Review Article

Indian Journal of Emergency Medicine
Volume 8 Number 4, October - December 2022
DOI: http://dx.doi.org/10.21088/ijem.2395.311X.8422.2

An Audit to Know the Epidemiological Distribution of Trauma Patients Presenting to ED of a Tertiary Care, Multi Speciality Hospital in Kolkata

Arnab Nag[1], Indranil Das[2], Tamal Khan[3]

How to cite this article:

Arnab Nag, Indranil Das, Tamal Khan/An Audit to Know the Epidemiological Distribution of Trauma Patients Presenting to ED of a Tertiary Care, Multi Speciality Hospital in Kolkata/Indian J Emerg Med 2022;8(4):125–130.

Author's Affiliation: [1]Senior Associate Consultant, [2]Senior Consultant and Head, Department of Emergency Medicine, [3]Research Officer, Medica Superspeciality Hospital, Kolkata 700099, West Bengal, India.

Corresponding Author: Indranil Das, Senior Consultant and Head, Department of Emergency Medicine, Medica Superspeciality Hospital, Kolkata 700099, West Bengal, India.

E-mail: drindradas@gmail.com

Received on: 25.08.2022

Accepted on: 03.09.2022

Abstract

Introduction: Trauma is a major cause of morbidity and mortality in both developed and developing countries. The usual causes are road traffic accidents (RTAs), fall from height, occupational injuries, and assault. According to the World Health Organization report on road safety, RTAs would be the fifth leading cause of death worldwide by the year 2030.[1] Occupational injuries leading to disability are also of major concern in a country like India as many industries continue to be unregulated. The majority of trauma deaths occur in the prehospital periods due to insufficient prehospital care where the first 60 min after trauma has been considered as the "golden hour" of trauma.[2] It is therefore important to quickly assess the severity of the injury accurately and quickly. This study was done to improve the understanding of the mode of trauma, severity of injuries, and outcome in our hospital so that effective prevention and comprehensive management strategies could be made. We also studied the accuracy of physiologic variables such as respiratory rate, Glasgow coma score (GCS), and systolic blood pressure which are used in the revised trauma score (RTS) in predicting mortality.

Keywords: Accidents; Emergency department; Polytrauma; Head injury; Road traffic accidents (RTA).

INTRODUCTION

Globalization across globe has led to the expansion in the road network along with rise in motorization of vehicles. Population explosion and rapidly increasing use of motor vehicles has led to rise in the number of road traffic related accidents, road accident injuries and fatalities making it as one of the leading causes of mortality and morbidity across the globe. According to The World Health Organization:

- 1.35 million people die each year as a result of road traffic crashes.
- Road traffic crashes cost most countries 3% of their gross domestic product.
- More than half of all road traffic deaths are among vulnerable road users: pedestrians, cyclists, and motorcyclists.
- 93% of the world's fatalities on the roads occur in low and middle income countries, even though these countries have approximately 60% of the world's vehicles.
- Road traffic injuries are the leading cause of death for children and young adults aged 5-29 years.[1,2]

The various Risk factors involved in the process range from: human error, Speeding, Driving under the influence of alcohol and other psychoactive substances, non-use of motorcycle helmets, seat-belts, and child restraints, distracted driving, unsafe road infrastructure, unsafe vehicles, Inadequate post-crash care and Inadequate law enforcement of traffic laws.[6,7] It is a matter of concern as it mostly affect pedestrians, passengers and cyclists as opposed to drivers, apart from loss of life and limb of a RTA victim and the psycho socio-economic consequences of the event are to be faced by the RTA victim and his family.[8]

In Indian scenario, there has been a steady rise in the casualties in road accidents in the country and their proportions in total deaths due to all accident have also increased considerably in the past. Autocar India has published the statistics released by the Indian government on the road accidents, injuries and fatalities for the year 2017:

- A total of 4,64,910 road accidents were reported in the country.
- This claimed the lives 147,913 and caused injuries to 470,975 persons.
- The above translates into 405 deaths and 1,290 injuries each day from 1,274 accidents.
- These statistics means that on Indian roads, in every hour 16 people are killed and another 53 injured.[12-14]

In India there is lack of formal data on any mappings of the RTAs and recommendations thereof. The Government has started a few initiatives. It has formulated National Road Safety Policy - a multi-pronged road safety strategy based on 4 Es: Education, Engineering (both of roads and vehicles), Enforcement and Emergency Care.[15-16]

According to the National Road safety policy "The Government will strive to ensure that all persons involved in road accidents benefit from speedy and effective trauma care and management. The essential functions of such a service would include the provision of rescue operation and administration of first aid at the site of an accident and the transport of the victim from accident site to nearby hospital. Hospitals alongside the National Highways and State Highways would be adequately equipped to provide for trauma care and rehabilitation."

