



## UNVEILING GENDER DISPARITIES AND ANATOMICAL PATTERNS OF INJURIES SUSTAINED IN GUN VIOLENCE: A FIVE YEAR RETROSPECTIVE STUDY

### Forensic Medicine

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### ABSTRACT

This study analyzes the distribution of gun violence cases over a specified period, categorizing the data based on various parameters. The year-wise breakdown reveals fluctuations in case prevalence, with 2018 accounting for 38% (N=12), 2019 for 29% (N=9), 2020 for 6% (N=2), 2021 for 16% (N=5), and 2022 for 9% (N=3) of the total cases. A gender-specific analysis demonstrates a consistent absence of reported female cases in 2019, 2020, 2021, and 2022, with varying percentages of male cases. Furthermore, age group distinctions highlight the prevalence of cases in the "Less than 20" (100% male, N=5) and "20-40" (4.34% female, N=1; 95.65% male, N=22) categories. In the "More than 40" age group, all cases were male (N=4). The anatomical distribution of injuries across regions such as the "Head," "Chest," and others is detailed, providing percentages and frequencies for each. This comprehensive examination offers valuable insights into the dynamics of gun violence, emphasizing the significance of year, gender, age, and anatomical considerations in understanding and addressing this societal issue.

### KEYWORDS

Gun Violence Distribution; Gender Disparities; Age-specific Patterns; Anatomical Injury Distribution

### INTRODUCTION

Gun-related violence is a prevalent issue in impoverished urban areas, often intertwined with gang violence and frequently involving juveniles or young adults<sup>1</sup>. In the United States, the risk of death from firearm injuries is comparatively high when compared to fatalities from road traffic accidents<sup>2</sup>. Conversely, European countries exhibit lower rates of death resulting from firearm injuries. For instance, Sweden, Finland, and Denmark report annual firearm injury mortality rates of around 200, primarily attributed to suicides<sup>3</sup>. In Egypt in the year 2000, there were approximately 117 fatal cases, comprising 83 accidental, 18 suicides, and 16 homicides<sup>4</sup>.

While firearm-related deaths make headlines in many countries, India bucks the trend. In 2008, its firearm murder rate (0.36 per 100,000) stood remarkably low compared to both the global average and its own overall murder rate (2.8 per 100,000). This contrasts sharply with places like Brescia, Italy, where the firearm mortality rate hovered around 0.84 per 100,000 in 2006<sup>5</sup>. In fact, India's firearm murder rate aligns more closely with European averages than with the United States, a nation grappling with significantly higher gun violence<sup>6</sup>. This suggests unique cultural and regulatory factors at play in shaping India's firearm landscape<sup>7</sup>.

Violence rates in India exhibit significant variation, with a majority of gunshot injuries perpetrated using illegal, unlicensed weapons. In 2006, India housed approximately 40 million civilian firearms out of an estimated 650 million globally, with only 6.3 million (just over 15%) being licensed<sup>8</sup>. Delhi alone, the national capital, was estimated to have 300,000 illegal firearms<sup>9</sup>.

These statistics highlight the relative scale of legal, illegal, and overall civilian gun ownership in India. Unlicensed weapons, constituting 86–92% of reported firearm-related murders, emerge as the most common and lethal, both overall and individually. Efforts to curb firearm-related deaths and injuries should prioritize these unlicensed weapons, which remain the primary culprits in firearm-related violence<sup>10</sup>.

Firearm injuries are consistently linked to high mortality and morbidity rates, with rare cases presenting as asymptomatic or showing delayed manifestations<sup>10</sup>. The presented study aims to assess firearm injuries and associated factors among their victims. The authors seek to delineate the patterns of firearm injuries and deaths in this study and draw comparisons with patterns observed in other parts of the world.

