e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(5); 1580-1584

Original Research Article

Pattern of Injuries in Victims of Road Traffic Accidents in Haryana: A Retrospective Study

Mamta Kumari[1], Sandeep Kumar Giri[2], Sanchit Jain[3], Mandeep[4], Kunal Khanna[5], Tarun Dagar[6]

[1]Assistant Professor, Department of Forensic Medicine, Muzaffarnagar Medical College, Muzaffarnagar, Uttar Pradesh, India

[2]Associate Professor, Department of Forensic Medicine, Kalpana Chawla Govt Medical College, Karnal, Haryana, India

[3]Assistant Professor, Department of Forensic Medicine, National Capital Region Institute of Medical Sciences, Meerut, Uttar Pradesh, India

[4]Senior Resident, Department of Forensic Medicine, Adesh Medical College, Shahabad, Haryana

[5]Associate Professor & Head, Department of Forensic Medicine, Kalpana Chawla Govt Medical College, Karnal, Haryana, India

[6]Assistant Professor, Department of Forensic Medicine, Kalpana Chawla Govt Medical College, Karnal, Haryana, India

Received: 01-01-2026 / Revised: 25-04-2026 / Accepted: 12-05-2026

Corresponding Author: Dr. Sandeep Kumar Giri

Conflict of interest: Nil

Abstract

Abstract: Death due to road traffic accidents (RTA) is one of the leading causes of mortality and morbidity in India. In this retrospective descriptive study, pathological features of these cases as type of injury, pattern and distribution of injuries, body parts involved, fatal injuries and cause of death were noted at the actual time of post-mortem examination of the victims. All the data thus collected was analyzed using Descriptive statistics.

Methods: We conducted our study from data obtained retrospectively on registered road traffic accidents cases from Doctor's registered ID on the official Medicolegal website of Haryana Medlaeprhry.gov, for the period 2015 to 2018.

Results: A total of 357 road traffic accident cases were reported between 2015 & 2018 and the study recorded the highest RTAs cases when compared to the other registered cases. Among 357 cases of RTAs, maximum victims were male 78.1%, whereas 21.9% were female. Majority of deaths occurred in the age group of 21-30 years (31.7%) and most of the victims were doing labour work. The most frequently injured body region was head (55.2%), followed by upper limbs (14.5%). In the head and maxillofacial region, contusions were the most common blunt force injuries, skull bone fractures were frequently observed, and subarachnoid haemorrhage (SAH) was the most common intracranial haemorrhage. In the chest region, rib fractures were the most common skeletal injuries, and multiple lacerations were observed in the lungs. In the abdomen region, abrasions blunt injury was the predominant external injuries, while liver laceration was the most commonly observed internal organ injury. Whereas pelvic bone fracture was predominant in pelvic region. As compare the blunt injuries over upper limbs and lower limbs, upper limbs sustained more injuries, in which abrasion was predominant along with bone fracture and in lower limbs, laceration blunt injury along with bone fracture were common. The most commonly damaged internal organ was brain and the most common cause of death was head injury (44%) followed by haemorrhage & shock due to multiple injuries (33.9%) and septic shock due to multiple injuries (15.1%).

Conclusion: It may be concluded that there is urgent need to address the epidemic of RTA on the roads. Road traffic deaths are to a great extent preventable. We encourage the use of this data to develop strategies that protect pedestrians and other vulnerable road users from RTAs.

Keywords: RTAs, Brought dead, Mortality, Injury, Prevention.

DOI: 10.25258/ijcpr.18.5.253

Introduction

The term accident has been defined as an occurrence in the sequence of events which usually produces unintended injury, death or property damage. Among all types of accidents, those

caused by motor vehicles claim the largest toll of life.[1]Road traffic accidents (RTAs) is an issue of national concern, considering its magnitude and gravity and the consequent negative impacts on the economy, public health and the general welfare of the people. Road traffic injury (RTI) is a major but neglected public health problem in both developing and developed countries.[2] The Annual Report on 'Road Accidents in India-2023 has been published by the Ministry of Road Transport and Highways. This report is based on the data/information received from police departments of States/UTs on calendar year basis in standardized formats as provided by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) under the Asia Pacific Road Accident Data (APRAD) base project. As per the report, A total number of 4,80,583 road accidents have been reported by Police Departments of States and Union Territories (UTs) in the country during the calendar year 2023, claiming 1,72,890 lives and causing injuries to 4,62,825 persons. This marks the total number of Road Accidents registered an increase by 4.2% in 2023 compared to the previous year 2022. The number of persons killed and the number of persons injured had also increased by 2.6% and 4.4% respectively in 2023 as compared to the year 2022.[3] Through this study, it is intended to examine the pattern of injuries in road traffic accidents in Rohtak region of Haryana and to address various safety measures that should be taken for reducing deaths due to road traffic accidents.

