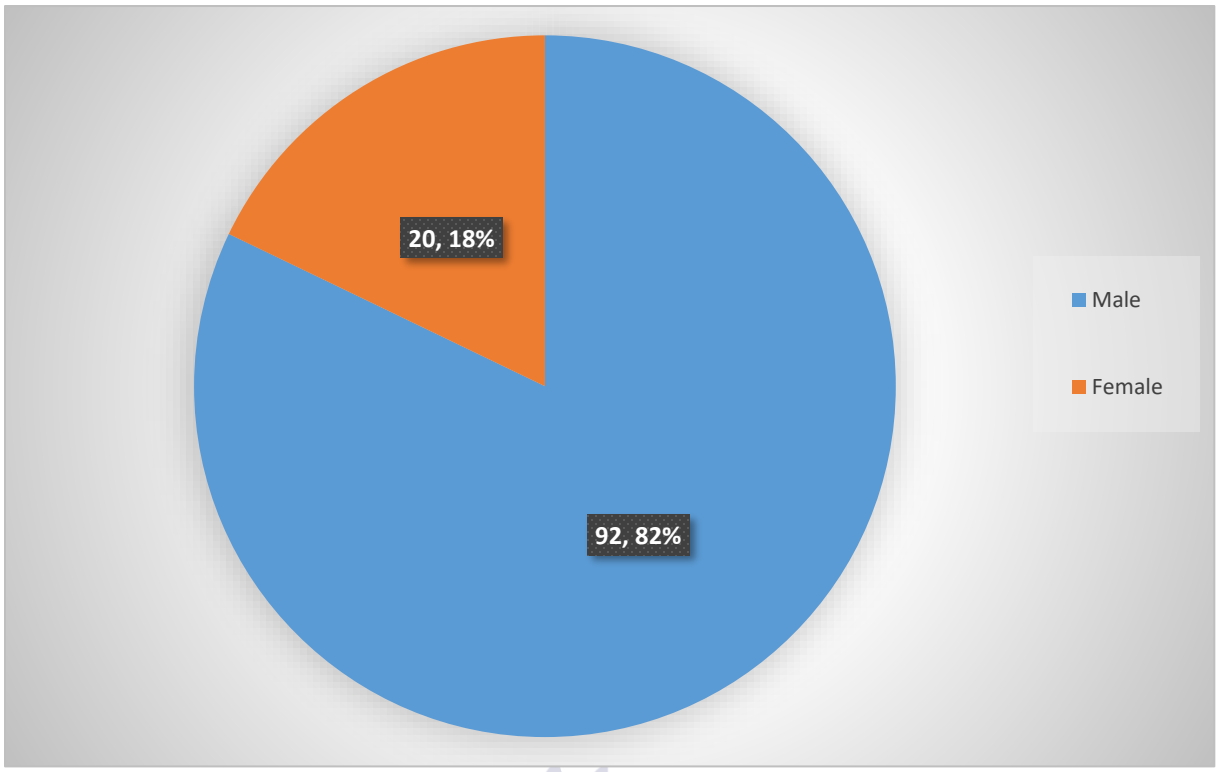
METHODOLOGY

Study Design: This is a cross sectional prospective study which was conducted in the District head quarter Hospital Rawalpindi Pakistan. Total time of the study duration was 6 months from January 2025 to July 2025. Conservative non random sampling technique was used.

All the 112 firearm injury cases regardless of age and gender that had forensic examination report attached in the record were included in the study. While cases of other injuries like accident emergency, explosive injuries, stab wound etc. or any other cases without any forensic evaluation report were excluded from the study. Information was collected from record files of all firearm or gunshot injury cases that were admitted or brought in the emergency unit of LUH during the study duration. The firearm injury cases dead or alive were examined and recorded after thorough examination of victim record file. All demographic information including; gender, age, occupation, residential address etc. were collected. Moreover, date, origin (homicidal, suicide, accidental or undetermined), injury location, number of bullet holes, type of weapon used, clinical status and outcome etc. A structured questionnaire and checklist was used to document the findings of all the cases. The data were entered and assessed in S.P.S.S version 22. The tables and graphs were developed for descriptive findings.

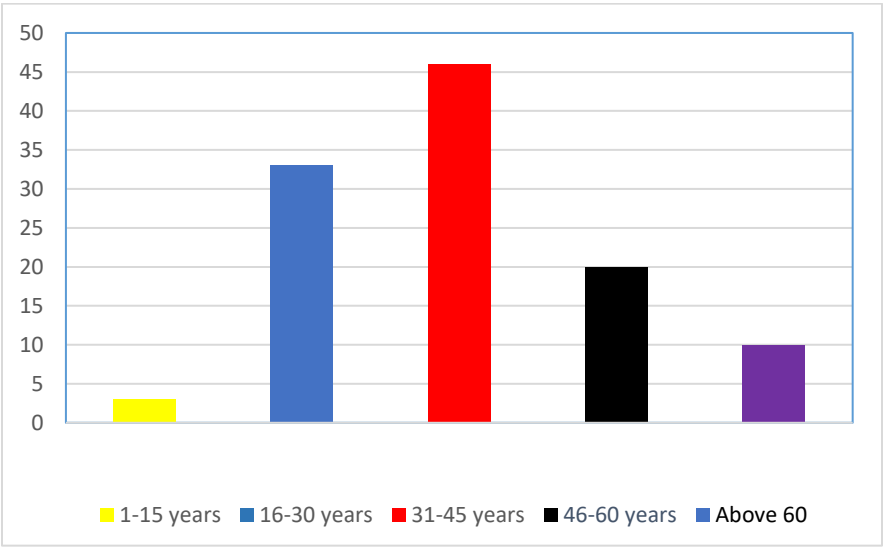
RESULTS

Total 782 different medico legal forensic cases were admitted or brought to the emergency unit during the study duration. Out of these, 112 cases had injuries due to gunshots or firearms that make the prevalence of 14.44% of firearm injury cases. While remaining cases including physical assault, sexual assaults, home violence, stab wounds, road traffic accidents etc. Among these firearm cases, majority 92 (82.3%) were male while 20 (17.7%) were female. (Figure-1)



(Figure: I. Gender Wise distribution of Firearm injury cases).

