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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/20693

DOI URL: <http://dx.doi.org/10.21474/IJAR01/20693>



RESEARCH ARTICLE

ANATOMICAL DISTRIBUTION AND TRENDS IN HOMICIDAL INJURIES: A MORTUARY BASED STUDY

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Manuscript Info

Manuscript History

Received: 25 January 2025

Final Accepted: 28 February 2025

Published: March 2025

Key words:-

Homicide, Trauma, Autopsies, Injuries, Wounds

Abstract

Homicide, a neutral term encompassing all instances of one person killing another, contrasts with the specific legal definition of murder, which necessitates intent and other jurisdictional criteria. Trauma forensics plays a pivotal role in analyzing injuries associated with homicidal deaths, which vary across cultures and depend on factors such as access to weapons and societal dynamics. This retrospective study investigated the patterns of injuries in autopsies conducted on alleged homicide victims over one year, aiming to enhance forensic interpretation and support accurate representation of homicide data. Results highlighted the head and neck as the most vulnerable anatomical regions, with young adults being the most affected demographic, particularly males. Injury types varied, with subgaleal hematoma, firearm wounds, and bruises being prevalent, while other injuries such as burns, stab wounds, and strangulation occurred less frequently. Regional variations in injury profiles reflect socio-environmental influences, emphasizing the need for targeted forensic approaches and preventive measures. The study underscores the importance of understanding demographic and anatomical patterns in homicidal cases for effective legal and forensic frameworks.

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Introduction:-

The terms "homicide" and "murder" are often used interchangeably, but this is not always precise or appropriate. While it is accurate to refer to a murder as a homicide, labelling a homicide as a murder is correct only when the legal criteria for murder, typically involving intentional killing, are satisfied within the relevant jurisdiction. Homicide is a broad, neutral term that refers to the act of one person killing another, without specifying the circumstances, motives, or intent. It can be classified as lawful, such as in cases of self-defence, or unlawful, such as murder or killings committed during the course of another crime.¹

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Trauma forensics involves the analysis of trauma from a medicolegal perspective within a specific jurisdiction. Medical practitioners may encounter various types of injuries, including burns from different sources, gunshot wounds, and blast or explosive injuries. While these injuries have a profound forensic impact, they are categorized as specialized force injuries. Addressing such injuries demands an in-depth focus that goes beyond the scope of standard physical trauma evaluation.²

Homicide methods and their prevalence differ across cultures. In areas with restricted access to firearms, sharp force trauma, such as cutting or stabbing, is commonly or even predominantly used, accounting for up to half of all homicides. In contrast, blunt force trauma includes injuries caused by fist blows, kicks, impacts with weapons, falls from heights, or vehicle collisions. Male victims are frequently killed by other men, often involving drug influence, whereas female victims are more commonly killed by a partner.³

Homicidal deaths can result from various causes, including injuries caused by blunt or sharp objects, firearms, fire, poisoning, drowning, strangulation, hanging, electrocution, exposure to environmental conditions, or even physical force. In a 1987 study of coroner autopsy cases, homicides accounted for 50.5% of deaths, with the remaining 49.5% resulting from accidents, natural causes, maternal deaths, and suicides combined. Internecine conflicts and crimes often involve a variety of weapons, such as firearms, machetes, swords, axes, knives, clubs, and other improvised tools, resulting in diverse fatal injuries. This study aimed to document and analyze injury patterns observed in autopsies of homicide victims. We believed that understanding the types of injuries and their causes in alleged homicides would aid relevant agencies in constructing an accurate representation of homicide rates in the region. Moreover, classifying injuries is critical for effective forensic analysis and interpretation.⁴

Material and Method:-

A retrospective analysis was conducted on consecutive autopsy cases at the Department of Forensic Medicine and Toxicology, Bhagat Phool Singh Government Medical College, Khanpur Kalan, Sonapat, Haryana, India, spanning from 1st January to 31st December 2023. The primary inclusion criterion was the presence of an allegation or suspicion of homicidal death, as noted in the police's initial report requesting the autopsy. Demographic data collected included the age, sex, type of injuries, and cause of death. The injuries were categorized into blunt force injuries (such as lacerations and patterned abrasions), sharp force injuries (including incised wounds, stab wounds, and chop wounds), and firearm injuries. Additional fatal injuries, such as subgaleal hematoma with subarachnoid hemorrhage and subdural hemorrhage were also analyzed. The data gathered was evaluated using IBM SPSS Statistics software, version 21.