Material and Methodology

It was a retrospective descriptive study in which autopsy cases of road traffic accidents were analysed. The data was collected from the personal Doctors ID on official website Meadleprhry from the year of 2015 to 2018. The postmortem reports were read and the necessary details were sought in terms of age, gender, type and site of injury, survival period, time since death and cause of death etc. The collected data was analysed by SPSS version 23, and the results were interpreted in terms of percentage and mean. A total of 357 RTAs cases were analysed for different variables. For this study, the pattern of injuries sustained during RTAs was documented by dividing the body into anatomical regions such as head and face, thorax, abdomen, pelvis, upper limbs and lower limbs etc.

Result and observation

The salient features of results of this study are as follows: The majority of deaths occurred in the age group of 21-30 years (113 cases) followed by age group of 31-40 years (79 cases) and age group 41-50 years (58 cases) (Table 1). Among all the study participants, 279 were male whereas 78 were female. The various injuries were studied by divided the body regions such as head and neck, maxillofacial, chest, abdomen, pelvis, upper limb and lower limb. Majority of the victims sustained injuries over head and neck region (691) followed by upper limbs(182) (Table 2). Table 3represents the distribution of victims according to the injuries sustained over head & neck region of the body. The most common external blunt injury was contusion over the scalp in 134 cases with associated skull bone fracture among 135cases. In majority of the victims, Subarachnoid Haemorrhage was the commonest when compared to other type of injury.

Table 1: Age-groups of participants (n= 357)

Age group	Total
0-10	12 (3.3%)
10-20	38 (10.6%)
21-30	113 (31.7%)
31-40	79 (22.1%)
41-50	58 (16.2%)
51-60	32 (8.7%)
61-70	16 (4.9%)
71-80	7 (2.0%)
81-90	2 (0.5%)

Table 2: Distribution of body regions injured in the accident

Site of injury	Total injuries
Head/Neck	691 (55.2%)
Maxillofacial	19 (1.5%)
Chest	114 (9.2%)
Abdomen	71 (5.6%)
Pelvis	55 (4.3%)
Upper limb	182 (14.5%)
Lower limb	120 (9.5%)
Total	1252

While observing the injuries over the head and neck region(table 3), SAH (164) is the commonest followed by skull bone fracture (135) and scalp contusion (134) Our findings correlated with study of Dalbir et al, Sunil A et al and Ranjana Singh et al. They all concluded that it may be due to rash driving, high-speed vehicle collision or non-wearing of seat belt or helmet. Therefore, safety measures should be taken to reduce the fatal RTAs.

According to the table 4, the victims sustained fatal chest injuries, including fracture of ribs (81%) followed by clavicle, sternum fracture along with laceration of lungs (79%) leading to the formation of hemothorax or pneumohemothorax. Ribs fracture was the most prevalent kind of chest injury, and consistent with the findings of the study conducted by Niraj Kumar et al, Ranjana Singh et al, Vipul N Ambade.

Liver was found lacerated in 18 victims of RTAs, and spleen was lacerated in 8 victims. It was observed that the abrasion was present over the abdomen among 21 victims, and in some victims, small intestine was ruptured due to blunt impact whereas thoracic-lumbar vertebrae was found fractured in 1 victim (Table 5). Our study's results were consistent with the study conducted by Sunil Aggarwal et al, Vipul N Ambade et al and Nilambar Jha et al.

