

Original Research Article

A Study on Homicidal Head Injury Cases with Findings in Medicolegal Autopsy At Darbhanga Medical College & Hospital, Bihar

Dhirendra Kumar Chaudhary¹, Kunal Babu², Prafulla Kumar Das^{3*}

¹Junior Resident, Department of Forensic Medicine and Toxicology, Darbhanga Medical College & Hospital, Bihar, India

²Junior Resident, Department of Forensic Medicine and Toxicology, Darbhanga Medical College & Hospital, Bihar, India

³Associate Professor, Department of Forensic Medicine and Toxicology, Darbhanga Medical College & Hospital, Bihar, India

Received: 10-10-2021 / Revised: 25 -11-2021 / Accepted: 19-12-2021

Abstract

Introduction: Traumatic head injury (THI) is one of the prevalent causes of global death and disability. lately, head injury (HI) cases have increased in both developed and developing nations. Therefore, it is of great value to evaluate various aspects associated with head injury.

Methodology: This study includes all cases of deaths pertaining to head injury, presented to the mortuary of the Darbhanga Medical College & Hospital, Darbhanga, Bihar for autopsy, over the period of one year that was from July 2018 to June 2019. Ethical approval for this study was taken with due procedure from the college ethical committee. **Results:** The present work reported a total of 48 cases with cause of death pertaining to head injury that reported to the Department of Forensic Medicine & Toxicology during the study period. The present work showed that the majority (43.7%) of cases was in the age group 25-49 years followed by age group of ≥ 50 years. Blunt head trauma was the most frequent type of trauma followed by multiple trauma. The least frequent was penetrating type of trauma. **Conclusions:** The exponentially increasing vehicle numbers, bad to traffic laws such as not keeping lane discipline driving in zigzag patterns by the public, badly maintained and congested highways, alcohol abuse and absence of knowledge of helmets and the new generation of high-speed cars are all liable for crashes.

Key Words: Homicidal Head Injury, Traumatic head injury, Medicolegal Autopsy.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Traumatic head injury (THI) is one of the prevalent causes of global death and disability. lately, head injury (HI) cases have increased in both developed and developing nations. Therefore, it is of great value to evaluate various aspects associated with head injury [1]. Every injury that results in harm to the scalp, skull or brain can be sort out as a HI which can be caused by traffic mishap, falls, sports and gunshot wounds. Vehicle accidents are one of the most prevalence causes of THI as they are deemed to be one of the main causes of fatality due to road traffic accidents (RTA) [2]. THI seriousness extended from mild to severe as it can induce astute alterations in molecular signaling, changes in the structures and function of the cell, and/or tissue injury, like contusion, hemorrhage, and diffuse axonal injury [3].

The epidemiology of serious THI is changing. These epidemiologic patterns may be used for management, monitoring, guidance for injury prevention measures and foreteller of mortality [4]. Blunt force cranial trauma may result from interpersonal violence (e.g., assault), accident (e.g., effect in traffic crashes) or self-inflicted injury (suicide by jumping from elevated locations), while sharp force trauma is predominantly linked to interpersonal violence. Scientists agree that cranial injuries are more probable to result from interpersonal violence than postcranial fractures [5].

*Correspondence

Dr. Prafulla Kumar Das

Associate Professor, Department of Forensic Medicine and Toxicology, Darbhanga Medical College & Hospital, Bihar, India.

E-mail: prafullakumardas77@gmail.com

banning of head and neck injury have to be the target and this can be accomplished by get better socioeconomic condition, educational standard level, add more security measures in this progressing and changeful lifestyle and the extension of corroboration to the judicial authorities by best submission of evidences as an expert to avoid failure of justice [6].

The study was carried to comment on the medico legal autopsy findings of homicidal head injury cases by the Department of Forensic Medicine and Toxicology, Darbhanga Medical College & Hospital, Laheriasarai, Darbhanga, Bihar.

Methodology

This study includes all cases of deaths pertaining to head injury, presented to the mortuary of the Darbhanga Medical College & Hospital, Darbhanga, Bihar for autopsy, over the period of one year that was from July 2018 to June 2019. Ethical approval for this study was taken with due procedure from the college ethical committee. Our study attempted to define the socio-demographic and medico legal aspects of such cases. Following information were obtained from the patients' records:

- Socio-demographic aspects:** a) Age groups: -The studied patients were classified into 4 groups as following: (0-9 y), (10-24 y), (25- 49 y) and ≥ 50 years; b) Gender: Number of males and females and the sex ratio; c) Seasonal variation: Summer, winter, spring or autumn. 4-Outcome
- Medicolegal aspects:** a) Type of trauma: (Blunt, sharp, firearm, penetration, multiple); b) Sites of head trauma: (Parietals, Temporal, occipital, frontal, face, multiple); c) Manner of exposure: (Accidental, homicidal, suicidal); d) Causes of injury: (fall, Road traffic accident, gunshot, abuse, sports); e) Mechanism of injury: (severe blow, rotational movement, combined mechanism).

