

Analysis of Pattern of Chest Injuries in Road Traffic Accidents in a Trauma Center: A Cross-Sectional Study

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Received: 01-07-2026 / Revised: 15-08-2026 / Accepted: 21-09-2026

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Conflict of interest: Nil

Abstract

Background: Injuries from road accidents are a significant contributor to both death and morbidity. It is the world's biggest public health issue, accounting for over 5.8 million deaths annually. Due to global increases in violence, construction, and the number of vehicles, chest trauma has gotten worse throughout time as urbanization and industry have grown.

Methods: From August 2024 to January 2025, this study was carried out at the Murli Bhedi Jha Community Health and Trauma Center, Araria Sangram, Jhanjharpur, Madhubani, Bihar.

The method of convenient sampling was employed. A hospital-based retrospective descriptive cross-sectional study design was employed to evaluate patient outcomes and trends related to chest injuries. For analysis, the gathered data was imported into SPSS version 25.

Result: Young adults (63%) between the ages of 18 and 35 were the most affected age group. Males made up nearly three-quarters (72%) of patients with chest trauma, while women made up 28%. The majority of patients with chest damage arrived at medical institutions one to two hours after the incident. The most frequent chest injuries were rib fractures (39%), followed by hemopneumothorax (25%) and pulmonary contusions (7%). Extremities were the most often injured body part (47%).

Conclusion: RTA-related chest injuries have a significant morbidity and fatality rate in this setting and mostly impact the male, economically productive age group.

Keywords: Chest Injury, Road Traffic Accidents, Rib Fractures, Associated Injuries, Hemopneumothorax.

DOI: 10.25258/ijcpr.18.10.7

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Introduction

Injuries from road accidents are a significant contributor to both death and morbidity. It is the leading public health issue in every nation on the planet, accounting for over 5.8 million fatalities annually, or 16,000 deaths per day.[1] Regardless of age, sex, income, or geographic location, injury affects and places a substantial health burden on all populations. Homicides account for 600,000 deaths worldwide and are thought to be the primary cause of traumatic deaths, whereas traffic accidents account for 1.3 million deaths and suicides for 844,000.[2] Ninety-one percent of these deaths take place in developing countries like India.

Due to global increases in violence, construction, and the number of vehicles, chest trauma has gotten worse as urbanization and industry have grown. Road traffic accidents increase as a result of the latter. It is a serious health issue, particularly for young men. Globally, chest trauma is the third important cause of mortality and morbidity

preceded by cancer and cardiovascular diseases being responsible for 10% of all trauma admissions and 25% of trauma-related deaths across the world.[3] In Europe and United states, the mortality rate as a result of blunt trauma can be as high as 60% but appropriate and timely diagnosis of chest traumas can decrease the mortality and morbidity.[4] Optimal care of severely injured patients needs a multidisciplinary approach starting from the point of injury to a rehabilitation structure in order to return the patient to their maximum potential level of function within a society.[5]

Major thoracic injuries are known as the Deadly Dozen. Six are lethal and six are hidden. The Lethal six are immediate life threatening conditions like Airway obstruction, Tension pneumothorax, open pneumothorax, Flail chest, Massive haemothorax and cardiac tamponade. While the hidden six like tracheobronchial tree injury, pulmonary contusion, blunt cardiac injury, blunt

oesophageal rupture, traumatic aortic disruption and traumatic diaphragmatic injury are potentially life threatening conditions.[6]

Material and Methods

The study was cross-sectional, quantitative, descriptive, and retrospective. From August 2025 to January 2026, the study was carried out at the Murli Bhedi Jha Community Health and Trauma Center in Araria Sangram, Jhanjharpur, Madhubani, and Bihar.

The study comprised 100 patients at our trauma center's Accident and Emergency department who were between the ages of 18 and 80 and had chest injuries sustained in a car accident. Young adults

were defined as those between the ages of 18 and 35, middle-aged adults as those between the ages of 35 and 60, and elderly patients as those beyond 60. Every patient in the trial provided written informed consent.

The collected data analysed using SPSS-25.

