Original Research Article

Pattern of Injuries in Victims of Fatal Road Traffic Accidents in Southern Haryana: An Autopsy-Based Study

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Abstract

Background: Road traffic accident is one of the major avoidable public health problems and is on the rise which can be attributed to increase in the number of vehicles, daily life changes, nasty tendency of violating traffic rules, anarchic traffic system and risky approach. It is a matter of national concern, in view of its extent and gravity and the subsequent negative impacts on the economy, public health and the general wellbeing of the people. The aim of this study was to know the pattern of injuries in victims of fatal road traffic accidents.

Material & Method: The present study was a prospective, cross-sectional study. The study was conducted at the tertiary healthcare centre in southern Haryana. Total of 75 cases of fatal road traffic accident cases were enrolled during one year of study period. The basic information about the deceased like age, gender, mode of travel of victim was obtained from investigating officer narration and inquest papers. During autopsy, detailed examination of injuries was carried out and the autopsy findings were recorded and analyzed.

Results: It was observed that out of 75 cases male outnumbered female in ratio 5.25:1. Majority of the victims belonged to age group 21-30 year (26.7%). Among the external injuries, abrasions were most common followed by lacerations. It was also observed that majority of the victims had intracranial hemorrhage (60%) followed by rib fracture (41.3%) and 17.3% of the victims had pelvis fracture.

Conclusion: From the present study it was concluded that road traffic accidents were more common in the younger age group and two wheeler occupants followed by pedestrians were most vulnerable to road traffic accidents.

Keywords: Road traffic accidents; pattern of injuries; abrasions; intracranial hemorrhage

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Introduction

Road traffic accident (RTA) is any vehicular accident occurring on the roadway i.e., originating on, terminating on, or involving a vehicle partially on the roadway. It may include collision of an automobile with a pedestrian, or another automobile or with a non-automobile on the roadway or fall from a moving vehicle causing injuries or death of the involved individuals.[1]

Injuries and fatalities occur in all forms of transportation but numerically road traffic accidents account for the great majority worldwide, causing more than a million deaths annually and injuring about 20–50 million. If the current trends continue, road traffic injuries are likely to rise to the fifth leading cause of death by 2030. Approximately 90% of these deaths occur in low- and middle-income countries, where the road traffic fatality rates are higher as comparative to high income countries. The pattern of injury, fatal and otherwise, varies significantly depending upon whether the victim is a vehicle occupant, a motorcyclist, a pedal cyclist or a pedestrian.[2]

Road traffic accidents not only affects primary victims but it has got innumerable secondary victims in the form of family and relatives, who suffer financially, psychologically and socially, though morbidity does not reckon with these social aspects of the problem.[3]

The present study is an attempt to analyze the pattern of injuries in autopsy cases with an alleged history of fatal road traffic accidents with regards to age, gender, mode of travel of victim, external and internal injuries sustained.

Material and Methods

The present study was a prospective, cross-sectional study. The study was conducted in the Department of Forensic Medicine of a tertiary care center of southern Haryana. Total of 75 cases of fatal road traffic accident cases were included during one year of study period, after obtaining Institutional Ethical Clearance. Decomposed, unidentified and dead bodies with no specific history were excluded. A proforma was designed especially for the purpose of the study. The basic information about the deceased like age, gender, address, mode of travel of victim, type of offending vehicle was obtained from investigating officer narration and inquest papers. Each injury was recorded as per the involvement of body region. During autopsy, detailed examination of injuries was carried out and the autopsy findings were recorded on standard autopsy proforma and the information thus collected, was statistically analyzed.

Observations and Results

In our study, it was observed that out of 75 cases, 63 were male (84%) and 12 were female (16%), the male outnumbered female in ratio 5.25:1.

It was observed that individuals belonging to age group 21-30 years were most affected in road traffic accident (26.7%), followed by 31-40 years (20.0%), the age wise distribution of victims is depicted in Figure 1.

