

Original Research Paper

Pattern of Head injuries in Homicidal deaths at Jaipur During 2012-13, India: An Autopsy based Study

¹R. K. Punia, ²Anil Yadav, ³Lalchand

Abstract

Inflicting injury to the head is one of the most effective methods of homicide. The aim of the present study was to evaluate the pattern of head injury among homicidal death victims. In present study 72 cases of homicidal deaths were studied. Males were victimized Three and half times more than females. Majority of cases were in 21-40 years of age comprising of 34 cases (47.43%). Majority of victims were married in 55 cases (76.38%). Injuries were inflicted by blunt weapons in significant number of cases; 48 cases (66.67%) which were followed by injuries by sharp weapons in 14 cases (19.45%).

The skull was fractured in 75% of victims. Most common pattern observed was combination of SDH & SAH along with skull fracture in 32 cases (44.44%). The majority of the victims (55.5%) died instantly or within 24 hours. Defense wound were present in 47.2% of the victims. The information gained from this type of analysis can be used by law enforcement authorities to curtail the amount of violence present in today's society.

Key Words: Head injury, Defense wound, Blunt weapon, Skull fracture

Introduction:

Head injuries are one of the most effective methods of homicide. The recent rise in the trend of murder cases involving head injury is a serious concern to society. Homicide is prevalent widely almost all over the world.

The head is a vital organ and the most exposed part of body to receive injuries. A cranio-cerebral injury due to blunt trauma causes more homicidal deaths as compared with blunt trauma injury to other areas of the body. Presence of defense wound implies that the victim was able to put some resistance to an assault, at some stage during that assault. [1]

In an assault, the natural reaction of the victim is to protect oneself and certain vital parts of the body like eyes, face, chest and head. Forearms, hands, elbows and legs are raised instinctively; hence defense wounds are more common on these parts of body.

Young offenders are becoming increasingly violent and this is a cause for concern, as they are tomorrow's generation.

The pattern of homicide may be a useful indicator of the social stresses in a community and may also provide useful information for law-enforcement strategies.

Investigation of a homicidal death can never be complete without a detailed post-mortem examination. The detailed analysis and scientific interpretation of autopsy finding is imperative to reconstruct the crime scene.

The main objective of this analysis was to analyze the information to determine trends of head injury in homicide cases in Jaipur region during the study period.

Materials and Methods:

A prospective autopsy study of 72 cases of head injury resulting from assault was conducted at the Department of Forensic Medicine, Government Medical College and Hospital, Jaipur India over a period of one year.

Out of 102 homicidal deaths, 72 cases (70.58%) were due to fatal head injury. Those who died by suicide or by accidental and natural causes were excluded. Information regarding the victims was collected from the inquest report, interviewing the family members and a proper and detailed autopsy examination was done. All observations were then transferred to a Microsoft Excel sheet.

Descriptive statistics for qualitative type of data was summarized and tabulated using frequency and percentages with summarization of all findings.

Corresponding Author:

¹Professor & HOD,
Dept. of Forensic Medicine,
SMS Medical College, Jaipur
E-mail: rkpunia86@gmail.com

²Senior Demonstrator,

³Resident

DOR: 04.02.2014 DOA: 24.07.2014

Observation and Results:

A total of 72 cases of homicidal deaths were included in this study, of which more than three-fourths were males with only about 22% females succumbing to episodes of homicide.

This is quite explainable by the pattern of Indian societies where males are the active members. (Table 1) In our study majority of the homicidal attacks were committed by blunt weapons (66.67%). The use of blunt weapons for an episode of homicidal attack was reported significantly in this study.

Sharp weapons and firearm weapons were put to use in 14 cases (19.45%) and 10 cases (13.88%) respectively. (Table 2)

Present study showed that in more than half of the cases death occurred within twenty four hours of the attack, reflecting the infliction of an injury which was sufficient to cause death in nature thus constituting the crime of murder; although spot deaths were reported to be less than 5% probably due to immediate attention given to the criminal episode. (Table 3)

In this study total head injury cases were 72, of which 54 (75%) cases were having fracture. Most common pattern observed was combination of SDH (Subdural Hemorrhage) & SAH (Sub arachnoid Hemorrhage) along with skull fracture in 32 cases (44.4%).

