

## A study of fatal gunshot injuries over two years in Mumbai, India

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### Abstract

**Introduction:** In Mumbai region of India very few studies had done on fatal firearm deaths. So pattern wise distribution of firearm injury and demographic pattern of deceased were largely uncovered. Present study is an attempt to uncover some of the data related with firearm deaths in Mumbai region.

**Materials and Method:** Present study was conducted at mortuary of tertiary referral hospital in Mumbai with aim to analyse fatal firearm deaths with respect of demographic data, injury pattern, manner of death, probable weapon and other post-mortem findings among the deceased and compared it with the pattern seen in other studies.

**Results:** During study period from august 2011 to august 2013 total 43 autopsy on fatal firearm deaths were carried out. 74.4% deceased were victims of homicidal attacks, 21% of suicide and 4.6% of accidental deaths. Maximum suicidal firearm deaths were done by police persons (66%). Male from 21-30 age group were most common deceased in firearm deaths. Chest (36.9%) was most common site of involvement of entry wound of firearm. Pistol or revolver weapon most commonly used (51.17%) in both homicide and suicide cases. The most common reason behind the homicidal firearm death or killing of person was the personal rivalry (46.51%).

**Keywords:** Firearm injury, Homicide, Rifled weapon.

### Introduction

India's rates of violence vary greatly from state to state, and city to city, ranging from relatively high to negligible. These rates are reflected in the nation's well-known diversity in languages, literacy, economic status, and cultural customs.

As in most metro cities, including Mumbai the violent crimes - especially homicides - continue to be a cause for concern over various agencies. Assault, mechanical asphyxia, blunt head injury and shooting are the common methods of homicides. Firearm as mode of homicide is increasing throughout the world. In the United States, the risk of death from firearms injuries versus death by RTA is relatively high.<sup>(1,2)</sup>

In 2012, India officially reported total national firearm murder cases 2818 (9.8%) out of 34305 homicidal deaths. Percentage wise it is nearly equal for year 2012 (10.98%) and for 2013 (10.90%).<sup>(2)</sup>

In the era of gang war and encounter in Mumbai there were significant contribution of firearm deaths in total homicides. But the decline in the rate of murder committed with firearms is especially striking compared to trends in other violent crimes, which declined only slightly over the period. Present study was done with objectives of studying the epidemiological patterns of firearms deaths and wound characteristics over the victim body.

### Materials and Method

This study includes all firearm fatality cases, presented to the mortuary of the Grant Govt. Medical College Mumbai for autopsy, over the period of two year i.e. from august 2011 to Aug 2013. Our study

attempted to define the age wise, gender wise pattern, manner and mode of death, extent and severity of firearm-related injuries in their victims etc. All firearm death records were thoroughly reviewed for the following information:

- Examination of various demographic factors observed in fire arm fatality.
- Examination of the characteristics of firearm injuries like range and number of entry/exit wound.
- The probable type of weapon used and the cause of death.

Ethical approval for this study was taken with due procedure from the college ethical committee.

### Observation and Results

Over the period of two year from august 2011 to august 2013 total 43 deceased with suspected firearm deaths were brought for autopsy examination. On autopsy following findings noted down.

Out of 43 victims maximum 16 (37.2%) were from age group of 21 to 30 years and all were males. Only one female victim (2.32%) was died because of firearm and she was from age group 31-40 years. This was followed by age group 31-40 which includes 14 (32.55%) deceased. 9 (20.1%) deceased were from age group 41-50 age group. 2 (4.6%) deceased were from age group 11- 20 years while 1 (2.32%) deceased was from age group above 50 years. (Table 1). After evaluation of police investigation papers and detail autopsy examination the homicide as the probable manner of death was confirmed in majority of cases 32 (74%). While suicidal firearm deaths observed in 9 cases (20.9%) and accidental firing in 2 cases (4.65%).

(Table 2). In 20 cases (21.5%) the probable motive behind the death was personal rivalry and in three deaths (6.97%) the probable reason was political. While controlling riots, police uses firearm weapon and 3 (6.97%) deaths occur in that. Two deaths (4.65%) occur in accidental firing while carelessly handling firearm weapon and suicide as a motive behind deaths observed in 9 cases. In 6 cases motive behind the death was not confirmed. (Table 3).

