

Emerging Trends of Intentional Firearm Injuries in Northern India: A Study

IRAM KHAN¹, MOHAMMAD SHAKEEL², JAWED AHMAD USMANI³, SYED ABRAR HASAN⁴

ABSTRACT

Introduction: Many developing countries are facing rise in firearm injury cases owing to communal and ethnic clashes, political violence, armed robberies and suicide causing huge economic loss to society. On the basis of intention, injuries can be categorized as intentional and unintentional or accidental injuries. Intentional injuries will include suicidal, homicidal and assault related injuries.

Aim: This study was undertaken to document the trends and patterns associated with intentional firearm injuries in order to suggest ways to curb the emerging trends.

Materials and Methods: This was a cross-sectional and descriptive study conducted at Jawaharlal Nehru Medical College and Hospital (JNMCH), AMU, Aligarh, UP, India from May 2007 to April 2008. The parameters studied were month wise distribution of cases, age and sex distribution of victims of intentional gunshot injuries, body part injured, alleged assailant and medical management provided to the victim. The observed data was entered onto a worksheet and descriptive statistics were used.

Results: A total of 140 cases of intentional firearm injuries were studied, 133 were assault cases and 7 were suicide by means of firearm. Maximum number of intentional gunshot injury cases were reported during the month of September (17.14%) and October (14.29%) and least during month of December (2.14%). For intentional injuries, 21-40 years was the high risk age group (91 or 65% cases) with male preponderance (95.71%) and male to female ratio of 22:1.

Preferred site for assault was the trunk, with 50.38% cases with chest abdomen and back injuries. Family feud (20.71%) was the leading cause of assault and assailant was not known (47.86%) to the victim in majority of cases of assault injuries.

Conclusion: Increasing cases of firearms as a means of assault and suicide, calls for limiting the number of handgun purchase, regulations to check illegal trade of firearms, accountability of ammunition used and to develop standardised hospital based data collection system so that trend and patterns associated with intentional firearm injuries can be determined.

Keywords: Assault, Gunshot wound, Suicide

INTRODUCTION

Gunshot injuries are results of impact on target by projectiles ejected from the firearms. Many developing countries are facing rise in firearm injury cases owing to communal and ethnic clashes, political violence, armed robberies and suicides [1]. Manner of injuries, morbidity and mortality depend on mainly the intention of the person using the weapon. On the basis of intention, injuries can be categorized as intentional and unintentional or accidental injuries. Intentional injuries will include suicidal, homicidal and assault related injuries [2].

A huge emotional, physical and financial burden is borne by the patient of firearm injury, his family and society [1,2]. This is as a result of the unpredictability of gunshot injuries with potentials for causing damages through wide mechanisms.

Gunshot injuries are a known cause of high morbidity and mortality and have become the leading external cause of non-natural deaths in some parts of the African continent [3]. In India, there has been rapid proliferation of illegal firearms with sharp increase in firearm fatalities, especially in Bihar, Jharkhand and Uttar Pradesh [4].

This study was undertaken to study the trends associated with cases of firearm injuries in order to suggest ways to curb the emerging trends.

MATERIALS AND METHODS

This is a cross-sectional and descriptive study carried out in Jawaharlal Nehru Medical College Hospital (JNMCH), Aligarh on the cases of intentional firearm injuries that presented to hospital for treatment from May 2007 to April 2008. Informed consent was taken from the patient, their history was recorded and examination done;

additional information was obtained from the case records during study period. Parameters studied were age and sex of victims, site of wounds, circumstances leading to injury, shot by whom and management received. For this study, only those cases in which patient clearly stated that it was intentional in nature were labelled as intentional gunshot injury and included in the study. Patients with accidental or unintentional gunshot and who did not give consent were excluded.

Observed data was entered onto a worksheet and descriptive statistics were used.