Next common was combination of EDH, SDH & SAH along with skull fracture in 18 cases (25%). (Table 4) Defense wounds were present in only 34(47.2%) cases out of total 72 cases of homicide in this study. Incised wound were present in 12 cases (16.6%) followed by abrasion in 8 cases (11.1%). (Table 5)

Present study showed that in 75% cases of fatal head injuries there was associated fracture skull. In 18 cases (25.0%) there was fracture of a single bone with depressed fracture in 30% cases. The most common bone to be fractured was frontal and parietal bone followed by temporal bone. Occipital bone was fractured in 3 cases only. No fracture of skull was present in 18 cases. (Table 6)

Discussion:

This study was undertaken to study the pattern of head injuries in culpable homicidal deaths excluding deaths due to rash/ negligent act at Jaipur region, India.

In our study, male: female (M: F) ratio was 3.5:1. Among the 72 victims included in study population, there were 56 males (77.77%) and 16 females (22.23%). Similar findings were observed in various other Indian studies [2, 3] and considerably lower than 6:1. [4]

In our study, the most commonly affected age group was 21-30 years (29.17%) followed by 41-50 years (20.84%) and 31-40 years (18.06%). Most of the other contemporary studies also reported 21-30 years to be the most commonly affected age group. [5-7]

Majority of the victims in our study belonged to the most productive age groups between 21-50 years (68%). Most of the victims i.e. 55 (76.38%) were married and unmarried victims were 17(23.62%).

Present study reports the use of blunt weapons as a means of committing homicide in a significant number of cases (66.67%). Similar findings have been reported by other Indian studies. [6, 8, 9, 11] However, our results are contradictory to many other studies where sharp weapons were used as the most common weapon for commission of homicide. [10, 12]

While other studies clearly shows the preponderance of the use of firearms and their effectiveness as a murder weapon. [15, 17]

Fingerhut et al [18] also reported firearms to be the most common murder weapon in the United States. Being light, handy and easy to use, they are far more effective than blunt objects or sharp weapons.

In our study, about 55.5% victims died within 24 hours of infliction of injury; however, among them spot deaths were seen in only 5.5% cases which is an inconsistent finding in homicidal deaths. This trend has probably resulted as most cases in our study may have been executed without an organized pre planning for the event.

This is quite low as compared to Vij A et al [13] (61.8%) with the event being pre planned in 52.8% cases; Shah JP et al [2] in 65% cases in Karthik SK et al [8] in 56% cases.

Most studies report a very low hospitalization rate of victims of homicidal event in contrast to ours where about 58.3% people were hospitalized following the attack and later succumbed to the episode though within a day in majority of the cases.

In our research Most common pattern observed was combination of SDH & SAH along with skull fracture in 32 cases (44.4%). Next common was combination of EDH, SDH & SAH along with skull fracture in 18 cases (25%). Brain injury was present in 25 cases (34.72%).

All three head structures, i.e. scalp, skull and intracranial structure are involved in most of the cases. A similar trend has also been observed by other study. [14-16] This indicates that the use of strength by the assailant/s is maximum during the material moment to make sureness of the death of the victims.

Defense wounds are of great significance in differentiating manner of unnatural deaths i.e. Homicide, Suicide and Accident.

The presence of defensive or violence associated traumatic wounds is indicative of a homicide. [19] These wounds are mainly seen on the upper limbs because these are the body parts with which a defendant raises to save himself. Presence of defense wounds indicates that victim was conscious, partly mobile and was not taken completely by surprise or was not taken unawares. Absence of defense wounds in few cases of homicides does not mean that defensive activity did not take place and hence does not rule out the possibility of homicide. [20]

Out of 72 cases, only 34 cases (47.22%) showed defense wounds. Male victims were more defensive than the female victims. Metter and Benz [21] in his study found, defense injuries in 48% of Homicidal cases.

Karlsson [22] in his study identified defensive injuries in 41% of homicide victims, Katkici et al found defense injury in 38.5% of cases. [20] Schmidt and Pollak found in 45.9% of cases. [23] Various studies show that the prevalence, location and effective factors associated with defense wounds vary worldwide and can be an indication of the country and the region where they would have taken place. [20]

It is the instinctive behavior of the victim to raise his/her arm to ward off an attack and to protect vital organs such as the brain.