### MATERIAL AND METHODS

The Department of Forensic Medicine at Maulana Azad Medical College in New Delhi conducted a retrospective review of autopsy reports of 31 deceased individuals who suffered firearm injuries between January 2018 and December 2022. The examination focused on various aspects, including demographic information of the victims (such as age, sex, residence, and occupation). The sampling method employed was convenience sampling, with inclusion criteria determining the selection of reports from investigators. Exclusions comprised deaths involving multiple types of trauma, such as sharp or blunt force trauma, as well as cases where complications arising from firearm injuries hindered the interpretation of initial injuries.

### RESULT

The table no 1 illustrates the distribution of cases across different years, presenting the number (N) and percentage (%) for each respective year. In 2018, there were 12 cases, constituting 38% of the total. The subsequent year, 2019, saw 9 cases, accounting for 29%. In 2020, the number of cases dropped to 2, making up 6% of the total. The year 2021 witnessed 5 cases, representing 16% of the total. Lastly, in 2022, there were 3 cases, contributing to 9% of the total. The data provides a year-wise breakdown, offering insights into the varying prevalence of cases over the specified period.

**Table (1): Distribution Of The Cases According To Years Of The Study.**

| Year | Cases |     |
|------|-------|-----|
|      | N     | %   |
| 2018 | 12    | 38% |
| 2019 | 09    | 29% |
| 2020 | 02    | 6%  |
| 2021 | 05    | 16% |
| 2022 | 03    | 9%  |

The table no 2 shows distribution of cases based on gender across different years, detailing the number (N) and percentage (%) for both female and male categories. In 2018, there was 1 female case, constituting 8.33% of the total, while male cases numbered 11, making up 91.66%. The subsequent year, 2019, saw no reported female cases, resulting in 0%, while male cases numbered 9, representing 100%. Similarly, for the year 2020, there were no reported female cases, constituting 0%, and 2 male cases, accounting for 100%. In 2021, there were no reported female cases, making up 0%, and 5 male cases, representing 100%. The most recent year, 2022, recorded no reported

female cases, constituting 0%, and 3 male cases, accounting for 100%. This breakdown offers a comprehensive overview of the gender-specific distribution of cases over the specified years.

**Table (2): Relation Between Sex And Year Of Firearm Injuries.**

|      | female |       | male |        |
|------|--------|-------|------|--------|
|      | N      | %     | N    | %      |
| 2018 | 1      | 8.33% | 11   | 91.66% |
| 2019 | 0      | 0%    | 9    | 100%   |
| 2020 | 0      | 0%    | 2    | 100%   |
| 2021 | 0      | 0%    | 5    | 100%   |
| 2022 | 0      | 0%    | 3    | 100%   |

The table 3 outlines the distribution of cases by gender across different age groups, providing the number (N) and percentage (%) for both females and males. In the age group "Less than 20," there were no reported female cases, constituting 0%, while male cases numbered 5, representing 100% of the total. For the age group "20-40," one female case was recorded, accounting for 4.34%, and male cases numbered 22, making up 95.65%. In the "More than 40" age group, there were no reported female cases, constituting 0%, while male cases numbered 4, representing 100%. This breakdown offers insights into the gender-specific distribution of cases within distinct age brackets, highlighting variations in prevalence across the specified age groups.

**Table (3): Relation Between Age And Gender Among Victims Of Firearm Injuries During The Period From 2018 To 2022.**

| Year         | female |       | male |        |
|--------------|--------|-------|------|--------|
|              | N      | %     | N    | %      |
| Less than 20 | 0      | 0%    | 5    | 100%   |
| 20-40        | 1      | 4.34% | 22   | 95.65% |
| More than 40 | 0      | 0%    | 4    | 100%   |

The table 4 provides a comprehensive overview of the distribution of injuries across different regions of the body, presenting both the frequency and corresponding percentage for each region. In the "Head" region, there were 8 reported cases, constituting 25.80% of the total. Cases involving the "Head in combination with other regions (excluding chest)" amounted to 5, representing 16.12%. The "Chest" region had 3 reported case, making up 9.67%, while cases involving the "Chest in combination with other regions (excluding head)" totaled 5, also accounting for 16.12%. In instances where injuries affected both the "Head and chest," there were 3 cases, contributing to 9.67%. Similarly, injuries involving both the "Head and chest in combination with other regions" also numbered 3, constituting 9.67%. Other regions with individual reported cases included "Abdomen," "Abdomen and upper extremities," "Neck," and "Pelvis," each contributing 3.22%. The cumulative total of reported cases across all regions amounted to 31, representing 100.0%. This detailed breakdown provides valuable insights into the distribution and prevalence of injuries across distinct anatomical regions.

