Original research paper

An Autopsy Based Retrospective Study on Pattern of Thoraco-Abdominal Injuries in Fatal Road Traffic Accidents of Kolar, South India

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Abstract

Background: India is experiencing increasing road traffic accidents (RTA) amidst increasing motorization and infrastructure growth in recent years. Every day, nearly 400 road deaths occur on Indian roads and several thousands are hospitalized due to road crashes. WHO estimates the incidence of road deaths to be 16.6 per 100000 population in India[1]. With the aim of studying pattern and exploring various epidemiological characteristics of RTAs, this retrospective study of medico-legal autopsies was conducted.

Aims & Objectives: 1 To study the pattern of thoraco-abdominal injuries (TAI) in fatal road traffic accidents in Kolar. 2. To describe demographic profile and create public awareness on road safety.

Material & Methods: A retrospective autopsy based study of pattern of thoraco-abdominal injuries in victims of fatal road traffic accidents was conducted in Sri Devaraj Urs Medical College, Kolar (South India) from 1st January 2014 to 31st December 2014. A total of 192 RTA victims were referred for autopsy during the period of which 100 cases sustaining thoraco-abdominal injuries were studied.

Results: A total of 192 medicolegal autopsies were conducted on victims of road traffic accidents (RTA) during the study period. Among them, 100 victims suffered thoraco-abdominal injuries, which accounted for 52.08% of the cases. The highest number of victims belonged to the age group of 20-40 years, accounting for 48% of the cases. In terms of gender distribution, males constituted 62.0% of the victims while females constituted 38.0%. The most common injuries were to the liver, accounting for 37.75% of the total injuries. Other frequently affected body parts included the spleen, lungs, thorax, abdomen, pelvis, and spine.

Conclusion: The analyzed data provides clear evidence that road accidents are foreseeable and avoidable. To make substantial improvements in road safety throughout India, it is essential to establish a robust and effective national and state-level road safety authority, foster intersectoral coordination, and secure regular funding. Our aim in sharing this article is to increase public awareness of the significance of road traffic injuries from a public health perspective and to alleviate the weight of fatalities and injuries on our communities.

Key words: road traffic accidents (RTA), thoraco-abdominal injuries (TAI), autopsy.

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Introduction

Millions of fatalities and injuries occur globally every year due to road traffic accidents, making it a substantial public health concern. The World Health Organization (WHO) defines a Road Traffic Accident (RTA) as an incident that takes place on a public thoroughfare or roadway involving at least one vehicle and resulting in the injury or death of at least one person[2]. Road Traffic Accidents (RTAs) make up 1.7% of the worldwide death toll, with 91% of fatalities occurring in low-income and middle-income nations[3]. Every day, around 400 individuals lose their lives on Indian roads while several thousands are admitted to hospitals for road accidents[1]. According to WHO, India witnesses an estimated 16.6 road fatalities per 100000 population. In countries like India, with middle-income and developing statuses, the expenses linked to Road Traffic Accidents or RTA account for 3 to 5% of the gross domestic product[1,3]. In 2019, the National Crime Records Bureau (NCRB) reported 437,396 road accidents in India, resulting in 154,732 deaths and 439,262 injuries[4]. One common injury sustained in these accidents is thoraco-abdominal injury (TAI), which affects the chest and abdominal areas and can lead to severe complications and even death if left untreated[5]. Although the Ministry of Road Transport and Highways in India recorded 449,002 road traffic accidents in 2019, resulting in 151,113 deaths and 451,361 injuries, there is no readily available data on the number of deaths specifically caused by TAI in road traffic accidents in India[6].

Reports of Motor Traffic Accidents are increasing nationwide, with thoraco-abdominal injuries accounting for a significant proportion of these deaths. Although this is not limited to India and is a worldwide issue, India has the highest rate of road traffic accidents globally. Understanding the patterns of thoraco-abdominal injuries in road traffic accidents is critical for improving prevention and treatment strategies. In this project, we aim to analyze the patterns of thoraco-abdominal injuries in road traffic accident deaths, including the types and severity of injuries, the demographics of the victims, and the circumstances surrounding the accidents. By doing so, we hope to contribute to the development of more effective measures for reducing the incidence and impact of these injuries.