The presence of such injuries indicates an assault by some other person or persons. Depending upon the type of weapon producing the most number of defense wounds, we concluded that assault by sharp cutting weapon produced more defense wounds as compared to assault with hard and blunt objects similar findings were noted by Inoue et al. [25]

Our study clearly pointed out to the fact that the chances of fatality following head injury are greater when multiple cranial bones are involved. Overall in 50% cases multiple bone fracture was detected. This also pointed toward the amount of force applied to the head.

In single bone involvement, Frontal and Parietal was the site of fracture in most of the cases. Yavuz et al [24] also reported linear fractures to be most common in the frontal and temporal region. The occipital bone (2.78%) showed the least involvement in fracture, as it is the thickest among the cranial bones.

Fracture of the occipital bone requires a great amount of force, hence when the occipital is fractured the magnitude of the force is

considerable and sufficient to cause death in the ordinary course of nature.

Summary and Conclusion:

The pattern of homicide may be a useful indicator of the social stresses in a community and may also provide useful information for law-enforcement strategies. Fatality among attack victims with firearm injuries to the head is very high. The type and site of skull fracture and the number of cranial bones involved is an indirect indicator of the severity of force of impact which leads to damage to the underlying brain and results in fatality.

The location of meningeal hemorrhage whether in single or multiple layers has little influence on the outcome while hemorrhage in the deeper layers has higher fatality. Thus these may be considered as high risk factors in violent attacks to the head.

References:

1. **Saukko P, Knight B.** Knight's Forensic Pathology. 3rd ed. London: Hodder Arnold; 2004. p. 336.
2. **Shah JP, Vora DH, Mangal HM, Chauhan VN, Doshi SM, Chotaliya DB.** Profile of Homicidal Deaths in and around Rajkot Region, Gujarat. JIAFM 2013 Jan-March; 35(1):33-36.
3. **Vijayakumari N, Magendran J, Meiyazhagan K.** Pattern of Homicidal Deaths at a Tertiary Care Centre, Chennai- A Prospective Study. Indian Journal of Forensic Medicine & Toxicology. 2013 Jan-June; 7(1):121-124.
4. **Shetty AK.** Trends of homicidal deaths in and around Belgaum, Karnataka. Medico-Legal Update. 2010; 10(1):6.
5. **Patel DJ.** Analysis of Homicidal deaths in and Around Bastar Region of Chhattisgarh. JIAFM 2012 Apr-June; 34(2):39-144.
6. **Buchade D, Mohite S.** Pattern of Injuries in Homicidal Cases in Greater Mumbai- A Three Year Study. JIAFM 2011 Jan-March; 33(1):46-49.
7. **Shivakumar BC, Vishwanath D, Srivastava PC.** Trends of homicidal deaths at a tertiary care centre Bengaluru. JIAFM 2011; 33(2):120-124.
8. **Karthik SK, Balaji PA, Syed Sadat Ali, Jayaprakash G, Mohan Velu J.** Analysis of Homicidal patterns in Bangalore City, India. Indian Journal of Forensic Medicine and Toxicology. 2012 Dec; 6(2):64-67.
9. **Mohanty MK, Kumar M, Mohanram A, Palimar V.** Victims of homicidal deaths- An analysis of variables. J Clin, Forensic Med. 2005 Dec; 12(6):302-304.
10. **Gupta S, Prajapati P.** Homicide trends at Surat region of Gujarat, India. Journal of Forensic Medicine and Toxicology. 2009; 26(1):45-48.
11. **Oberoi SS, Singh SP, Aggarwal KK, Bhullar DS, Aggarwal A, Walia DS, Thind AS.** Profile of fatal assault cases in Patiala. J Punjab Acad Forensic Med Toxicol. 2011; 11(2): 87-89.
12. **Hugar BS, Chandra G, Harish S.** Pattern of homicidal deaths. JIAFM 2010 July; 32 (3):194-198.
13. **Vij A, Menon A, Menezes RG, Kanchan T, Rastogi P.** A retrospective review of homicides in Mangalore, South India. J Forensic Leg Med. 2010 Aug; 17(6):312-5.
14. **Dixit P.C., Dogra T.D., Chandra J.** "Comprehensive study of homicides in South Delhi, 1969-1979. Med. Science and Law, 1986, Vol. 26 (3), Page 230-234.
15. **Chattopadhyay S, Tripathi C B.** "Skull fracture and haemorrhage pattern among fatal and nonfatal head injury assault victims a critical analysis, Journal of Injury and Violence Research, 2010, Vol. 2, No 2.
16. **Patil Amit M, Walter F Vaz.** "Pattern of blunt head injury: A two year retrospective/prospective medico-legal autopsy study", JIAFM 2010, 32 (2), P144-149.