RESULTS

During the study period a total of 198 cases of firearm related injuries reported to the emergency department of JNMCH. Out of these cases, 140 cases (70.7%) were due to intentional causes and were included in the study. Among these 140 cases, 133 injury cases (95%) were of assault by means of firearm and 7 cases were of suicide. It was observed that maximum number of intentional gunshot injury cases were reported during the month of September (17.14%) and October (14.29%) and least during month of December (2.14%) [Table/Fig-1].

The intentional injuries are most common in 21-30 years age group with 58 cases of assault and 3 cases of suicide. Next big group was 31-40 years of age group with 24 assault and 3 suicide cases. Thus, 21-40 years is the high risk age group (91 or 65% cases) for intentional injuries [Table/Fig-2].

Out of 140 cases of intentional firearm injuries, 134 (95.71%) were males and 6 (4.28%) were females; thus, male to female ratio was 22:1 [Table/Fig-2].

MONTHS	ASSAULT	SUICIDE	INTENTIONAL INJURY CASES
MAY '07	8 (6.0)	1 (14.3)	9 (6.43)
JUN'07	16 (12.0)	0	16 (11.43)
JUL'07	10 (7.5)	1 (14.3)	11 (7.86)
AUG'07	8 (6.0)	0	8 (5.71)
SEP '07	22 (16.5)	2 (28.6)	24 (17.14)
OCT'07	20 (15.0)	0	20 (14.29)
NOV'07	14 (10.5)	1 (14.3)	15 (10.71)
DEC'07	3 (2.3)	0	3 (2.14)
JAN '08	11 (8.3)	0	11 (7.86)
FEB'08	9 (6.8)	1 (14.3)	10 (7.14)
MAR'08	8 (6.02)	1 (14.3)	9 (6.43)
APR'08	4 (3.01)	0	4 (2.86)
TOTAL	133	7	140

[Table/Fig-1]: Month wise distribution of intentional firearm injury cases.

Age group (years)	Sex	Assault	Suicide	Subtotal	Total
<10	M	0	0	0	1 (0.71%)
	F	1	0	1	
11-20	M	18	0	18	19 (13.57%)
	F	1	0	1	
21-30	M	58	3	61	62 (44.29%)
	F	0	1	1	
31-40	M	24	3	27	29 (20.17%)
	F	2	0	2	
41-50	M	17	0	17	18 (12.86%)
	F	1	0	1	
51-60	M	10	0	10	10 (7.14%)
	F	0	0	0	
>60	M	1	0	1	1 (0.71%)
	F	0	0	0	
TOTAL	M	128	6	134 (95.71%)	140
	F	5	1	6 (4.28%)	

[Table/Fig-2]: Age and sex distribution of gunshot injury cases.

Out of 133 cases 29 (20.7%) were result of long-term rivalry and 26 (19.55%) cases were the result of altercation or some conflict. However, in majority of cases (47.85%) victim could not attribute any cause to the assault as the assailant was not known to them [Table/Fig-3].

Most common site of injury for assault was trunk 50.38% {chest and upper back (27.07%) + abdomen and lower back (23.31%)}, may be because it is easy to aim from long distance and broad area of aiming site which has vital organs also. The next common site was extremities (21.05%). Head and neck region was most preferred site of suicidal gunshot (71.43%), followed by trunk (28.57%). Preference for head and trunk can be attributed to the intent of the victim to target vital organs of the body [Table/Fig-4].

[Table/Fig-5] shows the perpetrator. In majority of assault cases by firearm, the victim did not know assailant (75 cases). In 3 cases husband was the assailant.

It was observed in our study that, most common modality of treatment was conservative management along with surgical procedures like Inter-Costal Tubal Drainage (ICTD), curettage and stitching of wound, close reductions and external fixations, pressure dressings etc. It accounts to 53.57% of cases. Major surgeries like laparotomies, enucleation, evisceration, open reduction and internal fixation, thoracotomy, resection anastomosis, colostomies etc were

S.No.	Causes	No. of Cases
1	Family Feud	29 (20.71)
2	Conflict/Altercation	26 (18.56)
3	Not Known	67 (47.86)
4	Robbery/Theft	11 (7.86)
5	Self/Suicide	7 (5)
	Total	140

[Table/Fig-3]: Causes of intentional gunshot injuries.

