ORIGINAL ARTICLE **DOI: https://doi.org/10.18502/fem.v9i3.20018**

Analyzing thoracic trauma trends at Dr. Mohammad Hoesin Hospital, Indonesia: findings from 2020

Fauzia Azizah Kusuma[1]*, Arie Hasiholan Lumbang Tobing[2], Tia Sabrina[3]

1. Medical Education Study Program, Faculty of Medicine, Sriwijaya University, Palembang, Indonesia.
2. Department of Thoracic and Cardiovascular Surgery, Mohammad Hoesin General Hospital, Palembang, Indonesia.
3. Department of Microbiology, Faculty of Medicine, Sriwijaya University, Palembang, Indonesia.

***Corresponding author:** Fauzia Azizah Kusuma; **Email:** kusuma.azizah777@gmail.com

Published online: 2025-08-24

Abstract: **Objective:** Thoracic trauma is frequently encountered in Indonesia, contributing to significant rates of mortality and morbidity. A considerable number of patients with thoracic injuries succumb before reaching medical facilities, as the prevalence of such trauma continues to escalate. Nevertheless, the risk of fatal outcomes can be mitigated through timely emergency intervention, precise diagnosis, and appropriate treatment. This study aimed to present an overview of the demographic characteristics, treatment outcomes, and duration of hospitalization for thoracic trauma patients admitted to Dr. Mohammad Hoesin Palembang during the years 2020 and 2021.

Methods: This descriptive observational study utilized secondary data derived from the medical records of thoracic trauma patients admitted to Dr. Mohammad Hoesin Palembang from January 1, 2020, to December 31, 2021, who satisfied the established inclusion and exclusion criteria.

Results: A total of 78 thoracic trauma patients were treated at Dr. Mohammad Hoesin Palembang Hospital during 2020–2021, with a sociodemographic profile predominantly consisting of males (91.3%) and individuals aged 45 years and older (66.3%). Penetrating injuries caused by sharp objects accounted for 45% of cases. The most prevalent diagnosis among these patients was hemopneumothorax (23.1%), followed by thoracic trauma without associated injuries (62.5%). The majority of patients (97.5%) were discharged from the hospital. Notably, 58.8% of patients arrived at the hospital more than six hours post-trauma, and nearly half (48%) had a hospital stay ranging from one to five days.

Conclusion: The cohort of thoracic trauma patients admitted to Dr. Mohammad Hoesin Palembang hospital in 2020–2021 was primarily male, aged 45 years or older, sustained injuries from sharp objects, diagnosed with hemopneumothorax without associated thoracic injuries, arrived at the hospital after more than six hours, and were discharged within one to five days.

Keywords: Blunt Thoracic Injury; Penetrating Thoracic Injury; Thoracic Trauma

Cite this article as: Kusuma FA, Lumbang Tobing AH, Sabrina T. Aradhya S. Analyzing thoracic trauma trends at Dr. Mohammad Hoesin Hospital, Indonesia: findings from 2020. Front Emerg Med. 2025;9(3):e22.

1. Introduction

Trauma refers to physical harm inflicted on the body due to external influences (1). The rates of mortality and morbidity linked to trauma are significant in both developing and developed nations (2,3). The world health organization (WHO) reports that trauma accounts for over five million fatalities globally each year, with projections indicating an increase by 2030. In Asia, trauma is responsible for one in ten deaths. For instance, Singapore has a trauma-related death rate of 20.6 per 100,000 individuals, while Myanmar's rate is considerably higher at 346.6 per 100,000 (4).

In Indonesia, the basic health research (RISKESDAS) indicates an annual incidence of trauma cases totaling 1,017,290 across 34 provinces. North Sulawesi province has the highest incidence rate, while South Sumatra province reports approximately 33,566 cases annually. Notably, men are more frequently affected by trauma (5,6). Traumatic injuries can impact any area of the body, with thoracic trauma constituting 20-25% of all trauma cases worldwide. Furthermore, one in four trauma patients succumbs to thoracic injuries or related pulmonary and non-pulmonary complications (2,3). Indonesia basic health research (RISKESDAS) data reveals that Indonesia averages around 2,000 thoracic trauma cases per province annually, with South Sumatra province documenting an average of 72 thoracic trauma incidents per district or city (5,6).