Statistical analysis

The data collected from the autopsies were entered and analyzed using Statistical Package for Social Sciences (SPSS) ver. 20.0. Results has been shown in terms of numbers and percentage and depicted in form of tables and text.

Results

The present work reported a total of 48 cases with cause of death pertaining to head injury that reported to the Department of Forensic Medicine & Toxicology during the study period.

Age, gender and seasonal variation

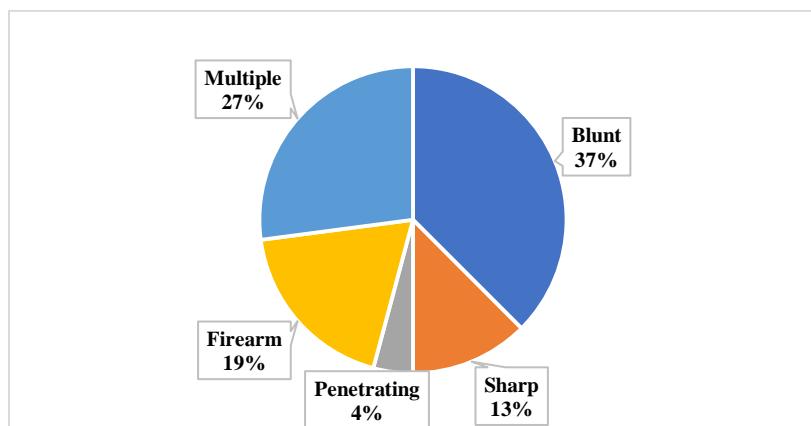
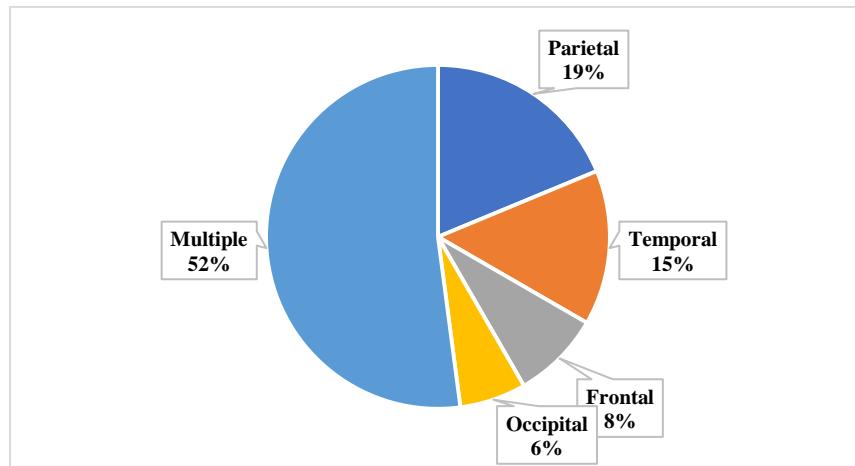
The present work showed that the majority (43.7%) of cases was in the age group 25-49 years followed by age group of ≥ 50 years. The majority of cases were males. The most prevalent cases were occurred in summer [Table 1].

Table 1: Distribution of the cases based on socio-demographic characteristics

| Socio-demographic data | Number (%) |
|------------------------|------------|
| Age groups | |
| 0-9 years | 9 (18.8%) |
| 10-24 years | 6 (12.5%) |
| 25-49 years | 21 (43.7%) |
| ≥ 50 years | 12 (25.0%) |
| Gender | |
| Male | 35 (72.9%) |
| Female | 13 (27.1%) |
| Season | |
| Summer | 19 (39.6%) |
| Autumn | 8 (16.7%) |
| Winter | 14 (29.2%) |
| Spring | 17 (35.5%) |

Type and site of trauma

Blunt head trauma was the most frequent type of trauma followed by multiple trauma. The least frequent was penetrating type of trauma. Moreover, the most of the cases had multiple sites of trauma(Figure 1 & 2).