Intent	Head & Neck	Trunk		Extremity		Multiple	Total
		Chest & U. Back	ABDO. & L. BACK	U.LIMB	L.LIMB		
Assault	21 (15.79)	36 (27.07)	31 (23.31)	12 (9.02)	16 (12.03)	17 (12.78)	133
Suicidal	5 (71.43)	0	2 (28.57)	0	0	0	7
Subtotal	47 (33.57%)	45 (32.14%)	43 (30.71%)	19 (13.57%)	23 (16.43%)	21 (15.00%)	140
Total	47 (33.57%)	88 (62.86%)		42 (30%)		21 (15.00%)	

[Table/Fig-4]: Primary body parts affected.

S.No.	Shot By	No. of Cases
1.	Self (Suicidal)	7(5.0)
2.	Known	55 (39.28)
3.	Spouse	3 (2.14)
4.	Not Known	75 (53.57)
	Total	140

[Table/Fig-5]: Relation between victim and assailant in intentional gunshot cases.

S.No.	Management	No. of Cases
1.	Admitted and conservatively managed	75(53.57%)
2.	Operated	43 (30.71%)
3.	Referred to higher centre	7 (5%)
4.	Fatal	15 (10.71%)
	Total	140

[Table/Fig-6]: Management of gunshot injury cases.

performed on 30.71% cases. Out of 140 cases 7 (5 %) were referred to higher centre and out of 15 fatal cases, 6 cases were brought dead, 5 were of fatal suicidal gunshot wound, 4 patients died while under treatment [Table/Fig-6].

DISCUSSION

The expanding population, increase in terrorism and decrease in tolerance level of people, has lead to rampant increase in number of weapon of defence and offence. Since, firearms are becoming handy with the advancement of technology and are easy to use and conceal, there has been an exponential increase in their number worldwide.

Gunshot wound may not always be fatal, but may have extreme consequences; furthermore, treatment and recovery place a heavy burden on survivors, their families and on society. Non- fatal firearm violence is far more widespread than deaths from firearms worldwide [2].

In our study, it was observed that maximum number of intentional injuries by firearm cases were reported during the months of September (17.14%) and October (14.29%). These months coincide with harvest season in India and flare up the family feud or long-term rivalries. Incidence of these cases is least during months of December (2.14%), which can be attributed to winter season where people don't dwell out much in dark. In June (11.43%) and July (7.86%), rise in number of assault by firearm can be attributed to access to victim, as males stay out in fields and people sleep

out in open. Another factor that might be responsible for increased incidence in June and July is love affairs, as many marriages are solemnised during this period. If that alliance is against someone's wishes then easy availability of firearm can make it a weapon of choice, for revenge or suicide.

It has been observed that 65% of assault occurs in 21-40 years of age group. This can be attributed to the fact that bread winner of the family is male and usually belong of this age group. Male preponderance is seen, which is a worldwide trend and the reason is the fact that young males are generally more adventurous and more aggressive [5]. Aggression and love affairs acts as the compounding factors. Children and elderly were least affected. Furthermore, such increase in number reflects the proliferation of illegal weapons and their rampant use. Increase in number of cases is directly related to the availability of weapon as suggested by low prevalence in Nigeria and Saudi Arabia [6]. Upadhyay and Tripathi CB has reported firearms as the most preferred means for assault in Varanasi region [7].

An interesting finding is suicide by gunshot, it forms 5% of total number of intentional gunshot injury cases and most cases were in 21-40 years of age group. In India, where most common method of suicide is poisoning and hanging [5]; this number reflects the rampant availability and use of firearms. As suggested by Bridges and Kunselman firearm suicide rates are strongly impacted by the rate of gun ownership [8]. Psychiatric illness and nuclear family trend can also compound the situation and it has been stressed that these are due to easy accessibility of firearms and non-reporting of mental status while issuing license to the applicant [9].