Material and Methods

This retrospective study was carried out at the Department of Forensic Medicine and Toxicology of Sri Devaraj Urs Medical College and R.L. Jalappa Hospital & Research Center, Kolar (Southern Karnataka) between January 1st, 2014 and December 31st, 2014. The study included all cases of confirmed fatal road traffic accidents where the victim died either before hospitalization or during treatment. Cases where the cause and manner of death were unclear, unclaimed or unknown bodies without relevant history, and decomposed bodies were excluded from the study. Information on various study variables like sex, age, time of RTA, type of vehicle (light vehicle like two wheelers, three wheelers, four wheelers) and position of the victim during RTA (occupant/ pedestrian/ driver), nature of injury, victim was under the influence of alcohol/ not and cause of death was collected.Data was obtained from various sources, including the investigating officer, first information reports, reliable attendants of the deceased, inquest reports, hospital case sheets, death summaries, post-mortem examination reports, and forensic science laboratory reports. Out of 192 autopsies conducted during the study period, 100 cases of thoraco-abdominal injuries in all age groups were studied. Descriptive analysis of the data was done using SPSS software and presented in the form of text, tables, and graphs.

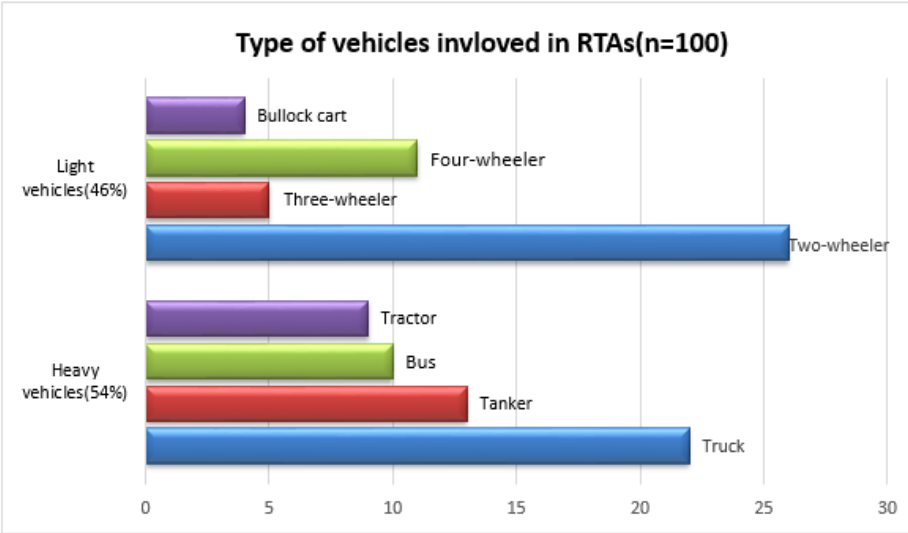
Results

During the study period January 1st and December 31st, 2014, a total of 192 individuals who were involved in road traffic accidents (RTAs) underwent autopsy, out of which 100 cases that sustained thoraco-abdominal injuries were included in the study. The age distribution of the victims revealed that 48 (48.00%) were between 20-40 years of age, while only 6 (06.00%) were below 20 years (refer to Table 1). Males constituted the majority of the victims at 62.00%(refer to Table 1). On considering the type of vehicles involved, it was found that for 54 % of RTAs were caused by heavy vehicles (truck, tankers, bus, tractor), while the remaining accidents resulting in fatalities were caused by light vehicles (two-wheeler, three-wheeler, four-wheeler, bullock cart) (refer to Graph 1).

Most RTAs occurred during the daytime, with 64.00% of the accidents happening during this time (refer to Table 2). National highways were the location of 60.00% of the RTAs (refer to Table 2). A total of 249 injuries affecting various organs, including the liver, spleen, lungs, thorax, abdomen, pelvis, and spine, were reported in the 100 victims (refer to Graph2). The liver was the most commonly injured organ, accounting for 94 (37.75%) of the total injuries. The remaining injuries involved the spleen, lungs, thorax, abdomen, pelvis, and spine. Knockdown kinematics caused a total of 44 casualties (44.00%) in RTAs, with two-wheeler drivers being the most commonly affected group among the victims (refer to Table 3).