Thoracic trauma is generally categorized into two main types: sharp thoracic trauma and blunt thoracic trauma. Sharp trauma refers to injuries resulting from cuts, lacerations, or gunshot wounds that compromise the integrity of the tissues. In contrast, blunt trauma encompasses injuries sustained from falls, vehicular accidents, and workplace in-

cidents, which can lead to damage to the underlying organs and structures. It is noteworthy that blunt trauma constitutes approximately 70% of all thoracic injuries and represents 15% of the total trauma cases globally. The incidence of thoracic trauma is on the rise, and the pre-hospital mortality rate among affected patients remains alarmingly high, with only 4% to 60% of trauma patients being able to avoid death during hospitalization (3). Given these statistics, thoracic trauma emerges as a critical contributor to mortality. Nevertheless, the risk of complications and subsequent fatalities can be mitigated through prompt diagnosis and intervention (7).

In Indonesia, the prevalence of thoracic trauma necessitates increased attention due to its associated high rates of mortality and morbidity. While numerous studies have explored the characteristics of thoracic trauma cases across various regions, there is a notable lack of data regarding cases managed at Dr. Soetomo General Hospital and Mohammad Hoesin Palembang. Consequently, this study seeks to elucidate the characteristics of thoracic trauma patients treated at Dr. Mohammad Hoesin Palembang General Hospital during the years 2020-2021.

2. Methods

This study is described as an observational descriptive investigation using existing data, focusing on the medical records of patients with thoracic injuries treated at Dr. Mohammad Hoesin Hospital in Palembang between January 1, 2020, and December 31, 2021. The research involved a group of 78 patients. All medical records within the specified timeframe were included in the sample through the use of total sampling. This study investigated variables such as age, gender, type and cause of trauma, diagnosis, coexisting injuries, patient outcomes, time spent in pre-hospital care, and length of hospitalization. The process of the study included gathering information by pinpointing patients who had undergone thoracic injuries at Dr. Mohammad Hoesin Hospital, Palembang, and retrieving pertinent details from their medical records based on the established research criteria. Analysis of data was carried out using Microsoft Excel 2019, with a focus on examining the frequency distribution of the research variables and calculating the percentage of thoracic trauma cases based on these variables. Approval for the study was authorized by the Medical and Health Research Ethics Committee (KEPKK) of the Faculty of Medicine, Sriwijaya University, with protocol number 097-2022.

3. Results

A total of 114 medical records about thoracic trauma were identified at Dr. Mohammad Hoesin Hospital in Palembang, of which 78 were eligible for inclusion in the study. The exclusion of 36 medical records was due to incomplete data (n=36).

Table 1 illustrates the demographic characteristics of the thoracic trauma patients treated at Dr. Mohammad Hoesin Hospital, revealing a predominance of male patients (91.0%) and individuals under the age of 45 (66.7%).

The classification of thoracic trauma types is presented in table 2. The findings indicate that the incidence of sharp trauma (59%) was nearly equivalent to that of blunt trauma (41%). The leading causes of injury among patients were stab wounds from sharp objects (46.2%) and motor vehicle accidents (24.4%). The diagnoses established for thoracic trauma patients included Hemopneumothorax (23.1%), Hemothorax (19.2%), and pneumothorax (17.9%). Additionally, 30 patients (38.5%) presented with concurrent injuries, with abdominal trauma being the most frequent (13 patients), followed by neck trauma (8 patients).

Table 3 outlines the management strategies employed for thoracic trauma patients at Dr. Mohammad Hoesin Hospital, including variables such as pre-hospital time, duration of hospital stay, and treatment outcomes. Among the thoracic trauma patients, 45 individuals (57.7%) arrived at the hospital more than six hours post-injury, while 22 patients (28.2%) arrived between two to six hours after the incident. Regarding the duration of hospitalization, 39 patients (50.0%) were treated for 1-5 days, and 33 patients (42.3%) were hospitalized for 6-10 days. Ultimately, 76 thoracic trauma patients (97.4%) survived, while 2 patients succumbed to their injuries.