Literature search

Kundavaram Paul Prabhakar Abhilash, Nilanchal Chakraborthy, Gautham Raja Pandian,Vineet Subodh Dhanawade, Thomas Kurien Bhanu of CMC Vellore, India published in https://www.ncbi.nlm.nih.gov (Profile of trauma patients in the emergency department- NCBI) found that: The ED attended to 16,169 patients during the 3-month study period with 10% (1624/16,169) being adult trauma incidents. The gender distribution was 73.6% males and 26.4% females. The mean age was 40.2 ± 16.7 years. The median duration from time of incident to time of arrival to the ED was 3 h (interquartile range [IQR]: 1.5–6.5) for priority one patients, 3 h (IQR: 1.5–7.7) for priority two patients, and 1.5 h (IQR: 1–7) for priority three patients. The average number of trauma incidents increased by 28% during the weekends. Road traffic accident (RTA) (65%) was the most common mode of injury, followed by fall on level ground (13.5%), fall from height (6.3%), work place injuries (6.3%), and others. Traumatic brain injury was seen in 17% of patients while 13.3% had polytrauma with two-wheeler accidents contributing to the majority. The ED team alone managed 23.4% of patients while the remaining 76.6% required evaluation and treatment by the trauma, surgical teams. The in-hospital mortality rate was 2.3%. Multivariate analysis showed low Glasgow coma score (odds ratio [OR]: 0.65, 95% confidence interval [CI]: 0.55–0.76, $P < 0.001$) and high respiratory rate (OR: 1.15, 95% CI: 1.07–1.24, $P < 0.001$) to be independent predictors of mortality among polytrauma victims. They concluded that RTA and falls are the predominant causes of trauma. A simple physiological variable based

scoring system such as the revised trauma score may be used to prioritize patients with polytrauma.

Hyder AA, Wunderlich CA, Puvanachandra P, Gururaj G, Kobusingye OC. (2007) 21 reviewed that Traumatic brain injury (TBI), according to the World Health Organization, will surpass many diseases as the major cause of death and disability by the year 2020. With an estimated 10 million people affected annually by TBI, the burden of mortality and morbidity that this condition imposes on society, makes TBI a pressing public health and medical problem. The burden of TBI is manifest throughout the world, and is especially prominent in Low and Middle Income Countries which face a higher preponderance of risk factors for causes of TBI and have inadequately prepared health systems to address the associated health outcomes. Latin America and Sub Saharan Africa demonstrate a higher TBI related incidence rate varying from 150–170 per 100,000 respectively due to RTIs compared to a global rate of 106 per 100,000. As highlighted in this global review of TBI, there is a large gap in data on incidence, risk factors, sequelae, financial costs, and social impact of TBI. This should be addressed through planning of comprehensive TBI prevention programs in LMICs through well-established surveillance systems. Greater resources for research and prioritized interventions are critical to promote evidence-based policy for TBI.

Tables: Data collected in excel sheet will be enclosed

MATERIAL METHOD

Figure Legends Discussion and Study Method

STUDY METHOD

This was a retrospective single centre observational study of all trauma patients presenting to emergency department (ED) in Tertiary care Hospital, Kolkata. Details of the incident, injuries, and outcome were noted.

STATISTICAL ANALYSIS

Sample Size

- The primary objective of this study is to find out the type of trauma victims reporting to emergency department in Tertiary care Hospital, Kolkata.
- The sample size was calculated on the basis of pilot study.
- In order to Avail & detect the fall out cases the final sample size of the study was estimated to be 100.