17. Memchoubi PH, Momonchand A, Fimate L. Homicides in and around Imphal. JIAFM 2003; 25(1): 13-15.
18. Fingerhut LA, Ingram DD, Feldman JJ. Firearm and non firearm homicides among persons 15 through 19 years of age. JAMA, 1992; 267(22):3048-53.
19. Brunel C, Fermanian C, Durigon M, de la Grandmaison GL. Homicidal and suicidal sharp force fatalities: Autopsy parameters in relation to the manner of death. Forensic Sci. Int. 2010 198: 150-154.
20. Katkici U, Ozkök MS, Orsal M. An Autopsy evaluation of defense wounds in 195 homicidal deaths due to stabbing. J Forensic Sci Soc. 1994; 34: 237-240.
21. Metter D, Benz D. Self defense injuries in homicides caused by penetrating forces. Z Rechtsmed, 1989; 102:277-291.
22. Karlsson T. Homicidal and suicidal sharp force fatalities in Stockholm, Sweden. Orientation of entrance wounds in stabs gives information in the classification. Forensic Sci Int. 1998; 93: 21-32.
23. Schmidt U, Pollak S. Sharp force injuries in clinical forensic medicine findings in victims and perpetrators. Forensic Sci Int. 2006; 159: 113-118.2: 277-291.
24. Yavuz SM, Asirdizer M, Cetin G, Balci YG, Alintok M. The correlation between skull fractures and intra cranial lesions due to traffic accidents. Am J Forensic Med Pathol. 2003; 24(4): 339-45.
25. Inoue H, Ikeda N, Ito T, Tsuji A, Kudo K. Homicidal sharp force injuries inflicted by family members or relatives. Med Sci Law. 2006; 46: 135-140.

Table 1: Age and Sex wise Distribution of Victims of Homicidal Deaths

Age Grps (yrs)	Victims		Total Victims (%)
	Male	Female	
< 10	00	02	02 (2.77)
11-20	07	03	10 (13.88)
21-30	16	05	21(29.17)
31-40	11	02	13(18.06)
41-50	14	01	15 (20.84)
51-60	05	02	07 (9.73)
61-70	02	01	03 (4.17)
> 71	01	00	01 (01.38)
Total (%)	56 (77.77%)	16(22.23%)	72 (100%)

Table 2: Distribution of Victims According to the Weapon Used to Inflict the Attack

Weapon	Cases	Total (%)
Blunt	48	66.67
Sharp	14	19.45
Firearm	10	13.88
Total	72	(100%)

Table 3: Distribution of Victims According to the Period of Survival after the Attack

Period of survival after attack	Cases	Total (%)
Spot death	04	(5.55%)
< 6 hrs	21	(29.17%)
6-24 hrs	15	(20.84%)
1-2 days	07	(9.72%)
2-7 days	14	(19.45%)
> 7 days	11	(15.27%)
Total (%)	72	(100%)

Table 4: Pattern of Head Injury in Homicidal Death

Pattern of Head Injury	Cases	Percentage (%)
Fracture Of Skull	54	75.0
EDH	0	0
SDH	4	5.55
SAH	6	8.33
EDH+SAH	4	5.55
SDH+SAH	32	44.44
EDH+SDH+SAH	18	25.00
Brain injury	25	34.72

EDH = Extradural hemorrhage, SDH = Subdural hemorrhage, SAH = Subarachnoid hemorrhage

Table 5: Types of Defense Wound

Type	Cases	Percentage (%)
Abrasion	8	11.11
Bruise	7	9.72
Incised Wound	12	16.66
Lacerated Wound	7	9.72

Table 6: Distribution of Fracture of Skull in Victims of Homicidal Deaths

Bone fractured	Cases	Percentage (%)
Frontal bone	06	8.33
Parietal bone	06	8.33
Temporal bone	04	5.55
Occipital bone	02	2.78
Frontal+ parietal	7	9.74
Frontal +temporal	13	18.05
Parietal + temporal	04	5.55
Parietal +occipital	03	4.17
Multiple skull bones	9	12.6
No fracture	18	25.0
Total	72	100