Results

The study included 100 patients with chest injuries. Young adults (63%) between the ages of 18 and 35 were the most affected age group. Males made up nearly three-quarters (72%) of patients with chest trauma, while women made up 28%. According to Table 1, motorcyclists were the most common road users among these patients who had chest injuries.

Table 1: Distribution of cases according to types of road users

Valid	No. of cases	Percentage
Vehicle driver	25	25.0%
Passenger	23	23.0%
Pedestrian	11	11.0%
Motorcyclist	41	41.0%
Total	100	100.0%

Majority of chest trauma patient 63% received blunt injuries while 37% received penetrating injuries as shown in Table-2.

Table2: Distribution of cases according to nature of chest injury

Valid	No. of cases	Percentage
Blunt	63	63.0%
Penetrating	37	37.0%
Total	100	100.0%

Most of the patients (92%) arrived to health care facilities within 1 to 2 hours of trauma. The average duration for hospital stay was 1 to 7 days. Concerning outcome of the patient, 77 were recovered, 15 were referred (with associated

injuries) and 8 died in our trauma center during treatment (Table-3). Those who died (8%) were the ones with advanced age (over 60 years), had associated injuries (head and neck) and presented late in hospital (after 2 hours).

Table3: Distribution of cases according to outcomes

Valid	No. of cases	Percentage
Recovered	77	77.0%
Referred	15	15.0%
Death	8	8.0%
Total	100	100.0%

Rib fracture was the commonest types of chest injury, it accounted for (39%) of chest injuries followed by hemopneumothorax (25%) and pulmonary contusion (7%) as shown in Table-4.

Table4: Distribution of cases according to pattern of chest injuries

Valid	No. of cases	Percentage
Rib fracture	39	39.0%
Clavicle fracture	10	10.0%
Sternal fracture	6	6.0%
Pneumothorax	17	17.0%
Hemothorax	8	8.0%
Cardiac tamponade	5	5.0%
Pulmonary contusion	7	7.0%
Myocardial contusion	2	2.0%
Chest wall contusion	4	4.0%
Airway obstruction	2	2.0%
Total	100	100.0%

Discussion

In this study, males in the economically productive age group were more likely to sustain chest injuries. The current study's results are consistent with those of other investigations.[7, 8–11]

According to a thorough review of the research, RTAs are the primary cause of chest injuries globally, particularly in poorer nations.[2] Nearly 62% of all thoracic injuries in the current study were caused by auto accidents. This mode of injury is more common in developing nations like ours and other Asian and African countries, but it is rarely documented in western literature.

Blunt chest injuries were more frequent than penetrating chest injuries in present study. Similarly, the same pattern reported from previous studies in Syria by Al-koudmani, in Tanzania by Lema and in Iran by Mohammadzadeh.[6,7,10]

Early presentation after a chest injury coupled with prompt and effective management at a trauma centre is the key to a good outcome. However, this study found that most of patients were presented to health care facilities within 1 hours of injury. Our observation is in agreement with a study from Nigeria.[8]

Moreover, late presentations to hospital (after 2 hours) were highly associated with mortality in the present study. This could be as a due to grossly inadequate ambulance service that usually resulted in a long interval between the accident and the arrival of the victims at the hospital, this needs further exploration in future studies.

Concerning pattern of chest injury majority of the patients sustained rib fracture, i.e., 39% followed by hemopneumothorax and pulmonary contusion i.e., 25% and 7% respectively.

In agreement with the present finding study in England reported rib fracture as the most common type of chest injury.[9] Contrasting to the present finding another study in Iran reported hemothorax as the most common type of chest injury.[11]

Among patients who arrived with chest injuries, the most frequently injured extra-thoracic related body region was the extremities. This result was in line with the research done in Syria.[6] This study indicated a grave outcome, with an 8% fatality rate among those over 60 who had related head and neck injuries. This finding is consistent with other national and international investigations.[12, 13]

Conclusion

The most frequent cause of blunt chest injuries, which primarily affect young males, is traffic accidents involving motor vehicles. The most frequent pattern of chest injuries was rib fractures.

Patients who are older, have related injuries, and arrive late to the hospital have a higher mortality rate.

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