Statistical Analysis

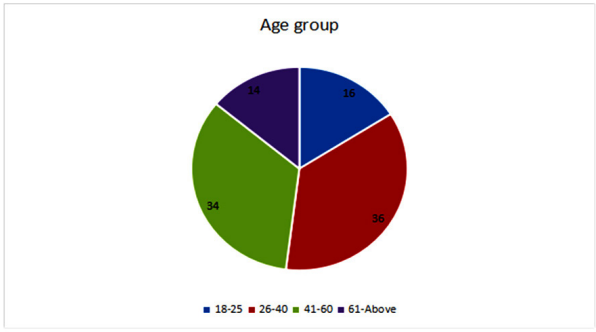
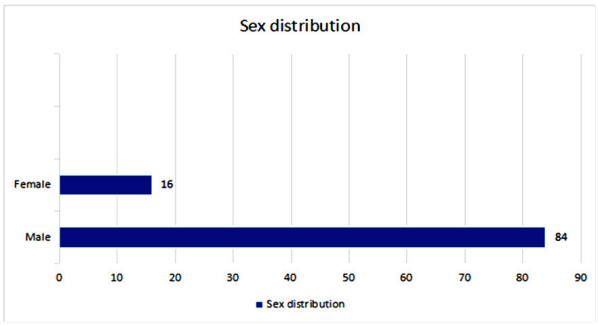


