

Epidemiological and Medicolegal Study of Unnatural Death Cases Due to Firearm Injury in Varanasi, Uttar Pradesh, India

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Abstract: ***Introduction:** Firearm is any instrument which discharges a missile by the expansive force of the gases produced by burning of an explosive substance. Epidemiological study a study that compares 2 groups of people who are alike except for one factor, such as exposure to a chemical or the presence of a health effect; the investigators try to determine if any factor is associated with the health effect. **Objective of the Study:** Aim of my study to understanding the incidence and impact of firearm injury in Varanasi, India as well as identifying preventive strategies to reduce their number and impact. **Material & method:** Data are analyzed retrospective for periods of five years. Cases were included in group of death due to firearm injury, on the basis of confirmation by investigating officer and corroborative finding at medico legal examination. **Result:** Out of 10195 medico-legal autopsy cases conducted during the study period total of 153 cases (1.5%) of death due to firearm injury were recorded at Institute of Medical Sciences, Banaras Hindu University, Varanasi Uttar Pradesh, India. Most of the deaths in 21 to 30 years of age group total (29.41 %). Distribution of deaths due to firearm injury in relation to marital status shows that in male married are nil i.e. (0 %), male unmarried are 3(2.05%), and most of the case are male of unknown marital status i.e. 143(97.95%) of total male cases.*

Keywords: Firearm Injury, Forensic Medicine, Medico legal Study, Unnatural Death

1. Introduction

Firearm is any instrument which discharges a missile by the expansive force of the gases produced by burning of an explosive substance [1]. Firearm injury caused by firearm weapons i.e. Rifles weapon- rifles, pistols, revolvers, machine guns. Smooth bored weapons (shot gun) -cylinder bore, choke bore, paradox, breach loader, muzzle loader, country made [2]. Epidemiological study a study that compares two groups of people who are alike except for one factor, such as exposure to a chemical or the presence of a health effect; the investigators try to determine if any factor is associated with the health effect [3]. **Epidemiology** is the science that studies the patterns, causes, and effects of health and disease conditions in defined populations. It is the cornerstone of public health, and informs policy decisions and evidence-based practice by identifying risk factors for disease and targets for preventive healthcare. Epidemiologists help with study design, collection, and statistical analysis of data, and interpretation and dissemination of results (including peer review and occasional systematic review). Epidemiology has helped develop methodology used in clinical research, public health studies, and, to a lesser extent, basic research in the biological sciences [11]. **Thanatology:** deals with death in all aspects. Section 46 IPC death denotes death of a human being unless the contrary appears from the context. Registration of birth and deaths act section 2(b) defines death as permanent disappearance of all evidence of life at any time after live birth has taken place. **Natural** death where a lesion is found at autopsy which is incompatible

with life and which is known to cause of death. **Unnatural death-** is a category used by coroners and vital statistics specialists for classifying all human deaths not properly describable as death by natural causes [4]. Medico- legal study define as study of, relating to, or concerned with both medicine and law, as when medical testing or examination is undertaken for a legal purpose [5]. In 2011 census Varanasi had population of 3,676,841 of which male and female were 1,921,857 and 1,754,984 respectively [6].

2. Material and Methods

Present study is carried out at forensic medicine department, Institute of Medical Sciences, Banaras Hindu University, Varanasi. Relevant information and subjective data like age, sex, habitat, marital status and manner of death due to firearm injury of victims have been collected from medico legal autopsy register. Data are analyzed retrospective for periods of five years. Cases were included in group of death due to firearm injury, on the basis of confirmation by investigating officer and corroborative finding at medico legal examination.

3. Objective of the Study

Aim of my study to understanding the incidence and impact of firearm injury in Varanasi, India as well as identifying preventive strategies to reduce their number and impact. It is essential to evaluate prevention programmes in order to establish best practices and to suggest improvements of

national and international guidelines for the prevention of firearm injury.