4. Discussion

Research conducted on the epidemiology and risk factors associated with thoracic trauma in Indonesia, particularly at RSMH Hospital in 2020, revealed epidemiological patterns that align with findings from various other nations. According to a GBD article (2021), Indonesia is ranked third in trauma cases within ASEAN, following Thailand and Cambodia. The types of trauma incidents reported include injuries leading to death or disability, resulting from either direct or indirect physical forces, immersion, or exposure. These forces can be accidental, interpersonal, self-inflicted, or arise from war, conflict, violence, and natural disasters (8). The findings of this study regarding age align with research from Cuba, showing that 25.49% of individuals in the study are under 40 years old (9,10). Study from from 4 Asian countries include Japan, Korea, Taiwan, and Malaysia, showed mean age was 45 years old (11). Research in Sri Lanka showed mean age was 45.8 years (12). Nevertheless, research at the Kediri City Hospital shows variations in the findings, with a higher percentage (35.5%) of thoracic trauma patients between the ages of 46-60 years (13). Nonetheless, various studies have demonstrated that the age group most at risk for thoracic trauma is typically the working-age population, despite discrepancies in findings among researchers. The most physically and economically active age with social development is the group in their productive years (10). In order for this particular age bracket to be active and mobile. Furthermore, the number of traffic accidents is directly linked to the pro-

Table 1 Distribution of sociodemographic characteristics of thoracic trauma respondents at Dr. Mohammad Hoesin General Hospital, Palembang (n=78)

Variable	Distribution	
	Total	Precentage (%)
Age		
<45 years old	52	66,7
45-65 years old	22	28,2
>65 years old	4	5,1
Gender		
Male	71	91,0
Female	7	9,0

Table 2 Description of thoracic trauma cases at Dr. Mohammad Hoesin General Hospital, Palembang (n=78)

Variable	Distribution	
	Total	Precentage (%)
Types of Trauma		
Sharp trauma	46	59,0
Blunt trauma	32	41,0
Etiology		
Stab wounds	36	46,2
Motor vehicle accidents	19	24,4
Fall	11	14,1
Shot	8	10,3
Work accident	2	2,6
etc*	2	2,6
Diagnosis (ICD 10)		
Hemopneumothorax	18	23,1
Hemothorax	15	19,2
Pneumothorax	14	17,9
Rib fracture	9	11,5
Subcutaneous emphysema	2	2,6
Tension pneumothorax	1	1,3
etc**	19	24,4
Other trauma that accompanies thoracic trauma		
No other trauma	48	61,5
Abdominal trauma	13	16,7
Cervical trauma	8	10,3
Extremity trauma	6	7,7
Craniocerebral and extremity trauma	2	2,6
Craniocerebral trauma	1	1,3

*: blunt object kicked by elephant; **: stab wounds, chest pain without signs of hemopneumothorax, vulnus sclopetorum, abdominal rupture

portion of working-age Indonesians (9). The younger demographic exhibits a tendency for aggressive conduct and has a significant participation in driving and engaging in risky confrontations (14).

The majority of individuals with thoracic trauma are males, with 71 patients (91%). Research from 4 Asian countries showed males is higher than females (11). Another research from Taiwan has same findings with this study (15). Study from Sri Lanka has same findings that 71.9% was comprised of males (12). The findings of this study align with research done in Cuba showing that males (77.45%) tend to have a higher incidence of thoracic injuries compared to females (22.55%) (10). Research conducted in India also revealed that a higher percentage of men (70.6%) suffered thoracic trauma compared to women (29.4%) (14). Research in Kediri City showed that a higher percentage of men (76.7%) suffered thoracic trauma compared to women (23.3%) (13). Men engage in more outdoor work than indoor work, leading to higher levels of activity (14). Men have a great deal of flexibility in terms of career options involving the use of motorized vehicles, including being motorcycle taxi drivers, truck drivers, delivery drivers, and bus drivers (13).