Fig. 1: Age & Sex Distribution



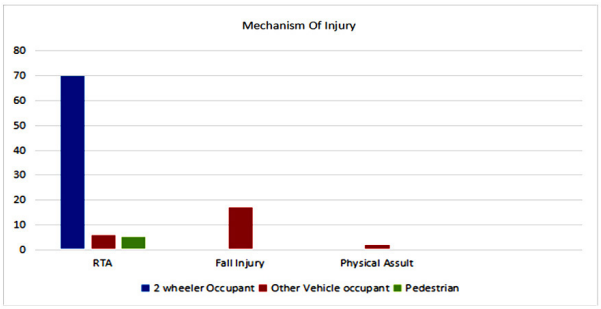


Fig. 2: Mechanism of Injury

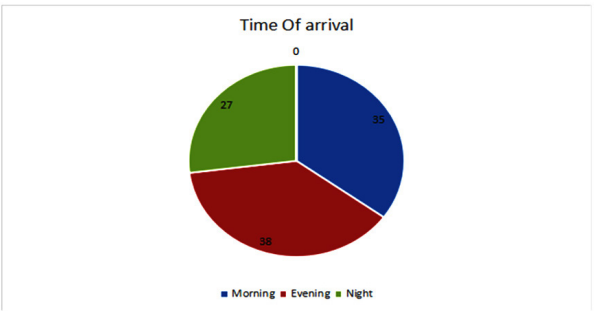


Fig. 3: Time of Injury

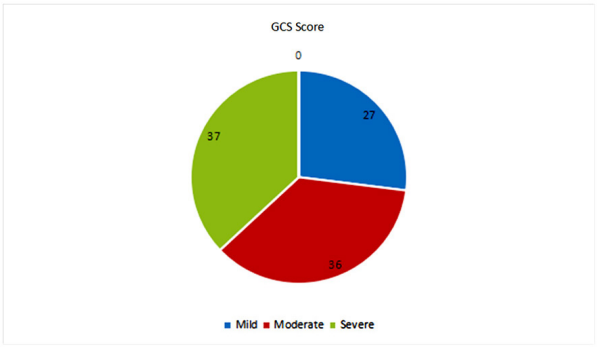


Fig. 4: GCS score

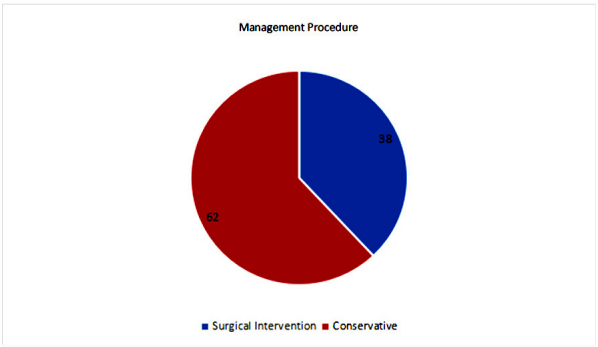


Fig. 5: Management

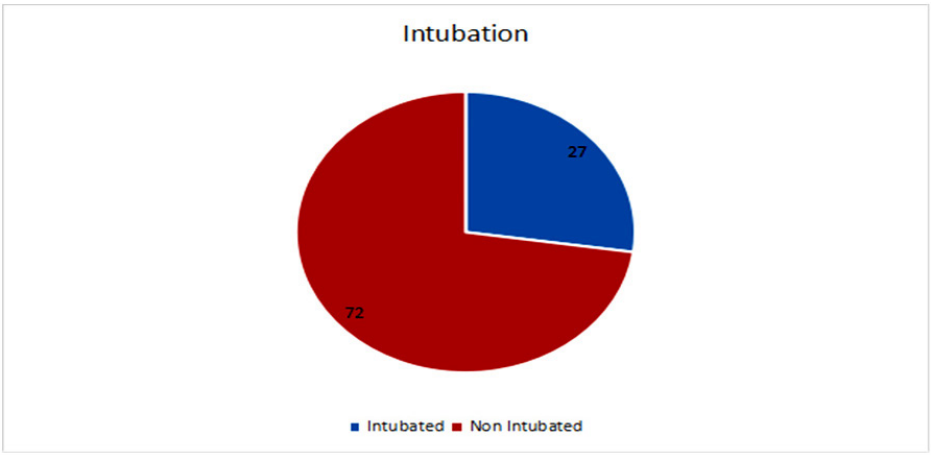
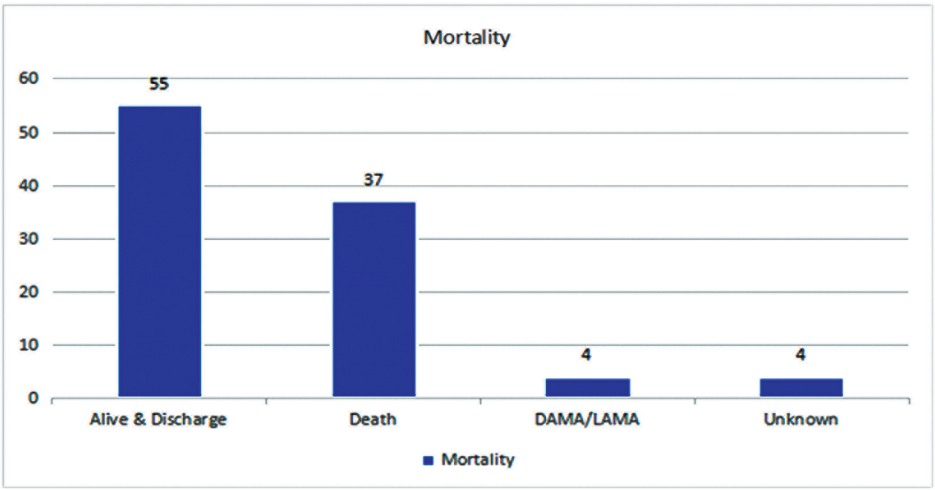


Fig. 6: Mechanical ventilation



DISCUSSION

A total of 100 patients were included in the study and the data were collected and then tabulated in a comprehensive data sheet. The variables were then analyzed and then represented in a graphical presentation. The observational analysis shows that the involved victims of RTA were mostly between 26 to 40 yrs and was followed closely by 41 yrs to 60 yrs age group of patients. The Average length of Stay was 6 days and 52min. Out of the total number of patients 84% was male and 16% was female. It was quite obvious from the analysis that below 25 yrs and above 60 yrs there was

quite significant number of victims of trauma. The highest number of victims were due to 2 wheeler accidents. However around 16 to 17% of the victims were due fall. A very small number of victims were due to Physical Assault also. Out of the total number of study population it was found that moderate and severe head injury were the most number of patient (around 36% and 37%) which points to the fact that the patients with serious head injury were brought to a tertiary care hospital with Neurosurgical Support. This relates to the fact that most of the patients survived well and was discharged form the hospital (55%). However 37% of the patients still did not survive and few (around 4%) left the hospital against advice. Regarding the type of injury 80% had isolated head injury as the primary diagnosis and around 20% of the victims had associated injuries (mostly Orthopaedic and few Chest and abdominal trauma).

Although 37% of the patients had sever head injury, but still 62% of the total patients were managed conservatively and did not require any surgical intervention. There is a quite significant observation that came up from the population studied, which showed that most of these trauma happened happened in the morning time. This is contributed by the fact that morning rush hours and high speeding by 2 wheelers was probably the reason behind this outcome.

