

A Manner Wise Distribution of Fire-Arm Cases According to Major Body Part Involved among Fatal and Non-Fatal Fire-Arm Injuries at Sms Hospital Jaipur: A Prospective Study

Shantilal Pargi¹, Lovekumar Bhagora², Rohit Kumar Meena³,
Manoj Sharma⁴, Brijesh Tatwal⁵

¹Associate Professor, Dept. of Forensic Medicine, Ananta Institute of Medical Science & Research center, Rajsamand, Rajasthan. ²Associate Professor, Dept. of Forensic Medicine, Nootan Medical College & Research Centre, Visnagar, Gujarat. ^{3,4&5}Medical Officer, Dept. of Medical & Health, Rajasthan.

How to cite this article: Shantilal Pargi, Lovekumar Bhagora, Rohit Kumar Meena et. al. A Manner Wise Distribution of Fire-Arm Cases According to Major Body Part Involved among Fatal and Non-Fatal Fire-Arm Injuries at Sms Hospital Jaipur: A Prospective Study. *Medico Legal Update* 2023;23(3).

Abstract

Background : Invention of fire was the greatest invention for the human from primitive matchlock system to the present automatic weapons. It has become the most dreaded killing tool used by human being. Proper examination of the victims of firearm injuries needs to ascertain the characteristics of wound and body part involved to correlate with fatalities.

Methods: A total of 115 cases of gunshot injury were included in this study carried out at the Department of Forensic Medicine, SMS Medical College and Hospital, Jaipur over a period of 17 months from mid of May 2014 to beginning of August 2015, after seeking permission and ethical clearance.

Results: During Study period total 115 cases were included in study. We observe finding after dividing human body in five body region for better understanding. The commonest targeted body parts were the peripheries including the upper and lower limbs (33.04%). The next to follow was the chest in 36 cases (31.30%). Abdomen including pelvis was targeted in 18.26% cases and head was the soft target in only 14.78% cases. Least affected body part was neck with only 3 cases.

Conclusion: In 73.04% (84) cases, only a single body region was inflicted upon by use of firearm weapon. In fatal cases (11) of firearm injuries, head (54.55%) was the most commonly targeted body part followed by chest (36.36%) and abdomen (9.09%). This study indicated that the most common victims of firearm injuries were young males of bread earning age. Certain changes may minimize mortality and disability due to firearm injuries, also reducing the costs to the community. So, there is a need to decrease the number of firearms used and sold in India.

Keywords: Firearm Injury, Prospective study, Jaipur

Introduction

Firearm is any instrument or device designed to propel a projectile by means of explosion of gases

generated by combustion of an explosive substance¹. Invention of fire was the greatest invention for the human being but the invention of firearm weapon

Corresponding Author: Lovekumar Bhagora, Associate Professor, Dept. of Forensic Medicine, Nootan Medical College & Research Centre, Sakalchand Patel University, Visnagar, Mehsana.

Email ID: lovebhagora2000@yahoo.com

Mobile: 9586502020

has come as curse to this world, it has become the most dreaded killing tool used by human being. It is improving day by day from primitive matchlock system of fire arm to the present automatic and semiautomatic weapons². Firearm injury is a global problem and causes considerable problems in a developing country like ours, where poverty and violence are common. Gunshot injuries in civilian environment are now a common phenomenon globally with wide regional variation worldwide³. Most firearm injuries are the result of enmity, communal clashes, domestic disputes, or suicides. Firearms have been used, and continue to be used, both for homicidal and suicidal purposes, offering an easy and quick mode of injury or death.

The availability of fire arm known as small arms and light weapons has been described as a cancer spreading across the developing world⁴. It destabilizes political, social, and economic systems, and leads to disability and death.

This study was thus undertaken to assess the medico-legal profile of gun-shot injuries in Jaipur region and also to suggest few recommendations which may prove useful in bringing down the toll of firearm injuries in this region.