Sharp trauma is more prevalent in this study. Research conducted in South America indicates that sharp trauma occurs more frequently than blunt trauma (16). Similarly, a study in Addis Ababa shows that sharp trauma accounts for 50% of cases, making it more common. However, several studies present contrasting findings (17). Research from Cuba

Table 3 Distribution of outcomes, pre-hospital time and length of stay of thoracic trauma patients at Dr. Mohammad Hoesin General Hospital, Palembang (n=78)

Variable	Distribution	
	Total	Precentage (%)
Outcome		
Discharge	76	97,4
Death	2	2,6
Pre-hospital time		
<2 hour	11	14,1
2-6 hour	22	28,2
>6 hour	45	57,7
Duration of hospital stay		
1-5 days	39	50,0
6-10 days	33	42,3
>10 days	6	7,7

reports that blunt trauma is more common, with a prevalence of 63.73%, compared to sharp trauma at 36.27%. Additionally, a study in India found that the majority of patients (98%) experienced blunt trauma, with sharp trauma only making up 2% (14). Research in Manado also shows that blunt trauma (70.40%) is more frequent than sharp trauma (22.85%) (18). The causes and frequency of sharp versus blunt trauma vary significantly based on geographic location, with evidence suggesting that South America shows a higher incidence of sharp trauma (16). Lundin (2022) further indicated that one-third of thoracic trauma cases were due to blunt trauma. This finding corresponds with the results of this study and those from several other countries (19).

Hemopneumothorax is the most common diagnosis in this study, consistent with findings in Sri Lanka, haemothorax and pneumothorax were the commonest types of injuries (12). Research in Addis Ababa, where 66.7% of patients also experienced hemopneumothorax. Both studies suggest that hemopneumothorax is the predominant condition. The study conducted in Addis Ababa shares similarities with this research, particularly in the prevalence of sharp trauma among patients. Consequently, the study concludes that hemopneumothorax and hemothorax are the most common diagnoses associated with sharp thoracic trauma (17). Hemopneumothorax refers to the accumulation of blood and air in the pleural cavity. Hemothorax and pneumothorax are prevalent in thoracic trauma patients, as they can result from either sharp or blunt trauma. Blood vessel lacerations and lung injuries are the primary causes of hemothorax (7). Additionally, hemothorax can occur when a hematoma on the chest wall ruptures, allowing blood to enter the pleural cavity. Blood vessel lacerations may also arise from rib fractures due to movement or coughing, leading to hemothorax (20). Pneumothorax occurs when air enters the potential space between the visceral and parietal pleura. In addition to causing hemothorax, lung lacerations that result in air leaks are the most common causes of pneumothorax (7). The study found that abdominal trauma was the most frequently occurring type of extrathoracic injury. A study from Sri Lanka showed that one of the commonest extrathoracic injury types is abdominal injuries (12). The findings of this research align with studies done in South America, which show that abdominal trauma frequently occurs alongside thoracic trauma (16). Furthermore, studies conducted in Cuba revealed that extremity and abdominal trauma outnumber other types of trauma when occurring alongside thoracic trauma (10). Nevertheless, the findings of this research do not align with studies in Turkey and Ethiopia that found a higher incidence of extremity trauma in thoracic injuries compared to abdominal injuries (21,22). Abdominal trauma is a type of trauma that can happen near the thorax due to the proximity of anatomical structures. Furthermore, abdominal trauma can be the result of blunt force from incidents like car accidents, seat belt injuries, and gunshot wounds (23).

A majority of patients were reported to be discharged, reflecting findings from a study in Kediri City, Indonesia, where 93.6% were deemed cured and 3.2% recorded as deceased (13). A study from Malaysia showed that the mortality rate of thoracic trauma was 1,04% (11). Research conducted in India indicated that 79.35% of patients were managed as outpatients with a mortality rate of 1.63% (14). Likewise, a study from Mali reported a mortality rate associated with thoracic trauma at 1.85% (24). Otherwise, a multi-cohort study from Taiwan showed the mortality rate was 6,2% (11). The mortality observed in the present study was elevated compared to these prior investigations, potentially attributable to cases of thoracic trauma occurring in conjunction with abdominal injuries.

The pre-hospital interval for patients in this study predominantly exceeded six hours. These findings contrast with those from research undertaken in Ethiopia, which identified a prehospital interval of 2-6 hours for patients suffering from thoracic trauma (21). Research from 4 asian countries, including countries such as Japan, Korea, Taiwan, and Malaysia, showed that patients who experienced transportation delays were likely to have poorer functional outcomes (11). Furthermore, a study in Amsterdam reported an average prehospital time of 45.2 minutes (25). Among the 78 patients an-

alyzed, 45 (57.7%) had an arrival time greater than six hours post-injury, with two patients (4.4%) succumbing. Prolonged pre-hospital intervals, or delays in medical treatment, may elevate mortality rates and diminish the likelihood of survival for critically injured patients. This necessitates the establishment of effective pre-hospital emergency care systems and ambulance services in developing countries to enhance survival prospects for those severely injured (26). Therefore, the concept of the "golden hour" for trauma patients emphasizes rapid transportation of injured patients so that they receive timely, definitive care (11).