**Table 1: Cross Table showing Age group vs gender wise distribution of firearm fatalities**

| Age group      | No. Deceased |        |       |
|----------------|--------------|--------|-------|
|                | Male         | Female | Total |
| 0-10           | 0            | 0      | 0     |
| 11-20          | 2            | 0      | 2     |
| 21-30          | 16           | 0      | 16    |
| 31-40          | 14           | 1      | 15    |
| 41-50          | 9            | 0      | 9     |
| Above 50 years | 1            | 0      | 1     |

**Table 2: Showing probable manner of death of victim**

| Manner of death | No. of deceased |
|-----------------|-----------------|
| Homicidal       | 32 (74.41%)     |
| Suicidal        | 9 (21%)         |
| Accidental      | 2 (4.6%)        |
| Not known       | 0               |

**Table 3: Showing probable motive behind the death of deceased**

| Probable Motive       | No. of Deaths |
|-----------------------|---------------|
| Suicide               | 9             |
| Accident              | 2             |
| Riot control firing   | 3             |
| Personal Rivalry      | 20            |
| Political             | 3             |
| Other non conclusive. | 6             |

As per information gathered from deceased family members and investigating officers the profession of deceased were categorized against manner of death. Out of which 13 unfortunate victims of homicidal death were labour or hard workers. 13 deceased were either unemployed or of unknown profession and all died in homicidal manner. Six police personnel had done the suicide by using service weapon, while 1 police victim was died in homicidal firing incidence. And in one police personal death occurs accidentally while handling firearm weapon. Remaining 9 deceased were from high qualified profession either businessman, builders or other.

In majority cases 36 (83.72%) the death occur because of haemorrhage. In 2 cases (4.65%) death occur after few days because of coma, while septicaemia occurs in 5 cases (11.62%) in hospitalised

victims. (Table 4). On autopsy examinations of all victims total entry wounds found were 73 in numbers, 46 were exit wounds and 27 bullets or pellets were recovered from body of deceased. (Table 5). Considering the detail evaluation of all these firearm entry, exit wounds and ballistic expert reports, the probable range of firearm was calculated. Out of 73 entry wound found over 43 victims' body, 36 entry wounds were of close range (49.31%). While the near range of firearm found in 16 entry wounds (21.9%). It is distant in 11 cases (15%). The 10 entry wounds were of body contact in nature (13.6%). (Table 5).

**Table 4: Showing probable cause of death in firearm cases**

| Cause of Death      | No. |
|---------------------|-----|
| Haemorrhage         | 36  |
| Coma                | 2   |
| Septicaemia         | 5   |
| Other complications | --  |

**Table 5: Showing probable range of firearm wound**

| Range        | No. of Wounds |
|--------------|---------------|
| Contact      | 10            |
| Close        | 36            |
| Near         | 16            |
| Distant      | 11            |
| Undetermined | 0             |
| Total        | 73            |

**Table 6: Showing body parts involved in firearm injury**

|            | Entry       | Exit | Bullet/Pellets retrieved |
|------------|-------------|------|--------------------------|
| Head       | 22 (30.13%) | 18   | 4                        |
| Face       | 7 (9.58%)   | 4    | 3                        |
| Chest      | 27 (36.9%)  | 16   | 11                       |
| Abdomen    | 4 (5.4%)    | 1    | 3                        |
| Back       | 6 (8.21%)   | 2    | 4                        |
| Upper limb | 5 (6.8%)    | 4    | 1                        |
| Lower limb | 2 (2.73%)   | 1    | 1                        |
| Total      | 73 (100%)   | 46   | 27                       |

In all firearm deaths chest was the most common area of body involved and had 27 entry wounds (36.9%). From chest 11 bullets or shots were retrieved on during autopsy. This was followed by head having 22 entry wound (30.13%), 18 exit wound (39.13%) and 4 retrieved bullets or shots. Entry wound present over face were 7 (9.5%), over abdomen 4 (5.4%), over back 6 (8.21%), over upper limb 5 (6.8%) while over lower limb were 2 (2.73%) in numbers (Table 6).

Out of 43 fatalities in 25 cases (58.13%) victim had only one firearm entry wound, i.e. victim was shot only

once. While the fatality with two shots observed in 13 cases (30.23%) and with three entry wound in one case (2.32%). More than three or multiple shots seen in 4 cases (9.3%). On autopsy examination, in majority of cases 22 (51.16%) pistol or revolver was used as the probable weapon of offence. In 4 cases it was shotgun (9.3%), and in single case airgun was used (2.32%). Rifle was used for firearm purpose in 16 cases (37.2%).

