

# Medicolegal Examination and Interpretation of Firearm Injuries

Ahmad Raza Khan, Riasat Ali and Aatiqa Abass

## ABSTRACT

**Objective:** This objective of this study is to gather detailed information regarding firearm injuries and their repercussions on the victims and this is to be monitored by scrutiny of the medicolegal protocol implemented by the initial medicolegal examiner, regarding history taking, injuries documentation and clothes examination with the sole purpose of fabrication assessment.

**Study Design:** Prospective cohort study

**Place and Duration of Study:** This study was conducted at the Medicolegal Clinic of Mayo Hospital Lahore of the year 2024 from 1<sup>st</sup> January 2024 to 31<sup>st</sup> December 2024.

**Methods:** The sample size was based on the number of victims reporting in the emergency department for firearm injury examination for the year 2024. The victims were questioned and examined after obtaining a valid informed consent and assent at every step of examination with absolute anonymity and confidentiality. Inclusion criteria was that all these participants were volunteers, male, female, adults, minors coming to medicolegal office for with history of firearm injury. All the other physical assault cases including injuries by blunt means, sharp edge weapons poisoning and sexual assault cases reporting to medicolegal office of Mayo Hospital Lahore were excluded from this study.

**Results:** Male victims were dominantly more in number as compared to female counterpart and dacoity was highlighted as a main cause followed by fight with either neighbors or family.

**Conclusion:** Firearm injuries are a horrific trauma to begin with followed by consequential sequelae in form of health along with financial issues, causing undesirable consequences at individual and community level both.

**Key Words:** firearm crimes, assailants, terminal ballistics, medicolegal examination

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## INTRODUCTION

Humans have an inbuilt vehemence trait which expresses itself either in ferocity or as a defense strategy. This human nature exhibits itself as either one on one combat or use of any weapon of assault including firearms. Targeting the main objective of the study firearm weapons usage is to be elaborately discussed in this study as to what leads to such heinous crime activity as either part of aggression, self-defense or totally fabricated scenario with sole purpose of incriminating someone for either blackmail intent or money extortion and when they are actual real injuries, what long lasting health, financial and legal complications arise due to this assault.<sup>1</sup>

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Department of Forensic Medicine and Toxicology, King Edward Medical College Lahore.

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Correspondence: Dr. Ahmad Raza Khan, Demonstrator, Forensic Medicine and Toxicology, King Edward Medical College Lahore.

Contact No: 03214102116

Email: arkizback@gmail.com

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This study shall address the interactive association of firearm injuries with their medicolegal outcome ranging from clinical disabilities to death.<sup>2</sup> Homicidal, suicidal and accidental modes shall be examined in detail to differentiate the intent assessing the nature of injury specially to rule out the possibility of a manipulated friendly hand injury or an absolute lack of use of any ballistics weaponry. This medicolegal differentiation of whether it is a genuine firearm injury, manipulated or fabricated is entirely dependent upon the forensic expertise of the initial medicolegal examiner.<sup>3</sup>

Furthermore, the investigative procedures comprising of crime scene circumstantial and corroborative evidence collection by the police is yet another clue for the medicolegal examiner to proceed into the matter with cross examining the history narrated by the victim with the evidentiary proof provided and examining the injured along with clothes scrutiny for any gunshot residue. All this hectic exercise is for eventual declaration of the medicolegal case.<sup>4</sup> All the legal proceedings in the court of law are dependent upon the medicolegal case report provided by initial medical examiner narrating the intricate details of the weapon used, resultant injuries suggesting the distance, direction and extent of damages for punishment of the assailant and monetary compensation to the victim.<sup>5</sup> By highlighting the multifaceted nature of this issue, we hope to stimulate further discussion and inspire

preventive measures to reduce the prevalence of firearm-related violence.

The medicolegal clinic entertains all categories of violent crimes including physical assault, sexual offences, accidental along with poisoning cases. In this paper we shall individualize the firearm cases especially in accordance with establishing the use of friendly hand or fabricated injuries mimicking the terminal ballistics of a firearm inflicted damage. How victims at times depict a specified history of being assaulted by a rifled or a smooth bore weapon but somehow on meticulous examination by a forensic expert can scrutinize the possibility of concoction and forgery.<sup>3</sup>