**Table 4: Body Regions Involved In The Path Of The Gunshot**

| Region                                                   | Cases | Percentage (%) |
|----------------------------------------------------------|-------|----------------|
| Head                                                     | 8     | 25.80          |
| Head in combination with other regions (excluding chest) | 5     | 16.12          |
| Chest                                                    | 3     | 9.67           |
| Chest in combination with other regions (excluding head) | 5     | 16.12          |
| Head and chest                                           | 3     | 9.67           |
| Head and chest in combination with other regions         | 3     | 9.67           |
| Abdomen                                                  | 1     | 3.22           |
| Abdomen and upper extremities                            | 1     | 3.22           |
| Neck                                                     | 1     | 3.22           |
| Pelvis                                                   | 1     | 3.22           |
| Total                                                    | 31    | 100.0          |

## DISCUSSION

The study reveals a notable gender disparity, with a male-to-female victim ratio of 30:1, aligning with similar observations in research conducted by Edirisinghe PAS et al.11. In comparisons with international studies, findings from India (Kumar A et al.12) and Bangkok (Myint S et al.13) highlight 92.48% and 91.3% male victims, respectively. European countries also exhibit variations; Sweden (Junuzovic M et al.14) with 35%, Denmark (Thomsen AH et al.15)

with 29.43%, and Italy (Solarino B et al.16) with 7.6% female gun violence victims. In the United States, contentious gun violence policies result in 13.56% female deaths, as reported by Resnick S et al.17.

Examining the 31 victims in the present study, the head (25.80%, n=8) and the chest in combination with other regions (16.12%, n=5) emerge as the most frequently targeted body areas. This aligns with a study in Sri Lanka by Edirisinghe PAS et al.4 but contradicts findings in an Indian study by Kumar A et al.18, where the abdomen was the predominant target (48.49%, n=32). Divergent patterns are observed in studies from India by Kohli A et al.19 and Shashikant Vk et al.20, which highlight the chest as the primary target and the head as the secondary, contrasting with the current study. Similar patterns of head being the primary target followed by the thorax are reported in studies from Thailand (Myint S et al.13) and Denmark (Thomsen AH et al.15). In the USA, Resnick S et al.17 note the head as the most common target overall, with suicides predominantly targeting the head (89.1%), while homicides target the head (38.3%) and chest (22.2%) closely.

The majority of cases in the study are classified as homicides, with only three instances of suicides, a trend consistent with findings in developing countries where guns are more frequently used for homicides (Kumar A et al.18, Kohli A et al.19, Ptaszyoska Si et al.21). Conversely, developed countries exhibit the opposite trend, as seen in studies by Junuzovic M et al.14 and Jeffery A et al.22.

## CONCLUSION

In conclusion, this study underscores a significant male predominance in gun violence, with a ratio of 30:1. The anatomical distribution of injuries reveals consistent patterns, notably targeting the head and chest. The majority of cases are classified as homicides, aligning with trends observed in developing countries. These findings emphasize the complexity of gun violence dynamics and highlight the need for nuanced, context-specific interventions. Addressing this issue requires comprehensive strategies that consider sociocultural factors and regional nuances to effectively mitigate the impact of gun violence on diverse populations.

**Conflict Of Interest:** NIL

**Source Of Funding:** NIL

**Ethical Considerations:** The post-mortem reports chosen for analysis were under the possession of department of forensic medicine and securely stored. The protection of the victim's identity was ensured by refraining from the use of any personal information that could reveal their identity. Only aggregated data was employed for analysis, adhering to essential ethical principles, particularly confidentiality.

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