**Fig 1: Pie diagram showing distribution of cases based on the type of head trauma****Fig 2: Pie diagram showing distribution of cases based on the site of head trauma**

Cause of head injury

RTA were the most common cause of head injury followed by fall, while the sport related injuries were the least frequent ones [Figure 3].

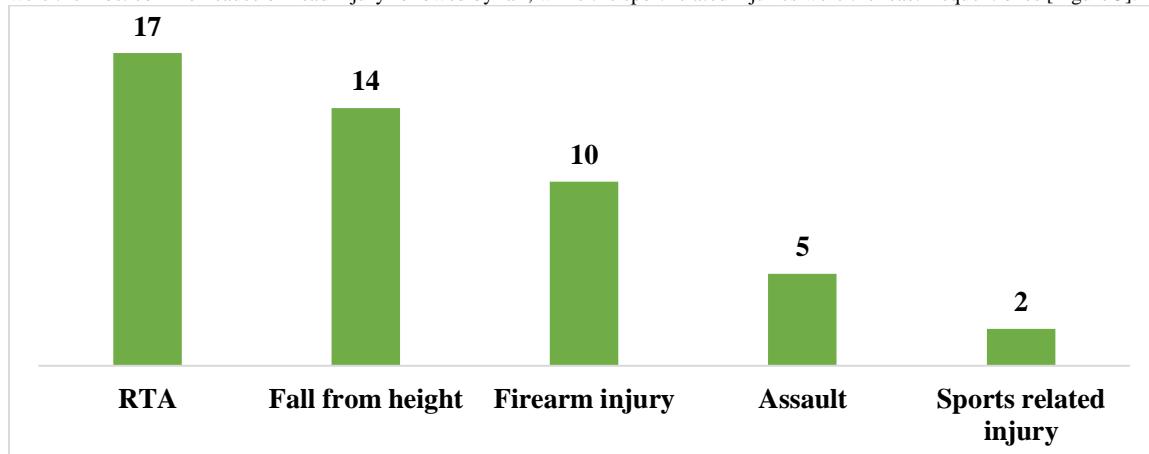


Fig 3: Column showing distribution of cases based on the causes of head trauma

Manner of trauma

The most frequent manner of head injury was accidental while suicidal manner was the least frequent as shown in Table 2.

Table 2: Manner of trauma

| Manner of trauma | Number | % |
|------------------|--------|-------|
| Accidental | 36 | 75.0% |
| Homicidal | 11 | 22.9% |
| Suicidal | 1 | 2.1% |

Discussion

The present study aimed to estimate the incidence of TBI in order to help create measures for TBI prevention. The most commonly affected age group was young adult followed by the elderly. Adolescents followed by children were the less commonly affected group. This finding is contrary to that of Halldorsson et al. [7] where they reported children to be the most commonly affected group. Also, a study done in emergency department in England, Wales by NICE in 2014 [8] found that 50% of traumatic head injury cases are children aged less than 15 years. This may be attributed to the fact they reported the overall incidence of head injury reported to the hospital and this study reports the incidence of death due to THI which is higher among the older age group. In line with this study, a study was conducted in Zagazig, Egypt by Taha and Barakat [9] who found that the most common age group was (20-29 years). Similary, Ravikumar [10] conducted a survey and discovered that the most susceptible age groups are those of the third century 48.13%, followed by the fourth century 24.06%, as these age groups are commonly discovered on the highways and are usually reckless drivers. This is because young adults are the family's top bread earners and remain outdoors for most of the day, while children are confined to the outskirts of the residential premises only [11]. The current study revealed that, males were prevalent constituting gender. Similar results has been reported by many of the previous researchers [9, 12, and 13]. Young men are also more likely to engage in fights involving weapons and firearms, engage in high-risk or contact sports such as football, karate, boxing, etc., and are much more likely to be employed in occupations with some form of industrial risk, often involving heavy equipment or manual labor [11, 12]. In the present study, the peak incidence of traumatic head injuries was in summer followed by spring season. Similar result has been elucidated by Sethi et al. [14]. In the current study, blunt trauma injuries were the most frequent and the least was penetrating injuries. These findings agreed with results of Mohanty et al. [15] in India who found that blunt trauma was the most common constituting while the least common was firearm trauma representing. In the current study, accidental infliction was the most common manner of infliction, while suicidal injury was the least. In the same

line with results of Yadav et al. [12], who found that, there were 92.4% victims of accidents, 6.7% of homicides and just 0.9% suicide committed by the victim. In our research, RTA were the most prevalent cause of head injuries while the least prevalent incidence in sport related injuries. These findings may agree with many previous authors [2]. The elevated incidence rate of traumatic head injuries caused by RTA could contribute to rapid and heavy traffic flow, as well as rapid industrialization in densely populated regions, growing number of cars, gnarling traffic rules and speed limits [10, 12].