Aims and Objectives

1. Study distribution of Fire-Arm Cases according to Major Body Part Involved Among fatal and non fatal Fire-arm Injuries.
2. Correlation of fire arm injuries with manner of injuries according to body region involved.
3. To suggest recommendations for preventing fire arm injuries so precious human life can be saved.

Material and Methods

After seeking due permissions and ethical clearances, this study was initiated at the Department of Forensic Medicine, SMS Medical College, Jaipur in Mid May, 2014. The proposed study period was of one year or until the achievement of the pre-determined sample size of 115 cases. 23,584 medico-legal cases reported at the Department of Forensic Medicine, SMS Hospital, among them 115 firearm injuries cases were included in study after satisfying the inclusion and exclusion criteria. Each

living victim was medico-legally examined after receiving written informed consent for the same. The personal details pertaining to socio-demographic profile were recorded in detail followed by physical examination regarding the wounds sustained, their number, size, shape, site and characteristic features of firearm injuries, extent of injuries, clinical condition of the patient and final outcome. The cases either received dead or who succumb to the firearm injuries sustained in due course of treatment were subjected to post mortem examination at the mortuary of SMS Hospital, Jaipur. The details of firearm wounds were noted as mentioned above along with the examination into cause of death in those cases. All the observations were recorded in the pre proposed Proforma as detailed above. These were then transferred to Microsoft excel data sheet and statistically analyzed using SPSS statistical software into quantitative data in tabulated.

Result

Table 1: Distribution of 115 Victims of Firearm Injuries according to number of body regions affected with gun-shot injuries.

Number of Body Region involved	Number of cases	Percentage
Single	84	73.04
Two	21	18.26
More than two	10	8.70
Grand Total	115	100

A single body region was involved in 73.04% cases and in rest of the 31 cases more than one body region was involved, being two in 18.26% cases and more than 2 in 8.70% cases.

Table 2: Distribution of 115 Victims of Firearm Injuries according to the primarily targeted body part in gun-shot injuries. n = 115

Body Part affected	No. of cases	Percentage
Periphery	38	33.04
Chest	36	31.30
Abdomen	21	18.26
Head & Face	17	14.78
Neck	03	2.61
Total	115	100

The commonest targeted body parts were the peripheries including the upper and lower limbs (33.04%). The next to follow was the chest in 36 cases (31.30%). Abdomen including pelvis was targeted

in 18.26% cases and head was the soft target in only 14.78% cases. Least affected body part was neck with only 3 cases.

Table 3: Distribution of 11 Victims of Firearm Injuries according to the targeted body part in gun-shot injuries and cause of death in fatal cases.

Major Body Part Involved	Cause of Death			Total No. of cases	Percentage
	Coma	Haemorrhagic Shock	Septicaemic Shock		
Head	05	00	01	06	54.55
Chest	00	04	00	04	36.36
Abdomen	00	01	00	01	09.09
Neck	00	00	00	00	00
Periphery	00	00	00	00	00
Total	05	05	01	11	100

The anatomical locations of fatal gunshot injuries were determined in all 11 cases. The head (54.55%) was the most common site of fatal gun-shot injuries followed by chest (36.36%). In 9.09% cases the fatal gunshot was an abdominal region and resulted in

death due to haemorrhagic shock. A single case of head injury died due to septicaemic shock. All cases of fire arm injuries on the chest region also died due to shock and haemorrhagic.

Table 4: Distribution of 115 Victims of Firearm Injuries according to the targeted body part in gun-shot injuries and manner of incidences.

Body Parts	Manner of Incidence				Total No. of cases	Percentage
	No. of Homicidal case	No. of Accidental case	Unknown Cases	No. of Suicidal case		
Periphery	32	06	00	00	38	33.04
Chest	28	07	01	00	36	31.30
Abdomen	17	02	02	00	21	18.26
Head	11	03	01	02	17	14.78
Neck	02	01	00	00	3	2.61
Total	90	19	04	02	115	100

Trunk region was the commonest target in homicidal cases in 50% cases with extremities being the next common site of gun-shot injuries. Head was the vulnerable target in suicidal cases (100%).