CONCLUSION

This small unicentre epidemiological data point to the fact that Emergency Departments need to be well prepared to cater to the serious head injury patients and a timely management and intervention do need make a significant change in outcome.The ever increasing use of 2 wheeler and the negligence on the part of drivers to follow the traffic rules lead to the loss of 37 patients out of 100 and this in turn adds to the huge economic burden to the society of LMIC countries. As Emergency Departments continue to face more and more trauma victims, there is a need of robust trauma care and trauma centres. This study is based on urban population and hence the statistics of rural trauma still remains an area of further study.

ACKNOWLEDGEMENT

Thankful to my department and my colleagues to help me collect data and special thanks to Mr. Tamal khan (Research officer) to help me complete this study.

Conflict of Interest: None

REFERENCES

1. Gururaj G. Road traffic deaths, injuries and disabilities in India: current scenario. National Medical Journal of India. 2008 Jan 1;21(1):14.
2. Global status report on road safety 2018.
3. Global plan for the decade of action for road safety 2011- 2012. Geneva, World Health Organization, 2012.
4. Anjuman T, Hasanat-E-Rabbi S, Siddiqui CK, Hoque MM. Road traffic accident: A leading cause of the global burden of public health injuries and fatalities. InProc Int Conf Mech Eng Dhaka Bangladesh. 200AD Dec 2020 (pp. 29-31).
5. Nantulya VM, Reich MR. The neglected epidemic: road traffic injuries in developing countries. Bmj. 2002 May 11;324(7346):1139-41.
6. Ameratunga S, Hijar M, Norton R. Road-traffic injuries: confronting disparities to address a global-health problem. The Lancet. 2006 May 6;367(9521):1533-40.
7. Bachani AM, Peden M, Gururaj G, Norton R, Hyder AA. Road traffic injuries.
8. Magoola J, Kobusingye O, Bachani AM, Tumwesigye NM, Kimuli D, Paichadze N. Estimating road traffic injuries in Jinja district, Uganda, using the capture-recapture method. International journal of injury control and safety promotion. 2018 Oct 2;25(4):341-6.
9. Boniface R, Museru L, Kiloloma O, Munthali V. Factors associated with road traffic injuries in Tanzania. Pan African medical journal. 2016;23(1).
10. Singh H, Aggarwal AD. Fatal road traffic accidents among young children. Journal of Indian Academy of Forensic Medicine. 2010;32:286-8.
11. Sánchez-Mangas R, García-Ferrrer A, De Juan A, Arroyo AM. The probability of death in road traffic accidents. How important is a quick medical response?. Accident Analysis & Prevention. 2010 Jul 1;42(4):1048-56.
12. Prakashy C, Tiwari VK, TP SR, Nair KS. Pattern of road accidents system response and quality of services in emergency ward of a tertiary hospital in delhi.
13. https://www.autocarindia.com/industry/road-accidents-in-india-claim-more-than-14-

lakh-lives-in-2017-410111.

14. World Health Organization. 2nd Global Status Report on Road Safety. 2011. [Last accessed on 2015 Jan 03]. Available from:
15. Carr BG, Caplan JM, Pryor JP, Branas CC. A meta-analysis of prehospital care times for trauma. Prehosp Emerg Care. 2006;10:198–206.
16. Champion HR, Sacco WJ, Copes WS, Gann DS, Gennarelli TA, Flanagan ME. A revision of the trauma score. J Trauma. 1989;29:623–9.
17. Center for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS) 2015. [Last accessed on 2015 Nov 16]. Available from:
18. Boyle MJ, Smith EC, Archer FL. Trauma incidents attended by emergency medical services in Victoria, Australia. Prehosp Disaster Med. 2008;23:20–8.
19. Babatunde AS, Adedeji OA, Chima PK, Sulyman AK, Ukpong SU, Lukman OA, et al. Clinical spectrum of trauma at a university hospital in Nigeria. Eur J Trauma. 2002;28:365–9. Mishra B, Sinha Mishra ND, Sukhla S, Sinha A. Epidemiological study of road traffic accident cases from Western Nepal. Indian J Community Med. 2010;35:115–21.
20. Rastogi D, Meena S, Sharma V, Singh GK. Epidemiology of patients admitted to a major trauma centre in northern India. Chin J Traumatol. 2014;17:103–7.
21. Shameem AM, Shabbir KM, Agrawal D, Sharma BS. Outcome in head injured patients: Experience at a level 1 trauma centre. Indian J Neurotrauma. 2009;6:119–22.