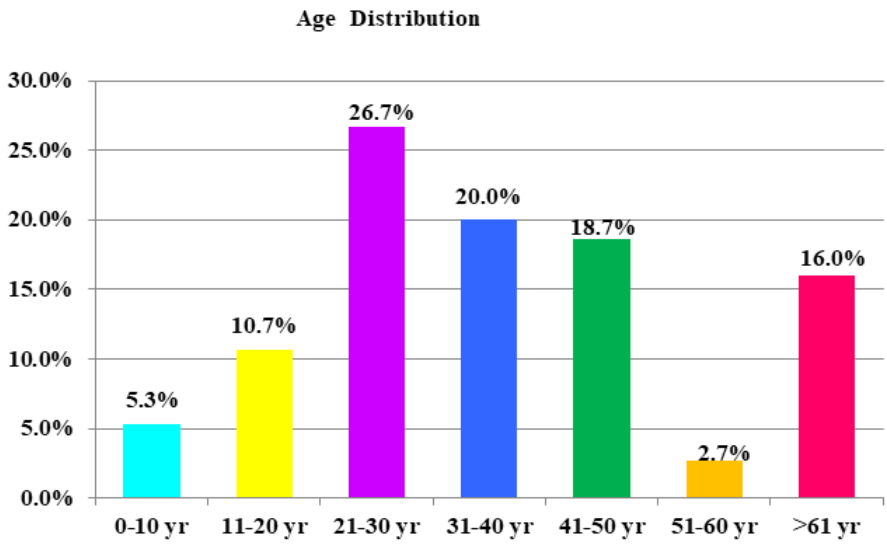

Figure 1: Bar diagram demonstrating the age distribution (%) of individuals involved in fatal road traffic accidents (n=75).

It was observed that motorcyclist / scooter occupants were most affected by RTA comprising 65.3% cases followed by pedestrians (20%), light motor vehicle occupants (13.3.%) and least affected were heavy motor vehicle occupant (1.3%). (Figure 2)

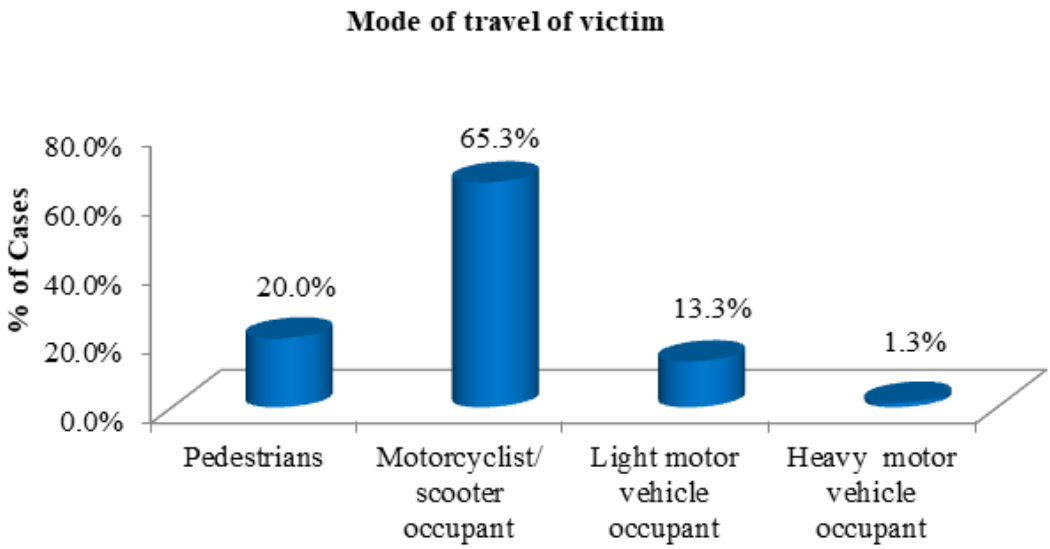

Figure 2: Bar diagram demonstrating the mode of travel (%) of the victims involved in fatal road traffic accidents (n=75).