Table 1. Age-group and gender-wise distribution

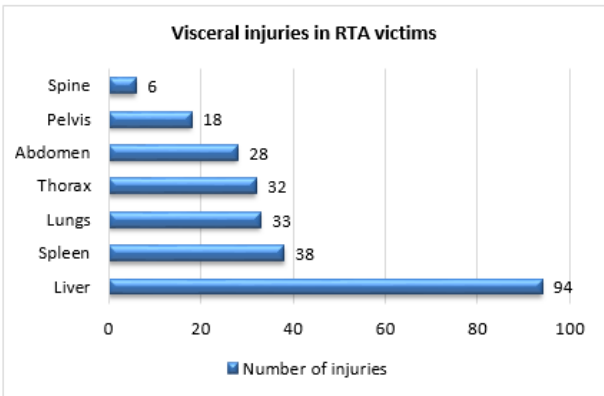
Age Group	Male	Female	Total	Percentage
20 and below	04	02	06	6.0%
21-40	33	15	48	48.0%
41-60	20	16	36	36.0%
61 and above	05	05	10	10.0%
Total	62	38	100	100%



Graph 1. Type of vehicles involved in RTAs

Table 2. Place and Time of RTAs (n=100)

Variables		Number of Victims in RTAs (%)
Place (n=100)	National Highways	60
	State Highways	16
	Rural & Urban roads	24
Time (n=100)	Morning (8.01 AM to 4.00 PM)	42
	Evening (4.01 PM to 12.00 AM)	22
	Night (12.01 AM to 8.00 AM)	36



Graph 2. Visceral injuries in RTA victims(n=249)

Table 3. Manner of production and type of vehicle involved in RTAs (n=100)

Manner of production	Number of cases	Type of vehicle involved				
		Victims				
		Pedestrian	Two wheeler driver	Pillion rider	Four wheeler driver	Occupant
Knocked down	44	09	12	16	03	04
Run over	06	04	01	01	00	00
Head on collision	22	00	10	00	10	00
Self-accident	28	06	12	02	07	03
Total	100	19	35	19	20	07

Discussion

Road traffic accidents (RTAs) are a major public health problem in India, with a high incidence of fatalities and disabilities. The present study aimed to investigate the demographic and injury pattern of individuals involved in RTAs who underwent autopsy during the year 2014. The study found that thoraco-abdominal injuries were the most common type of injury sustained by the victims, with males constituting the majority of the victims. This finding is consistent with previous studies that have shown that males are at a higher risk of RTAs than females[7-10].

The age distribution of the victims in this study revealed that individuals between 20-40 years of age were most commonly affected, which is in agreement with previous studies that have reported a higher incidence of RTAs in the younger population[11,12]. The finding that a majority of RTAs occurred during the daytime is consistent with previous studies conducted in India[11,12,13]. The study also found that heavy vehicles were responsible for a majority of the RTAs resulting in fatalities, with national highways being the most common location for these accidents. These findings highlight the need for stricter traffic regulations and enforcement to reduce the incidence of RTAs on highways[13,14]. In terms of injuries sustained by the victims, the liver was found to be the most commonly injured organ, followed by the spleen, lungs, thorax, abdomen, pelvis, and spine. These findings are consistent with previous studies that have reported liver injuries as the most common injury sustained in RTAs[15-19]. The study also found that knockdown kinematics caused a significant number of casualties, with two-wheeler drivers being the most commonly affected group. This highlights the need for stricter regulations and enforcement of traffic laws related to two-wheelers to reduce the incidence of RTAs[20,21].

Overall, the findings of this study provide valuable insights into the demographic and injury pattern of individuals involved in RTAs in India. The results can help in the development of targeted interventions and policies aimed at reducing the incidence and severity of RTAs, especially on national highways.

Conclusion

The increasing occurrence of Road traffic accidents is a global cause for concern. A significant number of these accidents can be prevented by implementing measures such as controlling speed, wearing helmets, avoiding driving under the influence, and enforcing road safety regulations. Emergency medical services must be improved alongside road safety education to increase emergency treatment procedures. Moreover, the high number of pedestrians and two-wheelers on Indian roads and non-compliance to road safety laws are additional problems. World Health Organization (WHO) has even stated that India's ambition to become a superpower is jeopardized due to the severity of the issue. Unfortunately, the government's inattention to road safety remains a central issue. The responsibility for road safety falls under numerous departments leading to the infamous saying - everyone's responsibility is nobody's responsibility.

Ethical clearance: Obtained from Institutional Ethics Committee, Sri Devaraj Urs Medical College, Kolar.