## Discussion

In this study, the male victims were outnumbered than females, and most of them were in age group 21-30 years. The young males from this age group are socially most active group so are having high probability of interpersonal violence. This finding is consistent with most of the studies covering the firearm deaths. (Kohli et al,<sup>(4)</sup> Singh et al,<sup>(5)</sup> Pattowary et al,<sup>(6)</sup> Pradeepkumar et al,<sup>(7)</sup> Fedakar et al,<sup>(8)</sup> Hagraş et al<sup>(9)</sup>). Amongst all deceased 74.46% were victims of homicidal deaths and 21% were choosing firearm as a method for suicidal death. These findings were consistent with some studies (Fedakar et al,<sup>(8)</sup> Hagraş et al<sup>(9)</sup>). But in contrast with some of the foreign studies where most of firearm deaths were suicidal in nature (Hagraş et al,<sup>(9)</sup> Druid et al,<sup>(10)</sup> De la Grandmaison GL et al,<sup>(11)</sup> Norton et al<sup>(12)</sup>).

Probable reason behind this is use of other available methods to commit suicide. But on the other side the finding of increased percentage of suicidal firearm deaths in this study is not similar with other Indian studies. (Singh et al,<sup>(5)</sup> Sachan et al,<sup>(14)</sup> Kumari et al<sup>(15)</sup>). This is because of geographic variation and more suicide in particular profession. The most common reason behind the homicidal firearm death or killing of person was the personal rivalry (46.51%). This finding is different from the findings of the other studies in this field, where the most common motive of the killings were due to property dispute or the politically motivated murders. (Pattowary et al,<sup>(6)</sup> Sachan et al<sup>(13)</sup>) This variation is because of the increase in interpersonal violence as compared to the political violence or gang war in metro cities during the study period.

During study it was found that maximum suicide by using firearm weapons were done by police persons n=6 (66%). In similar studies done in Iran where all suicidal deaths were by military weapon.(Amiri et al<sup>(15)</sup>). In both studies easy access to firearm weapons and mental burden while delivering services is main reason behind these suicides. Maximum (n=13, 42%) victims of homicidal firearm deaths were either unemployed or deceased with unknown profession. The probable reason behind this was no fixed money income source or having some criminal background. The death of one police professional was accidental because of carelessness while handling the firearm weapon.

Close range shot were observed in maximum (49.31%) cases which is similar to other studies (Singh

et al,<sup>(5)</sup> Sachan et al,<sup>(13)</sup> De la Grandmaison GL,<sup>(15)</sup> Akhiwu et al<sup>(16)</sup>). Similar to other studies chest is common site involved in firearm injuries (36.9%) (Kohli et al,<sup>(4)</sup> Singh et al,<sup>(5)</sup> Pattowary et al,<sup>(6)</sup> Hagraş et al,<sup>(9)</sup> Sachan et al<sup>(13)</sup>) but in contrast to other studies (Hussain et al,<sup>(3)</sup> Akhiwu et al,<sup>(16)</sup> Toygar et al<sup>(18)</sup>).

Out of total deceased in 25 cases (58.13%) victim had only one firearm entry wound, i.e. victim was shot only once. While the fatality with two shots in 13 cases (30.23%), thrice in one case (2.32%) and more than three or multiple shots in 4 cases (9.3%). These findings are similar to study (Chattopadhyay et al<sup>(19)</sup>) and differ from studies (Pattowary et al,<sup>(6)</sup> Kumaris et al<sup>(14)</sup>). On autopsy examination, in majority of cases (n=38) rifled weapon including hand held gun was commonly used as the probable weapon of offence (88.37%). Which is similar to (Kumaris et al,<sup>(14)</sup> Chattopadhyay et al<sup>(19)</sup>) studies. Cause for this is easy availability of local made illegal firearms weapon which are commonly used in criminal cases in developing countries. (Saleh et al<sup>(20)</sup>). These weapons are made up of cheap material and have characteristic injury pattern so detection of weapon by matching of cartridge with test is easy. (Jain et al<sup>(21)</sup>).

## Conclusion

Present study covers wound characteristic and epidemiological pattern of firearm deaths from only one metro city of India. Increase in suicidal pattern in police officials by using firearm weapon is major concern and proper psychological evaluation with mental support will definitely reduce this mortality. More studies from different location is needed for evaluation of firearm deaths trends.

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