Most commonly targeted site in assault cases was trunk (62.87%), may be because it is easy to aim from long distance. The next common site in assault cases is extremities with 19 cases (13.57%) of upper extremity and 23 cases (16.43%) of injury to lower extremity, reflects upon the intention of assailant to incapacitate the victim and escape [10-12]. Multiple injuries were least common with 17 cases (12.78%) out of 133, although, multiple gunshot wounds in assaults have also been reported [13,14].

In suicide cases, it was observed that head and neck region is most preferred site (71.43%) followed by trunk (28.57%), it can be attributed to the intent of the victim to target vital organs of the body.

It has been observed in the study that, in 47.85% of the cases victim did not attribute any cause to the attack. It can be either due to the fact that he was not able to identify the assailant or he did not want to disclose it. Out of 133 cases which were attributed to be due to assault by firearm, 29 (21.8%) were result of long-term rivalry and 26 (19.55%) cases were the results of argument. Causes of armed violence depend upon the socio-economic conditions of the country and may vary a lot as seen in other studies [4,11].

Furthermore, it was observed that assailant was not known to the victim (53.57%). In 39.28% of cases assailant was a known individual. Stark contrast is seen in developed nations where assaults by known individual are more common [15]. This difference could be because of lack of the faith of people in judicial system, the availability of weapons or increase in organised crime i.e. hiring of professionals. The other explanation could be his intention to settle scores himself as suggested by high incidence of family feud as the leading cause of assaults.

One more interesting finding is female victims, which are six, one committed suicide by means of firearm. In three out of five cases of the assault; husband was the assailant and the rest two were by unidentified assailant. In all six cases, element of domestic abuse and dowry could not be excluded [5].

Since, preferred target site is trunk and conservative treatment and surgeries are mainstay of management; thus, establishment of

trauma centres at every hospital is an essential requirement, so, that timely intervention and undivided attention can be provided to the patients.

LIMITATION

During the study period some of the cases could not be included because of lack of consent. This report is an attempt to highlight the need for designing standardised and comprehensive hospital based injury surveillance and data collection system with proper coding of injuries, weapons used, perpetrator of crime, intention and outcome of injuries.

CONCLUSION

High incidence of firearm injuries among young males and maximum number of cases not identifying the assailant calls for formulations of laws to prevent person with criminal complaint from getting license for firearms and expansive background checks for private purchasing to prevent rise in number of organised crime. Enforcement of regulations to prevent people on bail or ongoing criminal cases against them from carrying firearms, limiting the frequency and quantity of handgun purchase, regulations to check availability and accountability of ammunition used are need of hour. It calls for immediate steps to control the proliferation of manufacture and sale of illegal firearms as reported that maximum number of cases of assault are by unlicensed weapon and UP has maximum no. of cases. Formulation of stricter laws to check the issuance of licences as well as severe punishment for carrying firearms at public places should be done at the earliest.

Laws should be made to evaluate the mental status of the person possessing firearms every two years, so as to prevent it from becoming a method of choice to commit suicide as seen in developed countries.

Ethical clearance – Taken from the Institutional Ethical Committee of Jawaharlal Nehru Medical College & Hospital, AMU, Aligarh, UP.