Conflict of Interest: Nil

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References

1. Gururaj G, Sukumar M, Gautham. Advancing road safety in India: Implementation is the key. Indian J Community Med. 2020; 45(2):188-192.
2. World Health Organization. Road traffic injuries. [Internet]. Geneva: World Health Organization; [updated 2021 Sep 7; cited 2023 Mar 30]. Available from: https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries
3. World Health Organization. World report on road traffic injury prevention 2009. [Internet]. Geneva: World Health Organization; [cited 2023 Mar 30]. Available from: http://www.who.int>road_safety_status>2009
4. National Crime Records Bureau. Accidental Deaths and Suicides in India 2019. Ministry of Home Affairs, Government of India. [Internet]. [cited 2023 Mar 30]. Available from: https://ncrb.gov.in/sites/default/files/ADSI-2019.pdf
5. World Health Organization. Road safety in India. [Internet]. Geneva: World Health Organization; [updated 2022 Jan 3; cited 2023 Mar 30]. Available from: https://www.who.int/india/news/detail/03-01-2022-road-safety-in-india
6. Ministry of Road Transport and Highways. Road accidents in India - 2019. [Internet]. [cited 2023 Mar 30]. Available from: https://morth.nic.in/sites/default/files/Road_Accidents_in_India_2019.pdf
7. World Health Organization. Global status report on road safety 2018. Geneva: World Health Organization; 2018.
8. Mohan D. Road traffic injuries: data and analysis from India. Natl Med J India. 2003; 16(3):126-33.
9. Patil SS, Kakade RV, Durgawale PM, Kakade SV. Epidemiological aspects of road traffic accidents in the Aurangabad region of Maharashtra, India. J Inj Violence Res. 2014; 6(1):27-32. doi: 10.5249/jivr.v6i1.219
10. Singh A, Bhardwaj A, Pathak R, Ahluwalia SK. Epidemiology of road traffic accidents in a hilly state of India: Need for strengthening initiatives on prevention and control. J Fam Med Prim Care. 2019; 8(6):1967-1972. doi: 10.4103/jfmpc.jfmpc_236_19
11. Jagnoor J, Keay L, Ivers RQ, Thakur J, Gururaj G. What do we know about the epidemiology of traumatic brain injury in India? A systematic review. Neurol Res Int. 2013; 2013:930315. doi: 10.1155/2013/930315
12. Gururaj G. Road traffic deaths, injuries and disabilities in India: current scenario. Natl Med J India. 2008; 21(1):14-20.
13. Kamboj A, Sagar S. Road traffic accidents in India: issues and challenges. Int J Adv Eng Technol. 2018; 9(1):65-9.
14. Muralidharan V, Mohan D. Road safety in India: challenges and opportunities. J Inj Violence Res. 2019; 11(2):111-8.
15. Yenumula PR, Kondam A. Epidemiology of road traffic accidents in Hyderabad, Telangana state, India: A retrospective study of autopsy cases. J Forensic Leg Med. 2018; 54:72-77. doi: 10.1016/j.jflm.2017.12.001.
16. Reddy NB, Hanumantha, Madithati P, Reddy NN, Reddy CS. An epidemiological study on pattern of thoraco-abdominal injuries sustained in fatal road traffic accidents of Bangalore: Autopsy-based study. J Emerg Trauma Shock. 2014; 7(2):116-20.
17. Khajuria B, Sharma R, Verma A. A Profile of the Autopsies of Road Traffic Accident Victims in Jammu. J Clin Diagn Res. 2008; 2:639-642.
18. Joshipura MK, Shah HS, Patel PR, Divatia PA. Trauma care systems in India. Injury. 2003; 34(9):686-92.
19. Sagar S, Kamboj A. Pattern of organ injuries and outcome in road traffic accidents: experience from a tertiary care center in North India. Indian J Crit Care Med. 2019; 23(2):83-6.
20. Bener A, Rahman YS, Mitra B. Epidemiology of road traffic injuries in India. Int J Adv Res. 2015; 3(8):1279-85.
21. Supriya Keisham, Salam Bitam Singh, Rishilu Kamei, Memchoubi. A Study of Fatal Internal Injuries without Significant External Injuries in Road Traffic Accidents in Imphal from 2009-2014. J Indian Acad Forensic Med. 2015; 37:16-18.