Results:-

A total of 54 homicidal cases of which 35 were males and 19 were females were studied in one year retrospective study.

Table 1:- Classification of Injuries in Homicidal Cases.

Injury	Male	Female	Sum	Percentage (%)
Firearm Wounds	10	0	10	20.83
Chop Wounds	1	0	1	2.08
Lacerations	1	1	2	4.17
Subgaleal Hemotoma+ SDH+ SAH	8	4	12	25
Bruise	4	3	7	14.58
Other Bone Fractures	2	1	3	6.25
Stab Wounds	4	0	4	8.33
Patterned Abrasions	0	3	3	6.25
Ligature Strangulation	0	3	3	6.25
Manual Strangulation	1	2	3	6.25
Burns	2	0	2	4.17

Incised Wounds	2	0	2	4.17
Smothering	0	2	2	4.17
Total	35	19	54	100

Table 1 presents the types and frequencies of injuries in homicidal deaths, broken down by gender. The highest percentage of injuries are due to Subgaleal hemotoma with subdural hemorrhage and subarachnoid hemorrhage, accounting for 25% of the cases, followed by firearm wounds at 20.83%. Bruises are also significant, comprising 14.58% of the injuries. Injuries from stab wounds, other bone fractures, patterned abrasions, ligature strangulation, and manual strangulation each represent around 6.25% of cases. Other injuries, including chop wounds, lacerations, burns, incised wounds, and smothering, are present in 4.17% of cases each. The data indicates that males are more frequently victims than females, with males constituting 72.92% of the total injuries and females 27.08%.

Table 2:- Age Group Analysis in Homicidal Fatalities.

Injury	Age Groups (in years)							Sum
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	
Firearm Wounds	0	0	4	2	1	1	2	10
Chop Wounds	0	0	1	0	0	0	0	1
Lacerations	0	0	3	0	0	0	0	3
Subgaleal Hemotoma+ SDH+ SAH	1	1	4	2	2	0	1	11
Bruise	1	0	2	1	2	1	0	7
Other Bone Fractures	0	0	2	0	0	1	0	3
Stab Wounds	0	2	2	0	0	0	0	4
Patterned Abrasions	0	0	2	1	0	0	0	3
Ligature Strangulation	0	0	2	1	0	0	0	3
Manual Strangulation	1	1	0	0	1	0	0	3
Burns	0	0	0	0	11	0	0	11
Incised Wounds	0	0	2	0	0	0	0	2
Smothering	2	0	0	0	0	0	0	2
Total	5	4	24	7	19	4	3	66

Table 2 outlines the distribution of injuries across different age groups, with the highest number of injuries occurring in the 20-29 age group (24 injuries), followed by the 40-49 age group (19 injuries). Firearm wounds are prevalent in multiple age groups, making total 10 injuries. Subgaleal Hemotoma with subdural hemorrhage and subarachnoid hemorrhage injuries are most common among 20-29 and 40-49 age groups, contributing significantly to the total injuries (11 cases). Burns are concentrated in the 40-49 age group, accounting for all 11 cases. Bruises and stab wounds are observed across various age groups. Overall, the data shows that young adults (20-29) are the most affected by various types of injuries in this sample, making up the largest proportion of total injuries (66 cases).

Table 3:- Anatomical Localization of Injuries.

Injury	Anatomical Landmarks								
	Head	Face	Neck	Thorax	Abdomen	Upper Limbs	Lower Limbs	Genitalia	Back
Firearm Wounds	6	4	1	7	10	3	3	1	7
Chop Wounds	1	0	0	0	0	0	0	0	0
Lacerations	18	1	0	0	0	0	0	0	0
Subgaleal	11	0	0	0	0	0	0	0	0

Hemotoma+ SDH+ SAH									
Bruise	11	0	3	1	1	4	1	0	1
Other Bone Fractures	3	0	6	4	0	1	1	1	0
Stab Wounds	0	0	1	3	3	0	0	0	1
Patterned Abrasions	0	0	3	0	0	0	0	0	0
Ligature Strangulation	0	0	3	0	0	0	0	0	0
Manual Strangulation	0	0	3	0	0	0	0	0	0
Burns	Involving all body parts								
Incised Wounds	1	1	1	0	0	0	0	0	0
Smothering	0	2	0	0	0	0	0	0	0
Total	52	8	22	15	14	8	5	2	9