It was observed that among external injuries, the victims who had injuries over head & neck region, the majority had lacerations (49.3%), followed by contusions (42.7%) and abrasions (34.7%). Those who had injuries over upper limb, the majority had abrasions (54.7%) followed by lacerations (18.7%) and contusions (14.7%). Injuries over thorax were mainly abrasions (32.0%) and contusions (30.7%). However, majority of abdominal injuries were abrasions (17.3%). Those who had injuries over pelvic region majority had contusions (9.3%), followed by abrasions (4.0%). Victims who had lower limb injuries; majority had abrasions (65.3%), followed by lacerations (42.7%) and contusions (13.3%). Injuries over external genitalia were mainly lacerations (5.3%) followed by contusions (2.7%). (Figure 3)

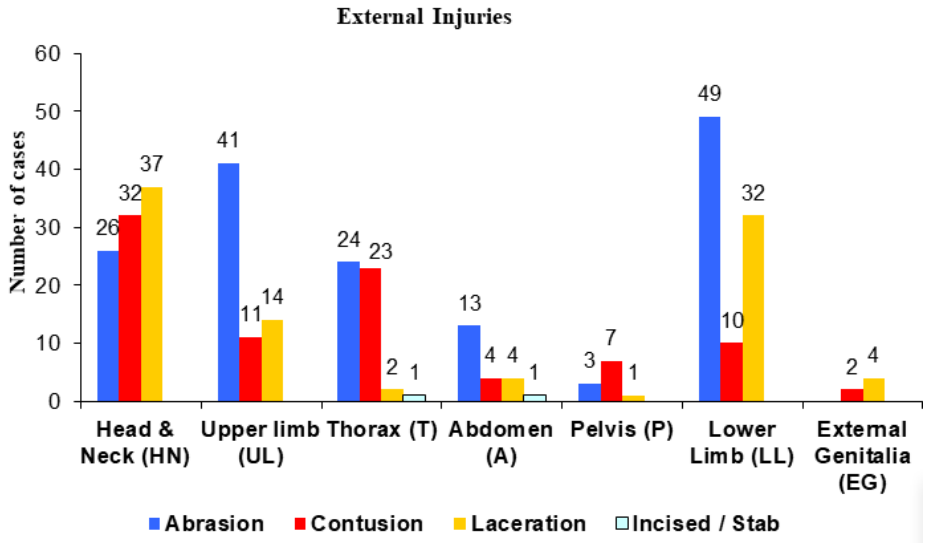

Figure 3: Bar diagram demonstrating the region of body involved and type of external injury sustained in the victims of fatal road traffic accidents (n=75).

It was observed that in majority of cases of fatal road traffic accident, 60.0% had intracranial haemorrhage followed by rib fractures (41.3%), fracture of skull (17.3%) and fracture of pelvis (17.3%). (Figure 4)

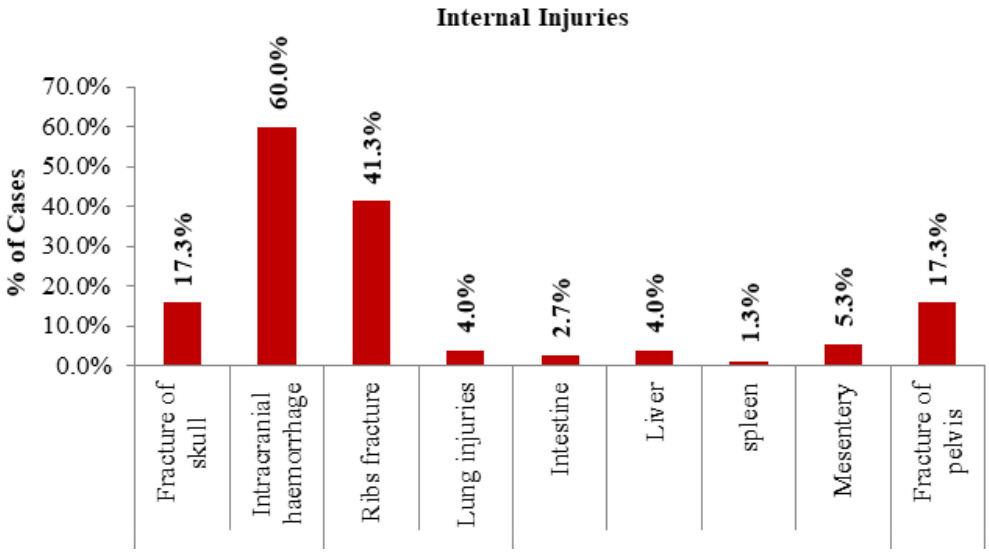

Figure 4: Bar diagram demonstrating the type of internal injury sustained (%) for the victims involved in fatal road traffic accidents (n=75).