Table 3: Distribution of injuries to head and neck (n- 710)

Head	**Injuries**	
Scalp	Contusion	134
	Lacerated wound	56
	Stitched wound	32
	Crush wound	4
Fractures	Vertebrae	20
	Nasal	4
	Skull	135
	Anterior cranial fossa	13
	Middle cranial fossa	14
	Posterior cranial fossa	3
	Maxilla	9
	Mandible	6
	Base of skull	2
Intracranial haemorrhage	EDH	21
	SDH	93
	SAH	164

Table 4: Distribution of injuries to chest (n-114)

Fractures	Ribs	66
	Clavicle	8
	Sternum	4
	Scapula	3
Lungs	Contusion	5
	Laceration	26
	Rupture	2

Table 6 shows the injuries distributed over the pelvic area. Among 357 cases, 55 cases (15%) sustained injuries to the pelvis region with pelvic fracture in 29 victims (53%), bladder rupture in 22 cases (40%) and sacrum fracture in 4 victims (7%). Similar results were observed in the study of Vipul N Ambade et al, Nilambar Jha et al. It was observed (table 7) that among injuries found on the upper limbs, abrasion (103) especially grazed abrasions were most frequent whereas over lower limbs, fracture of bones were commonest. All other authors also find a similar result in their studies Yogesh G, Divyesh Saxena et al, Ranjana Singh et al.

A huge number of 119 victims (33.3%) died instantaneously or on the spot, and another 88 victims(24.6%) died within 1-2 days. Victims of numbers 102 managed to survive for a week and more after receiving treatment in the initial golden hours, but died due to delayed complications of the injuries over the body. It was observed that the majority of victims died due to head injury alone (44%), followed by 33.9% victims who died due to haemorrhage and shock due to multiple injuries, and 15.1% victims expired due to septic shock due to multiple injuries (Table 8,9). These findings were consistent with the results of studies conducted by Dalbir Singh et al, Tarun Dagar et al.

Table 5: Distribution of injuries to Abdomen(n-71)

Liver	Contusion	11
	Laceration	18
Spleen	Laceration	8
Kidney	Contusion	5
	Laceration	1
Other	Abrasion over abdomen	21
	Stab	3
	S/I rupture	3
	Thoracic/lumbar vertebrae fracture	1

Table 6: Distribution of injuries to Pelvis'(n-55)

Pelvis fracture	29
Sacrum fracture	4
Bladder rupture	22

Table 7: Distribution of injuries to Upper Limbs and Lower Limbs(n- 182, n-120)

U/L		**L/L**
Contusion/ Abrasion	103	21
Lacerated Wound	31	46
Fracture	48	53

Table 8: Distribution of Victims according to Survival duration (n-357)

Instant death	119 (33.3%)
1-2 days	88(24.6%)
3-4 days	31(8.7%)
4-5 days	17(4.8%)
1 week	17(4.8%)
>1 week	85(23.8%)

Table 9: Distribution of Victims according to cause of death (n-357)

Head Injury	157 (44.0%)
Septic shock due to multiple injuries	54 (15.1%)
Haemorrhage and shock due to multiple injuries	121 (33.9%)
Abdominal injury	19 (5.3%)
Chest injury	6 (1.7%)

Discussion

Road traffic accidents (RTAs) remain a significant cause of preventable mortality in India and represent a substantial burden on forensic and medicolegal services. The present autopsy-based retrospective study analysed 357 fatal RTA cases and highlights important epidemiological and injury pattern characteristics relevant to the Haryana region. The majority of victims in this study belonged to the 21-30 years age group (31.65%), followed by 31-40 years, indicating that young adults in their most productive years are disproportionately affected. Similar findings have been reported by Singh R et al., Ambade VN et al., and Dagar T et al., where the highest incidence was observed in the third and fourth decades of life. Increased mobility, occupational exposure, risk-taking behaviour, and non-compliance with traffic regulations may explain this distribution. The socio-economic impact of such premature deaths is considerable. A marked male predominance was observed, which is consistent with most Indian studies. Males are more frequently involved in outdoor activities, driving occupations, and high-speed vehicular travel, predisposing them to greater risk of fatal accidents. The present study demonstrated that the head and neck region was the most commonly injured site.

Intracranial haemorrhage, particularly subarachnoid haemorrhage, and skull fractures were frequently encountered. Head injury was also the leading cause of death (157 cases). These findings corroborate previous autopsy-based studies which identify head trauma as the principal fatal injury in RTAs. The high incidence of head injuries may be attributed to active evasion of helmet usage among two-wheeler riders and seat-belt usage among four wheeler drivers. Chest injuries were the next most significant injuries observed, with rib fractures and lung lacerations being predominant. Thoracic trauma contributes substantially to mortality due to respiratory compromise and massive internal haemorrhage. The pattern of chest injuries in this study is comparable to findings reported by Kumar N et al. and Ambade VN et al. Abdominal injuries were less frequent but involved solid organs such