Accidental gun-shot injuries was seen in all body parts almost with equal preponderance. The least commonly affected body part was neck in all types of cases.

Table 5: Distribution of 115 Victims of Firearm Injuries according to the targeted body part in gun-shot injuries and range of fire.

Body Parts	Range of fire					Total	Percentage
	Distant	Undetermined	Contact	Close	Near		
Periphery	22	12	02	02	00	38	33.04
Chest	15	19	01	00	01	36	31.30
Abdomen	11	09	00	01	00	21	18.26
Head	11	01	05	00	00	17	14.78
Neck	01	01	00	01	00	03	2.61
Total	60	42	08	04	01	115	100

The distant shots were targeted to all body parts with almost an equal preponderance with maximum numbers in extremities (36.66%). Whereas, the contact wounds were majorly targeted on the head region of body (62.5%) cases.

Table 6: Distribution of 115 Victims of Firearm Injuries according to the vital organ primarily affected in fatal cases.

Vital Organ Primarily affected	Number of cases	Percentage
Brain	06	54.55
Heart & Lung	02	18.18
Intestine	01	9.09
Liver	01	9.09
Undetermined	01	9.09
Total	11	100

Out of 11 fatal cases of gun-shot injuries, brain was the most commonly affected vital organ (54.55%) followed by heart (18.18%), liver & Intestine in one case each. In a single case of gunshot injury of an unidentified individual whose dead body was recovered as partially skeletonized being in the advanced stage of putrefaction, foreign bodies were recovered from both skull and thoracic cage due to which the vital organ primarily affected could not be assessed definitely.

Discussion

In 73.04% cases, only a single body region was inflicted upon by use of firearm weapon. In 18.26% cases there was involvement of two body regions and in 8.7% cases, more than two body regions were affected.

Chest (31.3%) remained the most commonly targeted body region in this study followed by abdominal region (18.26%) and, head & face (14.78%). These results bear slight variation with those of Kumari S et al⁵ (most common site was abdomen- 30.9%, followed by chest- 21% and head- 16%). In 33.04% cases firearm wounds were found on peripheries and neck was the least affected part of the body (2.61%); and those of Sachan R et al⁶, where abdomen followed by head & neck was the commonest site.

In fatal cases (11 cases) of firearm injuries, head (54.55%) was the most commonly targeted body part

followed by chest (36.36%) and abdomen (9.09%); similar to observations of Pradipkumar KH et al³. Head region also remained the target in both cases of suicidal deaths being the most vulnerable site for suicide with firearm weapon. But, these are variable from those of Kumar R et al⁷ and Patowary AJ et al²; where chest followed by neck and head; and, Kumar K et al¹⁰, where chest followed by head were the most commonly offended body parts in fatal cases with 25% fatal entry wounds in abdomino-pelvic region too. In the present study, peripheries and neck were not affected in fatal gun-shot injuries as also reported by Kumar K et al¹⁰, who reported only 7% firearm wounds in lower limbs in fatal cases.

In our study Chest (28 cases) followed by abdomen (17 cases) were the most commonly targeted region in homicidal (cases 90) gun-shot injuries. Trunk region was the commonest target in homicidal cases in 50% cases with extremities being the next common site of gun-shot injuries (32 cases). Head was the vulnerable target in suicidal cases (2 case; 100%). Accidental (cases 19) firearm injuries were quite evenly distributed over all body regions, as accidents can happen anyway without a set pattern. But this findings were slight variable those from Amiri A et al⁸ where 42.6% of entrance wounds were located in the head, 42.6% in the chest, and 16.7% in the back.; Abbas AD et al⁹, where The most common site of injury was the chest (67 cases; 25.0%).