The table provides an overview of the anatomical distribution of various types of injuries. Firearm wounds predominantly affect the abdomen (10 cases), thorax (7 cases), and head (6 cases). Lacerations primarily target the head (18 cases), while subgaleal hematomas and associated injuries are concentrated exclusively on the head (11 cases). Bruises are spread across different regions, including the head (11 cases) and neck (3 cases). Strangulation injuries, both ligature and manual, are localized to the neck (3 cases each). Burns are noted to involve all body parts. This distribution indicates that different injuries tend to affect specific anatomical landmarks, with some regions like the head and neck being more vulnerable to multiple types of injuries.

Discussion:-

The present retrospective study of 54 homicidal cases, involving 35 males (72.92%) and 19 females (27.08%), highlights the prevalence and anatomical distribution of injuries, with the head and neck being most vulnerable. Young adults (20-29 years) are the most affected, accounting for the majority of injuries. Subgaleal hematoma with subdural and subarachnoid hemorrhage is the most common injury (25%), followed by firearm wounds (20.83%), bruises (14.58%), and various other injuries, including stab wounds, burns, and strangulation, each representing smaller proportions. Firearm injuries target the abdomen, thorax, and head, while burns affect all body regions. Overall, the data emphasizes significant gender disparities and age-related injury patterns, with males being disproportionately affected.

Table 4:- Patterns in Homicidal Wound Distribution Across Countries.

Researcher	Year	Country	Sample Size	Firearm Wounds	Chop Wounds	Stab Wounds	Incised Wounds	Lacerations	Bruise	Bone Fractures	Strangulation	Smothering
Yamada F et al ⁵	2014	Japan	1307	-	-	-	-	-	-	-	-	31
Herbst et al ⁶	2015	South Africa	424	-	6	83	59	315	184	-	-	-
Flieger A ⁷	2016	Germany	897	242	-	-	-	-	-	635	92	-
Vhrithire et al ⁴	2020	Nigeria	236	-	45	4	1	27	14	-	-	-
Present Study	2023	India	54	10	1	4	2	2	7	3	6	2

This table showcases research data comparing various injury types across different countries, time periods, and sample sizes.

1. Study Scope:

The table spans research conducted between 2014 and 2023 in diverse countries: Japan, South Africa, Germany, Nigeria, and India. The studies vary significantly in sample size, with Japan presenting the largest sample (1,307) and India the smallest (54) as per the sample size.

2. Key Observations:

- ☑ Firearm Wounds are notably prominent in Germany (242 cases) but absent in other countries except for India (10 cases).
- ☑ Chop Wounds, although uncommon overall, are recorded in South Africa (6 cases) and India (1 case).
- ☑ Stab Wounds and Incised Wounds occur frequently in South Africa (83 and 59 cases, respectively), highlighting regional differences in injury mechanisms.
- ☑ Lacerations are prevalent in Germany (635 cases) and South Africa (315 cases), suggesting their commonality in these regions.
- ☑ Bruises are most frequent in South Africa (184 cases), with lower numbers in Germany (92) and other regions.
- ☑ Bone Fractures and Strangulation are least reported, appearing sporadically across India and other countries.
- ☑ Smothering is documented uniquely in India (2 cases) and Japan (31 cases), showing its rarity overall.

3. Regional Insights:

Injury profiles reveal regional variations, with firearm injuries more prominent in Germany, and lacerations and bruises widespread in South Africa. These patterns could reflect social, environmental, and demographic factors unique to each location.

Conclusion:-

The present study highlights key patterns in homicidal injuries, revealing critical insights into demographics, age groups, and anatomical vulnerability. The head and neck stand out as the most affected regions, reflecting the severity of these incidents. Young adults are particularly at risk, showing the need for targeted interventions and preventive measures. Regional variations in injury types provide valuable information for forensic investigations, emphasizing the importance of understanding socio-environmental factors that influence homicidal trends globally. These findings underline the necessity of adapting forensic and legal frameworks to address the unique challenges posed by such cases.

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