The table 1 shows the mode of travel of victim and external injuries sustained. For the victims who were pedestrians, it was observed that 86.7% had head & neck injuries followed by injuries over upper & lower limb (73.3%) and thorax injuries (53.3%).

For the victims with mode of travel as motorcycle or scooter occupant, it was observed that 91.8% victims had lower limb injury, while 89.8% had head and neck injuries and 73.5% had upper limb involvement. The victims with mode of travel as light motor vehicle occupant, it was observed that 80.0% victims had lower limb injury, while 70.0% of the victims showed involvement of both head & neck and thoracic region. However, only a single case of heavy motor vehicle occupant was reported in the present study. Further, a significant association between mode of travel of the victim and head & neck injury was observed.

Table 1: Showing mode of travel of victim and external injuries sustained in victims of fatal road traffic accidents (n=75).

Mode of travel of victim	Frequency	External Injuries						
		Head & Neck	Upper Limb	Thorax	Abdomen	Pelvis	Lower Limb	External Genitalia
Pedestrians	15	13	11	8	5	3	11	1
		86.7%	73.3%	53.3%	33.3%	20.0%	73.3%	6.7%
Motorcyclist/ scooter occupant	49	44	36	29	13	3	45	5
		89.8%	73.5%	59.2%	26.5%	6.1%	91.8%	10.2%
Light motor vehicle occupant	10	7	5	7	2	3	8	-----
		70.0%	50.0%	70.0%	20.0%	30.0%	80.0%	-----
Heavy motor vehicle occupant	1	-----	1	-----	1	-----	1	-----
		-----	100%	-----	100%	-----	100%	-----

Discussion

The number of deaths on the world's roads remains unacceptably high, with an estimated 1.35 million people dying each year. Road traffic injuries are now the leading cause of death for children and young adults aged 5–29 years. More than half of all road traffic deaths are among vulnerable road users; pedestrians, cyclists and motorcyclists.[4]

In our study a total of 75 cases that satisfied the inclusion and exclusion criteria were included and it was observed that out of 75 cases 63 were males (84%) and 12 were females (16%) and males outnumbered females in ratio 5.25:1. These findings are in general agreement with the studies conducted by Singh & Dhattarwal,[5] Rao & Mukerjee,[6] Verma et al.,[7] Guntheti & Singh[8] and Bhagwat et al.[9]

Individuals belonging to age group 21-30 years were mostly affected in road traffic accident (26.7%), followed by 31-40 years (20.0%) and 41-50 years (18.7%), and least effected were those belonging to the age group 51-60 years (2.7%). It was also observed that individuals above 61 years age group were frequent victims of RTAs in this region. It might be due to their lack of knowledge of road safety measures, leading to increased fatalities. The age group 21-30 years is the most active phase of life, physically and socially, hence outnumbers the other road users. It was observed that majority of the cases (65.4%) lie within the economically productive age group of 21-50 years. These findings are in general agreement with the studies conducted by Singh & Dhattarwal,[5] Kiran et al.,[10] Dhillon et al.[11]

It was observed that motorcyclist / scooter occupants were most affected by RTA comprising 65.3% cases followed by Pedestrians (20%), light motor vehicle occupants (13.3.%) and least affected were Heavy motor vehicle occupant (1.3%). Majority of the victim in the present study were motorcyclist / scooter occupant, this can be explained by the fact that for majority of Indian families, motorcycle/ scooter is preferred mode of transportation. Being a rural area, the majority of the road users were either pedestrians or two-wheeler users. The findings of the present study are in general agreement with the study conducted by Dagar et al.,[12] and Chourasia et al.[13] However, the findings are contrary to the study done by Khan et al.[14] as they observed that pedestrians were most commonly affected by fatal road traffic accidents.

It was observed that all the victims had multiple external injuries in the form of abrasions, lacerations, contusions and incised wound. Among the external injuries, abrasion was most common injury in majority of the victims, followed by laceration, contusion and the least observed was incised wound. Further, a significant association between mode of travel of the victim and head & neck injury was observed i.e., there was high occurrence of head and neck injuries in the victims of fatal road traffic accident, irrespective of their mode of travel. Similar trends were observed by Aggarwal et al.[15] However, the findings of the present study are contrary to the study done by Chourasia et al.[13] as they observed maximum injuries over upper limb and abdomen respectively.