The duration of hospital stay in this investigation spanned from 1 to 5 days. These findings align with previous research performed at Dr. Mohammad Hoesin General Hospital, which reported an average length of stay of 4.35 days (9). A study conducted in Turkey similarly found an average duration of 4.5 days for patients with thoracic trauma (22). In Kediri City, Indonesia, it was noted that 58.1% of patients were treated within 1 to 3 days (13). Conversely, some studies reflect differing results; for instance, research from Cuba showed that the majority of thoracic trauma patients, specifically 44.12%, required treatment over 5 to 10 days, whereas a study in Ethiopia cited an average treatment length of 9.4 days, and a study from Sri Lanka showed 15.6±18.0 days (10,12).

5. Limitations

The limitation of this study lies in its reliance on secondary data sourced from a single hospital. To obtain a more comprehensive understanding of thoracic trauma cases in South Sumatra, further research should be conducted that includes multiple hospitals across the region.

Furthermore, 36 medical records (31.6%) were unable to be analyzed because of incomplete data, highlighting a significant issue that the RSMH hospital needs to address in its electronic and integrated management of medical records.

6. Conclusion

The epidemiological data on thoracic trauma recorded at Mohammad Hoesin Hospital (RSMH) demonstrated results that were consistent with incidents reported in both Asian and non-Asian countries. The mortality rate among thoracic trauma patients at RSMH was higher than the rates observed in Malaysia, India, and Mali.

7. Declarations

7.1. Acknowledgement

The authors would like to express gratitude to the Director of Dr. Mohammad Hoesin Hospital and the staff of the Department of Thoracic and Cardiovascular Surgery.

7.2. Authors' contribution

All authors contributed to the manuscript equally.

7.3. Conflict of interest

None.

7.4. Funding

None.

References

1. Peitzman AB, Courcoulas WS, Yealy DM, Rhodes M, Fabian TC. The Trauma Manual: Trauma and Acute Care Surgery. Philadelphia, PA: Lippincott Williams & Wilkins; 2012.
2. Beshay M, Mertzlufft F, Kottkamp HW, Reymond M, Schmid RA, Branscheid D, et al. Analysis of risk factors in thoracic trauma patients with a comparison of a modern trauma centre: a monocentre study. World J Emerg Surg. 202031;15(1):1-10.
3. Dogrul BN, Kiliccalan I, Asci ES, Peker SC. Blunt trauma related chest wall and pulmonary injuries: an overview. Chin J Traumatol. 2020;23(3):125-38.
4. Jung YH, Wi DH, Shin S Do, Tanaka H, Shaun GE, Chiang WC, et al. Comparison of trauma systems in Asian countries: a cross-sectional study. Clin Exp Emerg Med. 2019;6(4):321-9.
5. Riskesdas Team. National Report on Basic Health Research 2018 [Indonesian]. Jakarta: Health Research and Development Agency Publishing Unit; 2019:247-266.
6. Riskesdas Team. Provincial Report of South Sumatra: Basic Health Research [Indonesian]. Jakarta: Health Research and Development Agency Publishing Unit;2019:185-199.
7. Committee on Trauma. ATLS Advanced Trauma Life Support®. Tenth. Chicago: American College of Surgeons; 2018.
8. van der Lubbe SCC, Chong LS, Hay SI, Bisignano C, James SL, Dai X, et al. The epidemiology and burden of injury in countries of the Association of Southeast Asian Nations (ASEAN), 1990–2021: findings from the Global Burden of Disease Study 2021. Lancet Public Health [Internet]. 2025 Jun;10(6):e456–66. Available from: https://linkinghub.elsevier.com/retrieve/pii/S2468266725000696
9. Marrantiza S, Umar A, Bermansyah, Satria G, Nugraha A. Chest trauma score of thoracic trauma patients in Dr. Mohammad Hoesin General Hospital Palembang January-June 2020. Sriwijaya Journal of Surgery. 2021;4(2):408-21.
10. Satorre Rocha JA. Characteristics of thoracic trauma in the Enrique Cabrera Hospital. Review of a five-year period. Am J Biomed Sci Res. 2019;5(4):291-5.
11. Chen CH, Shin S Do, Sun JT, Jamaluddin SF, Tanaka H, Song KJ, et al. Association between prehospital time and outcome of trauma patients in 4 Asian countries: a cross-national, multicenter cohort study. PLoS Med. 2020 ;17(10).