4. Observations and Results

Table 1: The present study was undertaken from 1st January 2009 to 31st December 2013. Out of 10195 medico-legal autopsy cases conducted during the study period total of 153 cases (1.5%) of death due to firearm injury were recorded at Institute of Medical Sciences, Banaras Hindu University, Varanasi Uttar Pradesh, India.

Table 2: Describes age and sex wise distribution of death due to firearm injury. Most of the deaths in 21 to 30 years of age group total (29.41 %), in male 43(29.45 %) and in female most deaths 41 to 50 years age group 3(42.86 %) and before this age group and after this age group case are progressively less in number. In our study male death due to firearm injury dominated over female in the ratio of male to female 20.9:1.

Table 3: Distribution of deaths due to firearm injury in relation to marital status shows that in male married are nil i.e. (0 %), male unmarried are 3(2.05%), and most of the case are male of unknown marital status i.e. 143(97.95%) of total male cases. In female 71.43% are married, 28.57 % of female are unmarried and in rest marital status is unknown i.e. (0%).

Table 4: Incidence of death due to firearm injury in rural areas 142(92.81%) is more common than urban areas 9(5.88%) and unknown habitat status is 2(1.31%) cases.

Table 5: Describes distribution of death due to firearm injury in relation to manner of death. In our study shows that about all deaths due to firearm injury is homicidal in manner 153(100%), suicidal (0%), accidental (0%) and unknown (0 %).

Table 6: Year wise frequency of total autopsy in relation to death due to firearm injury from 2009 to 2013 are follows as 19%, 20%, 19%, 20% and 21% respectively. This correlated with death due to firearm injury as 23.53%, 19.61%, 19.61%, 16.99% and 20.26% respectively. Percentage of total autopsy is more or less static and percentages of total death on railway track are average 20%.

Table 7: Shows that distribution of death due to firearm injury on the basis of religion. Among Hindu death due to firearm injury are most common i.e. 144(94.12%), in Muslim are 7(4.58%), unknown 2(1.31%) and in Christians are nil.

5. Discussion

1) **Incidence:** Show that incidence of death due to firearm injury was 1.5% in our study which is significantly less than (2.09%) result of the other study [7]. This difference in the incidence may be due to geographical variation in the population. India is considered to be a developing country estimated population 1.2 billion inhabitants. Varanasi is the district province in India occupying an area of 4535 km². It accommodates almost 367684 [2011

census] of the total Indian population. It is inhabited by people of different cultural background [8]. A retrospective study from Brescia (Northern Italy) analyzes post-mortem examination data of 164 firearm-related casualties. This study revealed that the 2006 firearm-related mortality rate amounted to 0.84 per 100,000 residents, with an average of 12.6 cases per year [9].

- 2) **Age:** Most of the deaths in 21 to 30 years of age group total (29.41 %) in male 43(29.45 %) and female most deaths 41 to 50 years age group 3(42.86 %). Other study [10] finds that most of the death due to fatal firearm injury at the 16 to 30 year age group.
- 3) **Gender:** In our study male death due to firearm injury dominated over female in the ratio of male to female 20.9:1. In other study [10] find that male to female ratio were 5.75:1.
- 4) **Marital Status:** Distribution of deaths due to firearm injury in relation to marital status shows that in male married are nil i.e. (0 %), male unmarried are 3(2.05%), and most of the case are male of unknown marital status i.e. 143(97.95%) of total male cases. In female 71.43% are married, 28.57 % of female are unmarried and in rest marital status is unknown i.e. (0%).
- 5) **Habitat:** Incidence of death due to firearm injury in rural areas 142(92.81%) is more common than urban areas 9(5.88%) and unknown habitat status is 2(1.31%) cases, rural to urban ratio 15.8:1. Other study [10] find that rural to urban ratio is 1.7:1.
- 6) **Manner Of Death:** Describes distribution of death due to firearm injury in relation to manner of death. In our study shows that about all deaths due to firearm injury is homicidal in manner 153(100%), suicidal (0%), accidental (0%) and unknown (0 %). Other study [7] find that homicidal 66% i.e. comparatively less in number, accidental and suicidal 3.4%.
- 7) **Religions:** Shows that distribution of death due to firearm injury on the basis of religion. Among Hindu death due to firearm injury are most common i.e. 144(94.12%), in Muslim are 7(4.58%), unknown 2(1.31%) and in Christians are nil.