Source of funding – Self

REFERENCES

- [1] Ojo E, Ibrahim A, Alabi S, Obiano S. Gunshot Injuries In A North Eastern Nigerian Tertiary Hospital. *The Internet Journal of Surgery*. 2007;16(2).
- [2] Frat AA. A Matter of Survival: Non-Lethal Firearm Violence. Small Arms Survey. Geneva. Cambridge University Press.2012. Available from: <http://www.smallarmssurvey.org/fileadmin/docs/A-Yearbook/2012/eng/Small-Arms-Survey-2012-Chapter-03-EN.pdf>
- [3] Allard D, Burch VC. The cost of treating serious abdominal firearm-related injuries in South Africa. *SAMJ*. 2005;95(8):591-94.
- [4] Kohli A, Karp A, Marwah S. Mapping Murder: The Geography of Indian Firearm Fatalities. Small Arms Survey. Issue Brief. 2011;2. Available at: <http://www.india-ava.org/fileadmin/docs/pubs/IAVA-IB2-mapping-murder.pdf>
- [5] Achary A, Karp A, Marwah S. India's States of Armed Violence: Assessing the Human Cost and Political Priorities. Small Arms Survey. 2011;1:1-12. <https://www.unodc.org/documents/southasia/webstories/IAVA-IB1-web.pdf>
- [6] Madni OA, Kharosha MAA, Shotar AM. Firearm fatalities in Dammam, Saudi Arabia. *Med. Sci. Law*. 2008;48(3):237-40.
- [7] Upadhyay P, Tripathi CB. Homicidal deaths in Varanasi region. *JFMT*. 2004;2(2).
- [8] Bridges FS, Kunselman JC. Gun availability and use of guns for suicide, homicide, and murder in Canada. *Percept Mot Skills*. 2004;2:594-98.
- [9] Mouzos J, Rushforth C. Firearm related deaths in Australia, 1991-2001. Australian Institute of Criminology- trends and issues in criminal justice. *Australia*. 2003. 269.
- [10] Solagberu BA. Epidemiology and outcome of gunshot injuries in a civilian population in West Africa. *European Journal of Trauma*. 2003;2:92-96.
- [11] Udosen AM, Etiama AU, Ugare GA, Bassey OO. Gunshot injuries in Calabar, Nigeria: an indication of increasing societal violence and police brutality. *Afr Health Sci*. 2006;6(3):170-72.
- [12] Adesunkanmi ARK, Lawal R. The pattern and outcome of civilian gunshot injuries in adults in rural and semi-urban Nigerian communities. *Injury Extra*. 2007;38(4):104-05.
- [13] Pereira C, Boyd JB, Olsavsky A, Gelfand M, Putnam B. Outcomes of complex gunshot wounds to the hand and wrist: a 10-year level I urban trauma center experience. *Ann Plast Surg*. 2012;68(4):374-77.

- [14] Druid H. Site of entrance wound and direction of bullet path in firearm fatalities as indicators of homicide versus suicide. *Forensic Sci Int.* 1997;88(2):147-62.
- [15] Global study on homicides. United Nation Office on Drug and Crime. 2011. Pp. 125. Available at: https://www.unodc.org/documents/congress/background-information/Crime_Statistics/Global_Study_on_Homicide_2011.pdf

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Forensic Medicine and Toxicology, Hind Institute of Medical Sciences, Lucknow, Uttar Pradesh, India.
2. Associate Professor, Department of Otorhinolaryngology and Head and Neck Surgery, Era's Lucknow Medical College, Lucknow, Uttar Pradesh, India.
3. Professor, Department of Forensic Medicine and Toxicology, Jawaharlal Nehru Medical College and Hospital, AMU, Aligarh, Uttar Pradesh, India.
4. Professor, Department of Otorhinolaryngology and Head and Neck Surgery, Jawaharlal Nehru Medical College, AMU, Aligarh, Uttar Pradesh, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Iram Khan,
B-25, Abrar Nagar, Picnic Spot Road, Kalyanpur, Lucknow-226022, Uttar Pradesh, India.
E-mail: driramkhan1011@gmail.com

Date of Submission: **Aug 08, 2016**

Date of Peer Review: **Aug 29, 2016**

Date of Acceptance: **Sep 12, 2016**

Date of Publishing: **Oct 01, 2016**

FINANCIAL OR OTHER COMPETING INTERESTS: None.