Head was affected most commonly in contact wounds (05 cases) followed by periphery (two case). This is quite explainable as head is considered a soft target and a vulnerable body part for trauma of any sort. Close range fires were found in abdominal & neck regions and peripheral parts of the body. Distant fires were well distributed over all body parts possibly due to non accurate hit of target in distant fire as most assailants were not well trained for use of firearm weapons.

Brain and meninges (54.55%) were the most commonly injured vital organ in fatal cases followed by lung& heart (18.18%); similar to that reported by Kumar R et al⁷. However, this was not so in the observations of Kumar K et al¹⁰, who reported highest involvement of lungs (29%) followed brain, stomach and intestine (16% each). Liver and intestines were the least affected internal organs in this study (9.09%

each); which is again quite low as that reported by, Kumar K et al¹⁰; but the differences are easily attributable to the differences of the pattern of gun-shot injuries sustained by victims in the two studies. No other vital structures were observed to be affected in fatal cases of gun-shot injuries.

Conclusion

The results of the present study support the argument that rigorous pursuit of campaign firearms without a license and country made guns may prove useful in reducing the number of firearm injuries in society. Educational efforts, and individual, community and societal approaches are needed to alleviate firearm related injuries. Government must take the following steps to prevent firearm injuries.

- Proper employment facility for the youth.
- Social stability and creation of proper political environment
- Strong and effective measures to control the unlicensed arms.
- Need to eliminate illegal gun making units in our region in order to decrease the rate of firearm fatalities.
- Private gun ownership should be strictly limited.
- The issue of medical certificates for acquiring license of fire arms should be strictly monitored for psychiatric assessment.
- Proper protective gear for the police and defense personals.
- There should be proper training of maintenance, cleaning & handling of fire arm weapons at the time of sale to minimise accidental gunshot injuries.

Source of Funding: Self

Conflict of Interest: Nil

Acknowledgement: Nil

Ethical Clearance- It is taken from the Ethical committee of SMS Medical College, Jaipur before starting of study.

Reference

1. Reddy KSN. Regional Injuries in: The Essentials of Forensic Medicine and Toxicology. Published by K. Sugna Devi, Hyderabad. 32nd Ed., 2013: 231-275.
2. Patowary A, Study of pattern of injuries in homicidal firearm injury cases. JIAFM 2005; 27(2):92-95.
3. Pradipkumar Kh, Marak FK, Keisham S, Phom M, Momonchand A. Homicidal Fatal Firearm Injuries. JIAFM.2005 ;27(4):222-225.
4. Koplán JP, Bond TC, Merson MH, et al. Towards a common definition of global health. Lancet. 2009;373(9679):1993-5.
5. Kumari S, Rajput AS, Agarwal A, Arif A, Chaturvedi RK. Medico-legal Aspects of Firearm Injury Cases in Agra Region. J Indian Acad Forensic Med. 2014; 36(4):387-90.
6. Sachan R , Kumar AA , Verma AA. Frequency of fire arm injuries, death and related factor in Kanpur India. International Journal of Medical Toxicology and Forensic Medicine. 2013; 3(3): 88-95.
7. Kumar R. Study of wounds in victims of homicide by firearms and explosives. Journal of Evolution of Medical and Dental Sciences 2013; 2(44):8517-8539.
8. Amiri A, Zadeh, HS, Towfighi H, Zavarei, Ardestani FR, Savoji N. Firearm fatalities. A preliminary study report from Iran. Journal of Clinical Forensic Medicine. 2003; 10(3): 159-163.
9. Abbas AD, Bakari AA, Abba AM. Epidemiology of armed robbery related gunshot injuries in Maiduguri, Nigeria. Nigerian Journal of Clinical Practice. 2012 Mar; 15(1):19-22.
10. Kumar K, Mohanty S, Das S, Sahoo N, Mishra A, Patil S. Factors Influencing The Pattern Of Firearm Injuries In Ganjam - A Ten Years Retrospective Study. 2014 Feb; 1(32):1-7.