Medicolegal examiner has to face various firearm resultant injuries inflicted from different weapons like rifled and smooth bore firearm weapons, ranging from individual lacerated wounds of entry and exit to multiple penetrating injuries respectively. The most important factor under consideration for a medicolegal examiner is to decide the possibility of a friendly hand or even fabrication simulating a firearm injury which has its eventual effect on legal proceedings in court of law. Hence objectivity of this research is targeted towards the final decision of declaration of injury as genuine or fake.<sup>6</sup>

## METHODS

It is an Observational study with analytical longitudinal design in prospective cohort design with consecutive sampling technique. The study was conducted in the medicolegal clinic of emergency department of Mayo Hospital Lahore. The sample size was based on the number of victims reporting in the emergency department for firearm injury examination for the year 2024. The victims were questioned and examined after obtaining a valid informed consent and assent at every step of examination with absolute anonymity and confidentiality. Inclusion criteria was that all these participants were volunteers, male, female, adults, minors coming to medicolegal office for with history of firearm injury. All the other physical assault cases including injuries by blunt means, sharp edge weapons poisoning and sexual assault cases reporting to medicolegal office of Mayo Hospital Lahore were excluded from this study.

Retrospective data was collected regarding all the information including biodata, time of incidence, time of reporting the incidence to the medicolegal clinic, clothes examination and dispatch to PFSA for gunshot residue and ultimately declaring final opinion of the case. Collected data was analyzed using IBM SPSS Statistics version 26.0. This retrospective study design cannot establish causation due to potential confounding factors not accounted for in the analysis.

**Ethical Declaration:** Ethical review board proceedings were conducted in Mayo Hospital Lahore under the

Chairmanship of Prof. Muhammad Imran, Secretary Institutional Review Board, Chairman Department of Medicine, King Edward Medical University/Mayo Hospital, Lahore and project was approved vide letter no. 96/RC/KEMU dated 04<sup>th</sup> December 2023.

## RESULTS

Male victims were dominantly more in number as compared to female counterpart and dacoity was highlighted as a main cause followed by fight with either neighbors or family.

**Table No. 1: Showing 86% male versus 14% female victim**

GENDER	FREQUENCY	PERCENT
Male	8	14.3
Female	48	85.7
Total	56	100

**Table No. 2: In 84% of the cases there was a single assailant**

ASSAILANTS	FREQUENCY	PERCENT
One	47	83.9
Two	7	12.5
Three	2	3.6

Table 3. In 64% of the cases the victim was fired upon from a distance of more than 3 feet with only 23% being attacked from within a distance of 1 foot

**Table No.3: Distance frequency percentage in patients**

DISTANCE	FREQUENCY	PERCENT
Within six inches	1	1.8 %
Within one foot	13	23.2 %
Within two feet	3	5.4 %
Within three feet	3	5.4 %
More than three feet	36	64.2 %
Total	56	100 %

**Table No.4: Mostly used weapon was a handgun (pistol/revolver)**

WEAPON	FREQUENCY	PERCENT
Pistol	49	87.5 %
Revolver	3	5.4 %
Rifle	3	5.4 %
Smooth bore	1	1.8 %

**Table No. 5: Victims were fired upon from predominantly from front/ right or left side**

DIRECTION	FREQUENCY	PERCENT
Front	16	28.6 %
Right side	18	32.1 %
Left side	17	30.4 %
Front and right	1	1.8 %
Front and left	1	1.8 %
Back	3	5.4 %

Table No. 6: Lower limb injuries including fracture and muscle damage were 41% followed by 23% resultant damage to upper limbs with abdominal injuries were reportedly 18%

**Table No.6: Injuries, frequency percentage**

INJURIES	FREQUENCY	PERCENT
Muscle deep upper limb	6	10.7 %
Muscle deep lower limb	12	21.4 %
Fracture upper limb	7	12.5 %
Fracture lower limb	11	19.6 %
Head injury	3	5.4 %
Chest cavity deep	7	12.5 %
Abdominal cavity deep	10	17.9 %