as liver and spleen, consistent with blunt force trauma mechanisms. Pelvic fractures and bladder ruptures reflected high-energy impacts typical of vehicular collisions. Although limb injuries were commonly documented, they were rarely the sole cause of death; however, they contributed to haemorrhage and shock when associated with multiple injuries. Analysis of survival duration revealed that a significant proportion of victims died instantaneously or within 24 hours, suggesting severe primary impact injuries. However, a notable number of cases survived for several days and later succumbed to complications such as septic shock. This observation highlights the importance of efficient trauma care systems, early resuscitation, and infection control measures in reducing preventable deaths. The predominant causes of death in this study were head injury alone, followed by haemorrhage and shock due to multiple injuries. These findings are consistent with other forensic studies conducted in North India. From a medicolegal perspective, detailed documentation of injury patterns during autopsy is crucial for reconstruction of events, determination of mechanism of injury, and correlation with alleged circumstances. The findings of the present study emphasize that most fatal RTAs are preventable. Strict enforcement of traffic rules regulations, mandatory helmet and seat belt use, speed control, improved road engineering, and strengthening of emergency trauma services are essential measures to reduce mortality.

Conclusion

The present autopsy-based retrospective study highlights that young adult males constitute the most vulnerable group in fatal road traffic accidents in Haryana. The head and neck region was the most frequently injured site, and head injury was the leading cause of death. Intracranial haemorrhage, particularly subarachnoid haemorrhage, was the predominant fatal pathology. The high proportion of instantaneous and early deaths reflects the severity of primary impact injuries, whereas delayed deaths due to septic shock indicate the need for improved trauma management and critical care services. Road traffic fatalities are largely preventable. Strict enforcement of helmet and seat belt laws, speed regulation, improvement in road infrastructure, public awareness programs, and strengthening of pre-hospital and emergency trauma care systems are essential to reduce morbidity and mortality. From a forensic perspective, systematic documentation of injury patterns is vital for medicolegal interpretation, reconstruction of events, and formulation of preventive strategies. Therefore, it is imperative to follow the traffic rules made by the government and at the same time government must ensure the strict adherence of traffic rules in the state. It is important to follow the traffic rules and safety measures in order to bring down the accident risk and fatality in the state of Haryana

Source of funding: Nil

References

1. Park K. Park's Textbook of Preventive and Social Medicine. 24th ed. Jabalpur: Banarsi Das Bhanot; 2017. pp. 423.
2. Singh R, Singh HK, Gupta SC, Kumar Y. Pattern, severity and circumstances of injuries sustained in road traffic accidents: a tertiary care hospital-based study. Indian journal of community medicine. 2014 Jan 1;39(1):30-4.
3. Road Accidents in India, 2023. Transport Research Wing, Ministry of Road Transport & Highways, Government Of India, New Delhi.
4. Singh D, Singh SP, Kumaran M, Goel S. Epidemiology of road traffic accident deaths in children in Chandigarh zone of North West India. Egyptian journal of forensic sciences. 2016 Sep 1;6(3):255-60.
5. Kumar N, Prasad M, Singh NK, Desai SR. The pattern of chest injuries following RTA. International Journal of Toxicological and Pharmacological Research. 20232023; 13(3): 310-15
6. Ambade VN, Manu S. Pattern of injuries in different types of victims of road traffic accident in central India: A comparative study. Journal of forensic science and research. 2021 Feb 26;5(1):7-11.
7. Aggarwal S, Vohra VK. Pattern of Injuries in Road Traffic Accident Death Cases in Western Haryana-An Autopsy Study at Maharaja Agrasen Medical College, Agroha, Hisar. Indian Congress Of Forensic Medicine & Toxicology. 2022; 40(3,4):72-7
8. Jha N, Srinivasa DK, Roy G, Jagdish S. Injury pattern among road traffic accident cases: A study from South India. Indian Journal of Community Medicine. 2003 Apr 1;28(2):85.
9. Yogesh G. Pattern of Injuries in Fatal Road Traffic Accidents: Autopsy Based Study. Journal of Evidence based Medicine and Healthcare.2015;2(4):321-7.
10. Saxena, D., Juglan, S., Sane, M. R., & Varun, A. A study of pattern of injuries sustained in fatal road traffic accidents: An original research. International Journal of Health Sciences.2022;6(S2):6795-800.
11. Dagar T, Jakhar JK, Khanna K, Vijay P. Road traffic accidents: An autopsy based comparative study of pattern & profile of fatality in Haryana region. Int J Sci Res. 2019;8(8):40-2.