It was observed that in majority of cases of fatal road traffic accident, 60.0% had intracranial haemorrhage followed by rib fractures (41.3%), fracture of skull (17.3%) and fracture of pelvis (17.3%). A high incidence of brain injury was due to the fact that two-wheeler users were not using helmet. The findings of the present study are in general agreement with the study conducted by Dhillon et al.[11]

Limitation of the study: The small sample size is the major limitation of the study.

Conclusion

From the present study it was concluded that road traffic accidents were more common in the younger age group and two wheelers' occupants followed by pedestrians were most vulnerable to road traffic accidents. Road traffic accident is one of the major avoidable public health problems. The road traffic accidents result in mortality, morbidity and disability of the victims. So, public attention, awareness, preventive and remedial strategies pertaining to the human habitations, roadways and to reduce the morbidity and mortality should be undertaken to control fatal road traffic accidents.

Conflict of interest: None

Source of Funding: None

Ethical approval: The study was approved by the Institutional Ethics Committee (SHKM GMC, Nalhar, NUH) vide Letter No. SHKM/IEC/2018/31 dated: 29/10/2018.

References

1. Siddaramanna TC, Dileep KR. Retrospective study of pattern of external injuries in road traffic accidents. Int J Biomed Adv Res. 2014;5(9):451-3.
2. Saukko P, Knight B. Knight's Forensic Pathology. 4th edition. New York: CRC; 2016.277p.
3. Nair S, Lakshmanan N. Pattern and distribution of head injuries in victims of fatal road traffic accidents-an autopsy based study. Indian J Forensic Community Med. 2017;4(1):42-5.
4. Global status report on road safety 2018: summary. Geneva: World Health Organization; 2018.
5. Singh H,Dhattarwal SK. Pattern and distribution of injuries in fatal road traffic accidents in Rohtak. J Indian Acad Forensic Med. 2004;26(1):20-3.
6. Rao D, Mukerjee S. A study of pattern of injuries in road traffic collisions. J Punjab Acad Forensic Med Toxicol. 2010;14-6.
7. Verma R, Bohra B, Garg V, Vaishnava N, Simatwal NK, Vyas PC. Profile of death due to road traffic accidents brought to Dr. S. N. Medical College & Hospital, Jodhpur. J Indian Acad Forensic Med. 2014;36(3):255-8.
8. Guntheti BK, Singh UP. The pattern of injuries due to fatal road traffic accidents in and around Khammam. J Res Forensic Med Toxicol. 2016;2(2):8-13.
9. Bhagwat DL, Sharma MD, Tirpude BH, Murkey PN, Khandekar IL, Khan S, et al. Profile of cases of fatal road traffic accident with respect to diurnal variation of time, age, sex and death of victim in central rural India-autopsy based study. Med Legal Update. 2019;19(1):15-9.
10. Kiran ER, Saralaya KM, Vijaya K. Prospective study on road traffic accidents. J Punjab Acad Forensic Med Toxicol. 2004;4(1):12-6.
11. Dhillion S, Kapila P, Sekhon HS. Pattern of injuries present in road traffic accident in Shimla hills. J Punjab Acad Forensic Med Toxicol. 2007;7(2):50-3.
12. 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.
13. Chourasia S, Baghel J, Rautji R, Radhakrishna KV, Shivakumar DK. An autopsy study of fatal road traffic accidents at medico legal centre of a tertiary health care hospital in south western Maharashtra: six year retrospective study.Int J Biomed Adv Res. 2019;10(5):1-5.
14. Khan RN, Radhakrishna KV, Rautji R. Profile of victims and offending vehicles in fatal road traffic accidents in western Maharashtra - An autopsy study. Int J Adv Res. 2019;7(5):138-42.
15. Aggarwal KK, Oberoi SS, Kumar R, Sharma M. Pattern and distribution of injuries in fatal road traffic accident cases. J Punjab Acad Forensic Med Toxicol. 2009;71-5.