## DISCUSSION

In Lahore alone eight teaching institutes along with five rural health centers cater the medicolegal cases.<sup>7</sup> In this study the target population was the firearm injured personnel reporting in Emergency Department of Mayo Hospital, Lahore. Total number of firearm cases reported were 56 in number in the year 2024, with the presented data sheds light on the concerning prevalence and patterns of firearm injuries. The overwhelming majority of victims were male 48 out of 56, highlighting a significant gender disparity in firearm-related violence. This trend may be linked to societal factors, cultural norms, and potential involvement in criminal activities, which substantially portrays the accessibility of the male gender to firearm weapon and a dominant predilection of the males to fall prey to a dispute leading to drastic outcome like firearm involved fights.<sup>8</sup> Preponderance of single-assailant incidents i.e. 84 % of the reported cases suggested a high degree of targeted attacks, possibly driven by personal vendettas, disputes, or criminal intent which were a leading trait of the study showing a lack of arbitrary communication and tolerance among the individuals.<sup>9</sup> These individuals being short-tempered and having an access to a firearm weapon whether legal licensed or any random illegal piece which makes it even more difficult for the police personnel to follow through with the investigation. Mostly the licensed weapons are for either personal protection carried by one's own self or by the recruited bodyguards.<sup>10</sup> Other than this shot guns are usually for the prophylaxis of the sown crops from the wild animals like bores and hyenas. The widespread use of illegal handguns like pistols and revolvers, highlights the accessibility of firearms and their potential for lethal harm, the easy availability of hand guns from black market is cardinal reason for rifled arms brutality.<sup>11</sup> Besides these one on one targeted attacks multifaceted diverse motivational intents were also observed. The varied motivations behind these attacks, including dacoity, neighbor disputes, and domestic violence, underscore the complex nature of firearm-related

violence.<sup>12</sup> This diversity necessitates an ambidextrous approach to prevention and intervention strategies.

Coming on to the next facet of the inquisitory intent was to establish a link between distance and angle of attack: The majority of attacks i.e. 64% occurred from a reasonable distance of more than three feet with a single assailant targeting a single victim, indicated a deliberate intent to inflict harm. However, a significant proportion of 23% involved close-range confrontations, suggested impulsive or reactive violence.<sup>13</sup>

The most notorious aspect of the legality outcome is the injury infliction pattern motivated by the accountability and penalty denouement. The amercement for first degree murder meaning intentional killing of someone is either death penalty or life imprisonment for 25 years however this considerably reduced in case when the intent is only to warn or harm the individual rather than to actually kill him. The sentence is mitigated down to around 15 years being further abridged down to 7-10 years with good behavior. Hence the high incidence 36 out of 56 i.e. 64% of lower and upper limb injuries suggest that many attacks were focused on incapacitating victims rather than causing immediate fatalities. However, the significant number of injuries underscored the potential for severe internal damage and life-threatening consequences i.e. 13% chest, 18% abdominal and 5% attacks directed towards the head were suggestive of deliberate premeditated murders.<sup>14</sup>

Lastly coming on to the objective of the study which is to elucidate the pattern of injuries and their configuration, dimensions correlation with the narrated history to establish a reasonable conclusion that either the injury is either genuine or by a friendly hand and finally it is not a firearm injury to begin with and it has it been a manipulated or maneuvered wound either created by an icepick or a screw driver or any other point sharp edge weapon.<sup>6</sup> But unluckily this segment of the medicolegal examination has been a neglected chunk with no detailed meticulous history and no well-expressed injury description stating the collar of abrasion, inverted and everted margins of entry and exit wound respectively.

This discussion can now be concluded by stressing on the implications and recommendations for public health, law enforcement, and policymakers. The very first step is to improve the quality of the medicolegal work and train the medical officers as to how to follow the protocol of medicolegal examination as it is a specific mindset of a forensic medical expert that can appreciate the intricate details than an untrained personnel.<sup>15</sup> Further rationale of the study is to prevent easy provision and accessibility of the illegal, unlicensed firearm weapons to public specially the minors who possess such ballistics.<sup>16</sup> Strict implementation of the existent law needs to be enforced regarding as to whom the firearm weapon is to be sold under proper licensed authority to prevent easy accessibility and misuse. Besides a legal crack down should be executed against the illegal sale and purchase of the guns and finally those who get incriminated shall

face the punitive reforms for preventing recidivism.<sup>17</sup> Finally provision of prompt medicolegal care and rehabilitative services to the victims shall ensure survivability and productive society.<sup>18</sup>

## CONCLUSION

Educating the masses about violence and ramifications of firearm injuries is the first step towards reduction of this heinous crime. Secondly a strict disciplinary law enforcement for prevention of easy availability of the weapons to public especially the minors is yet another reformatory maneuver, and finally an effective medicolegal proceedings leading to quick, successful, authoritative court proceedings shall impose a productive effect in the society.

### Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Ahmad Raza Khan, Riasat Ali
Drafting or Revising Critically:	Ahmad Raza Khan, Aatiga Abass
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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