The mean age of these firearm injury cases was 34.33 ± 13.5 years. The younger most of the case was 08-years-old and oldest was 81 years. Most 46 (40.8%) of the cases belongs to the age group 31-45 years. Then 33 cases (29.9%) belongs to the age group 16-30 years and 20 (18%) of the cases belong to 46-60 years, 10 cases (9%) is above 60 years of age and 3 cases (3.6%) belongs to 1-15 years of age respectively. Figure: -2



(Figure: 2. Age wise distributions of Firearm injury cases).

More than half of fire arm injury or gunshot cases were homicidal in origin followed by accidental, suicidal, while remaining were unspecified. It was determined from the data that homicide cases predominantly belong to age range of 31-45 years. Moreover, higher number of suicidal and accidental cases were from age range of 16-30 years. (Table: 1:).

Table: 1: Distributions of age groups according to pattern of firearm injury (n=112)

	Homicide 63 (56.7)	Accidental 23(21%)	Suicide 19 (17)	Unspecified 7 (6.25)	Total 112
1-15 Years	6 (9.52)	5 (21.74)	1 (5.26)	0 (0)	12 (10.71)
16-30 Years	16 (25)	8 (36.6)	9 (47.37)	4 (57.14)	37 (33.04)
31-45 Years	20 (30.50)	6 (26.9)	5 (26.32)	2 (28.57)	33 (29.46)
46-60 Years	13 (20.5)	3 (13.04)	2 (10.53)	1 (14.29)	19 (16.96)
Above 60	8 (12.70)	1 (4.35)	2 (10.53)	0 (0)	11 (9.82)

Table 2. Location wise distribution of firearm injuries on cases (n=112)

AREA OF INJURY	Number	%
Head & Neck	15	13.43
Chest	5	4.55
Abdomen	9	7.91
Extremities Upper, Lower	56	50.35

Table 2 below is representing the injury location wise distribution of firearm/ gunshot wound injuries observed on the cases. When the cases were

evaluated, the most common location of injury on cases was on extremities both upper and lower with the rate of 50.35% total 56 cases. (Table 2)

In total 112 cases with a specified number of bullet holes, a single bullet hole caused by riffled firearm weapon is 70 (62.62%) was the most common, followed by five and more bullet holes caused by riffle firearm is 18 (16.64%) making total 88 (78.57) cases of riffle firearm weapon. On the other hand, it was evaluated that 24 (21.43%) cases had multiple pellets injuries caused by smooth bore firearm weapon.

DISCUSSION

Firearm or gunshot injuries are acknowledged for their peculiar findings and appearances in the routine medico legal examinations of alive persons as well as during the autopsies.9, 16 These injury results from the discharge of bullets from different

types of firearms. The severity of these type of injuries or wounds depends on the type of firearm weapon, distance, caliber, site or area got injured etc.12 This study were designed to evaluate and analyze the pattern of such type of injury cases reported during 6 months from January to July 2024. In this study, 92 (82.03%) were male while 20 (17.07%) were female. Similar findings have also been reported by Hapeep et al.13 This may be due to the fact that men have easier access to firearms and take part in social life more actively, and that enmity in families, snatching, robbery incidents are more frequent in this region, secondly availability of firearm weapon is accessible easily to anyone. The mean age in the study was determined to be 34.33 ± 13.5 years. Consistent findings were also reported by different studies, Meral et al. reported the similar mean age of their study cases (i.e. 32.13 ± 11.52).14 Moreover, the age range of the cases in the present study was between 08 and 81 years with the most 46 (40.08%) of the cases belongs to the age group 31-45 years followed by age range of 16-30 years 33 (29.09%).

CONCLUSION:

The high incidence of young age adults between ages (16 to 45 years) with male predominance is common in firearm injury cases. Homicidal origin of firearm injuries is very common. Limbs also known extremities are the most commonly injuries regions of the body. While the riffle is the most common firearm weapon used.

ETHICS APPROVAL: The ERC gave ethical review approval

FUNDING: The work was not financially supported by any organization. The entire expense was taken by the authors

ACKNOWLEDGEMENTS: We would like to thank the all contributors and staff and other persons for providing useful information.

AUTHORS' CONTRIBUTIONS: All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.

CONFLICT OF INTEREST: No competing interest declared.

Collectively, more than half (> 62.5%) of all cases were from age range 16-45 years. Similar study from brazil reported 61.5% cases were from age group of 20-39 years.15

The current study showed that the origin of most of the firearm injury was Homicidal 63(56.7%) followed by accidental 23 (21%) and suicidal 19(17%) origin cases. Husain et al also reported that majority (77.7%) of their firearm injury cases had homicidal origin followed by accidental and suicidal origin.16 Most of these homicide and accidental origin firearm injury cases belongs to age group of 31-45 years (30.50% and 26.9%) respectively. While suicide cases were most common in the 16-30 age group (47.37%). Consistent findings were also reported by Flower et al.17 The low suicide rates were due to difficulty of obtaining firearms for suicide attempts. In this present study, extremities (50.35%) are the most commonly injured location on body. These results are consistent with the Hari Ram et al. 18

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