12. Mathangasinghe Y, Pradeep IHDS, Rasnayake D. Demographic, clinical features and outcome determinants of thoracic trauma in Sri Lanka: a multicentre prospective cohort study. Can Respir J. 2020;2020:1219439.
13. Handoyo CN, Supriyanto E. Profile of thoracic trauma in the surgical inpatient ward of Gambiran Hospital, March 2017–March 2018 [Indonesian]. J Ilm Kedokt Wijaya Kusuma. 2018;7(2):178-88..
14. Walia BS, Dugg P, Sharma S. Clinical features, management, and outcomes of chest trauma at a tertiary-care centre in India: a retrospective observational study. Sci World J.2021;2021:1-4.
15. Chang PC, Chen CW, Liu YW, Chou SH, Chang TW, Li HP, et al. Pulmonary entrapping predicts occult diaphragmatic injury in blunt thoracic trauma with rib fractures. Asian J Surg. 2025;48(5):2859-65.
16. Roberto GL, Sebastián BM, Alejandra RU, Rodrigo RM, Felipe AO, Enrique SS, et al. Thoracic trauma: analysis of hospitalizations among different age-groups. Rev Cir (Mex). 2021;73(4):410-9.
17. Adem A, Ilagoa R, Mekonen E. Chest injuries in Tikur Anbessa Hospital, Addis Ababa: a three year experience. East Cent Afr J Surg. 2016;6(1).
18. Masloman AH, Rendy L, Wowiling PAV, Sapan HB. Pattern of trauma patients in the surgical emergency unit of Prof. Dr. R. D. Kandou Hospital, Manado, January 2013 [Indonesian]. e-CliniC. 2016;4(1).
19. Lundin A, Akram SK, Berg L, Göransson KE, Enocson A. Thoracic injuries in trauma patients epidemiology and its influence on mortality [Internet]. 2022. Available from: https://www.researchsquare.com/article/rs-2024177/v1
20. Mayasari D. Penatalaksanaan Hematotoraks Sedang Et Causa Trauma Tumpul. J Agromed Unila. 2017;4(1):37–42.
21. Yimam AE, Mustofa SY, Gebregzi AH, Aytolign HA. Mortality rate and factors associated with death in traumatic chest injury patients: a retrospective study. International Journal of Surgery Open. 2021 ;37:1-7.
22. Liman ST, Kuzucu A, Tastepe AI, Ulasan GN, Topcu S. Chest injury due to blunt trauma. Eur J Cardiothorac Surg. 2003;23(3):374-8.
23. Yasuhara H, Naka S, Kuroda T. Blunt thoracic and abdominal vascular trauma and organ injury caused by road traffic accident. Eur J Vasc Endovasc Surg. 2000;20(6):517-22.
24. Abdoulhamidou A, Thierno DM, Moustapha M, Alaji DS, Mahamadoun C, Youssouf S, et al. Chest trauma at the emergency department of the Gabriel Touré University Hospital Bamako, Mali. Open J Emerg Med. 2021;9(2):18-24.
25. Berkeveld E, Popal Z, Schober P, Zuidema WP, Bloemers FW, Giannakopoulos GF. Prehospital time and mortality in polytrauma patients: a retrospective analysis. BMC Emerg Med. 2021;21(1):1-6.
26. Masuma JS, Boniface RL, Lugazia ER, Masuma JS, Boniface RL, Lugazia ER. Prevalence and factors associated with mortality among chest injury patients admitted at Muhimbili National Hospital in Dar es Salaam, Tanzania. Int J Clin Med. 2021;12(9):364-76.