6. Conclusion

- Our study on firearm injuries proves that certain changes may minimize mortality, morbidity, disability, and costs among community. There is a need to stop the illegal used and sold of firearm in India. We need to eradicate illicit local community gun manufacturing system. It is obvious that private gun ownership should be strictly limited and the illegal availability should be controlled. Elimination of these illegal countries made firearms is of the most importance in order to decrease the high homicidal firearm fatality rate in this region.
- Incidence of death due to firearm injuries was 1.5% in our study.
- Most of the deaths in 21 to 30 years of age group total (28.57 %).
- In our study male death due to firearm injuries was dominated over female, in the male to female ratio of 20.8:1.
- Death due to firearm injuries is more common in rural areas (92.81%) than urban areas (5.88%).

- Average number of total deaths due to firearm injuries 20% per year.
- Most of the death due to firearm injuries victims was Hindus (94.12%) followed by Muslim (4.58%).

7. Acknowledgement

Author would like to thank faculty and staff of department of Forensic Medicine IMS, BHU, Varanasi for their valuable support and full help in data collection from autopsied cases.

8. Conflict of Interest

Nil.

9. Source of Funding

This research was not financially supported by any funding agencies.

10. Ethical Clearance

The present study was approved by "Institutional Ethical Committee" of Institute of Medical Sciences, Banaras Hindu University, Varanasi. All the information has been taken under consideration of medical ethical committee.

11. Tables

Table 1: Incidence of death due to firearm injury:

Total no. of autopsy conducted in 5 year 2009 to 2013	death due to firearm injury	%
10195	153	1.5

Table 2: Age and sex wise distribution of death due to firearm injury:

Age in	Total		Male		Female	
	NO.	%	NO.	%	NO.	%
0-10	1	0.65	1	0.68	0	0.00
11-20	5	3.27	3	2.05	2	28.57
21-30	45	29.41	43	29.45	2	28.57
31-40	43	28.10	43	29.45	0	0.00
41-50	30	19.61	27	18.49	3	42.86
51-60	19	12.42	19	13.01	0	0.00
61-70	6	3.92	6	4.11	0	0.00
>71	4	2.61	4	2.74	0	0.00
Total	153		146		7	

Table 3: Distribution of death on firearm injury in relation to marital status:

Marital Status	Male		Female		Total	
	NO.	%	NO.	%	NO.	%
Married	0	0.00	5	71.43	5	3.27
Unmarried	3	2.05	2	28.57	5	3.27
Unknown	143	97.95	0	0.00	143	93.46
Total	146	100.00	7	100.00	153	100.00

Table 4: Incidence of death on firearm injury in rural and urban areas:

Habitat	Male	%	Female	%	Total	%
Rural	135	92.47	7	1	142	92.81
Urban	9	6.16	0	0	9	5.88
Unknown	2	1.37	0	0	2	1.31
Total	146	100.00	7	1	153	100.00

Table 5: Distribution of death due to firearm injury in relation to manner of death:

Manner	Total	%
Accidental	0	0
Suicidal	0	0
Homicidal	153	100
Unknown	0	0
Total	153	

Table 6: Year wise frequency of total autopsy in relation to death due to firearm injury:

year	No. of total autopsy	%	Total death	%
2009	1986	19	36	23.53
2010	2025	20	30	19.61
2011	1974	19	30	19.61
2012	2081	20	26	16.99
2013	2129	21	31	20.26
Total	10195	100	153	100.0

Table 7: Distribution of death on firearm injury on the basis of religion:

Sr. No.	Religion	No. of death	%
1	Hindu	144	94.12
2	Muslim	7	4.58
3	Christian	0	0.00
4	Unknown	2	1.31
	Total	153	100.00

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