Conclusions

RTA is also an unplanned occurrence that occurs in an unforeseen situation suddenly, and inadvertently. Also, two-wheeler motorized cars make up a big part of India's car fleet. The exponentially increasing vehicle numbers, bad to traffic laws such as not keeping lane discipline driving in zigzag patterns by the public, badly maintained and congested highways, alcohol abuse and absence of knowledge of helmets and the new generation of high-speed cars are all liable for crashes.

References

1. Wang J, Han F, Zhao Q, Xia B, Jialin Dai J. Clinico-pathological characteristics of traumatic head injury in juvenile, Middle-Aged and Elderly Individuals. international medical journal of experimental and clinical research. 2018; 24: 3256-3264.
2. Chelly H, Bahloul M, Ammar R, Dhouib A, Mahfoudh K B, Boudawara MZ. Clinical characteristics and prognosis of traumatic head injury following road traffic accidents admitted in ICU "analysis of 694 cases". European Journal of Trauma and Emergency Surgery. 2017; <https://doi.org/10.1007/s00068-017-0885-4>.
3. Pearn ML, Niesman IR, Egawa J, Sawada A, Almenar-Queralt A, Shah S B. Pathophysiology Associated with Traumatic Brain Injury: Current Treatments and Potential Novel Therapeutics. Cellular and Molecular Neurobiology. 2017; 37(4):571- 585.
4. David F, Meaney, Smith D H. Biomechanics of Concussion. Clin Sports Med. 2014; 30(1): 19 - 31.
5. Kranioti E F. Forensic investigation of cranial injuries due to blunt force trauma: current best practice. Research and Reports in Forensic Medical Science. 0215; 5:25-37.
6. Kumar D, Bains V, Sharma BR, Harish D. Descriptive Study of Head Injury and its Associated Factors at Tertiary Hospital, Northern India. Journal of Community Medical Health Education. 2017; 2:141.
7. Halldorsson J G, Flekkoy K M, Gudmundsson K R, Arnkelsson G, Arnarson E O. Urban-Rural Differences in Pediatric Traumatic Head Injuries: A Prospective Nationwide Study.

Journal of Neuropsychiatric Disease and Treatment. 2007; 3(6):935-941.

- 8. NICE. Head Injury: Triage, Assessment, Investigation and Early Management of Head Injury in Children, Young People and Adults. NICE Clinical Guideline, United Kingdom. National Institute for Health and Clinical Excellence: Guidance. 2014
- 9. Taha M M, Barakat M I. Demographic Characteristics of Traumatic Brain Injury in Egypt; hospital based study of 2124 patients. Journal of Spain neurosurgery. 2016; 5:6.
- 10. Ravikumar R. Patterns of Head Injuries in Road Traffic Accidents Involving Two wheelers: An Autopsy Study. J Indian Acad Forensic Med. 2013; 35 (4): 0971-0973.
- 11. Gupta A. Cranio-Cerebral Damage with Special Reference to Circle of Willis in Fatal Road Traffic Accidents. Anil Aggrawal's Internet Journal of Forensic Medicine and Toxicology. 2010; 3(2):1..
- 12. Yadav A, Kohli A, Aggarwal N K. Study of Pattern of Skull Fractures in Fatal Accidents in Northeast Delhi. Indmedica - MedicoLegal Update. 2008; 8(2):1.
- 13. Hassan N, Ali M, Haq N U, Azam F, Khan S, Khan Z. Etiology, clinical presentation and outcome of traumatic brain injury patients presenting to a teaching hospital of Khyber Pakhtunkhwa. Journal of Postgraduate, 2019; 31(4): 365-70.
- 14. Sethi R K V, Kozin E T, Lee D J, Shrime M G, Gray S T O. Epidemiological Survey of Head and Neck Injuries and Trauma in the United States. Otolaryngol Head Neck Surg. 2020; 151(5): 776-784.
- 15. Mohanty S, Mohanty M K, Panigrahi M K. Fatal head injury in homicidal victims. Medicine, science and the law. 2021; 45(3):244-8.

Conflict of Interest: Nil

Source of support: Nil