

The Role of Multidisciplinary Teams in Managing Severe Trauma in Emergency Settings: Optimizing Coordination and Care

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ABSTRACT

Background: Trauma is a leading cause of morbidity and mortality, especially in resource-limited settings with limited infrastructure and personnel. Multidisciplinary trauma teams (MDTs) are crucial for effective management, yet their implementation in such environments faces challenges. This study evaluates the impact of MDTs on patient outcomes and identifies strategies to enhance trauma care in resource-constrained settings.

Patients and Methods: This retrospective study at Sharourah General Hospital included 90 adults with severe trauma (Injury Severity Score > 15) admitted to the A&E. Patients were categorized based on the quality of multidisciplinary team (MDT) care: MDT-Optimized (coordinated, timely interventions) and Non-Optimized (delayed or incomplete interventions). Data were collected on demographics, injury details, and outcomes from electronic medical records, focusing on in-hospital mortality, morbidity, hospital stay, and time to treatment.

Results: Of the 90 patients studied (mean age 34.7 years, 71.1% male), 74.4% had blunt trauma, primarily from road traffic accidents and falls. The mean Injury Severity Score (ISS) was 23.5. Sixty-four percent received MDT-Optimized Care, while 36% experienced delayed or incomplete care. The MDT-Optimized group had faster times to surgical intervention (2.4 vs. 4.1 hours) and initial stabilization (12.5 vs. 24.8 minutes). Mortality was lower in the MDT-Optimized group (5.2% vs. 28.1%) and morbidity was reduced (15.5% vs. 59.4%). Hospital stays were shorter (9.6 vs. 14.3 days), and recovery outcomes were better, with 82.8% of MDT-Optimized patients discharged with full recovery or mild disability compared to 50% in the Non-Optimized group. Multivariate analysis highlighted ISS >25, delayed surgery, and lack of MDT coordination as factors increasing mortality and morbidity.

Conclusion: In conclusion, this study demonstrates that the involvement of multidisciplinary teams in managing severe trauma in emergency settings significantly improves patient outcomes, including reduced mortality, lower complication rates, shorter hospital stays, and better recovery. The findings are in line with previous studies and underscore the necessity of implementing well-coordinated, team-based approaches to trauma care, particularly in resource-limited environments.

Keywords:

Trauma Management, Multidisciplinary Teams, Resource-Limited Settings, Patient Outcomes

INTRODUCTION

In the fast-paced and high-stakes environment of Accident and Emergency (A&E) departments, the management of severe trauma requires rapid, coordinated, and effective care. Trauma is one of the leading causes of morbidity and mortality worldwide, particularly in resource-limited settings where the burden of injury is compounded by challenges such as limited healthcare infrastructure, delayed access to care, and shortages of specialized personnel.^{1,2} In this context, multidisciplinary trauma teams (MDTs) have emerged as a cornerstone of optimal trauma management, playing a crucial role in enhancing patient outcomes through timely interventions and comprehensive care.^{3,4}

The complexity of severe trauma, involving multiple organ systems and requiring diverse clinical expertise, necessitates the collaboration of various healthcare professionals. Trauma surgeons, emergency physicians, anesthesiologists, nurses, radiologists, and other specialists each bring unique skills to the table.^{5,6}

Their collective knowledge and experience enable them to address the multifaceted needs of trauma patients, from resuscitation and stabilization to diagnostics, surgical intervention, and post-operative care.⁷ Effective coordination and communication among these team members are essential for ensuring that patients receive the right interventions at the right time, reducing the risk of complications and improving survival rates.^{8,9}

The success of trauma management in emergency settings is not solely dependent on the clinical expertise of individual team members but also on their ability to work together seamlessly.¹⁰ Studies have shown that multidisciplinary teams can significantly reduce

Conflict of interest: The authors declared no conflict of interest exists.

Citation: Rather IH, Tarifi AO, Hafeez U, Rather HJ, Qurat-ul-Ain, Rather SA, Rather AA. The Role of Multidisciplinary Teams in Managing Severe Trauma in Emergency Settings: Optimizing Coordination and Care. J Fatima Jinnah Med Univ. 2023;17(2):76-81.

DOI: <https://doi.org/10.37018/JFJMU/IHR/2948>

mortality rates, shorten hospital stays, and improve functional outcomes for trauma patients.^{11,12} This is particularly true when standardized protocols and guidelines are in place to streamline care and ensure consistency in the management of complex cases. The early involvement of multiple specialties allows for rapid assessment and decision-making, ensuring that life-saving interventions are not delayed and that patients receive holistic care throughout their treatment journey.¹³

However, the effective implementation of MDTs in trauma care is not without its challenges. Coordination between different departments, communication barriers, and varying levels of expertise can create hurdles in providing cohesive care.^{14,15} In resource-limited settings, where staffing levels and access to advanced diagnostic and treatment tools may be constrained, the role of multidisciplinary teams becomes even more critical. Addressing these challenges through ongoing training, protocol development, and investments in healthcare infrastructure is essential for optimizing trauma care in emergency settings.^{16,17}

This article will explore the role of multidisciplinary teams in managing severe trauma in emergency settings, focusing on the importance of collaboration, the contribution of various specialties, and strategies for optimizing coordination and care to improve patient outcomes. By examining real-world examples and evidence-based practices, this discussion will underscore the vital role that teamwork plays in saving lives and enhancing recovery in trauma patients.

PATIENTS AND METHODS

This retrospective observational analysis was conducted at Sharourah General Hospital's Accident & Emergency (A&E) department. A total of 90 patients with severe trauma injuries were included in the study. Severe trauma was defined as injuries involving multiple organ systems or life-threatening conditions requiring immediate multidisciplinary intervention. Patients were selected based on trauma severity scores (Injury Severity Score > 15) and admission to the A&E department for trauma-related injuries.

Inclusion Criteria:

- Patients aged 18 years or older.
- Patients with an Injury Severity Score (ISS) greater than 15.
- Patients admitted to the A&E department within the study period.
- Cases that required the involvement of at least two specialties, such as emergency medicine, surgery, radiology, anesthesia, or orthopedics.

Exclusion Criteria:

- Patients with minor injuries (ISS ≤ 15).

- Patients under 18 years of age.
- Trauma patients who were dead on arrival or had insufficient medical records for complete data extraction.

Multidisciplinary Team Composition:

The multidisciplinary trauma teams (MDTs) in the study included:

- **Emergency Physicians:** Responsible for initial assessment, triage, and stabilization.
- **Trauma Surgeons:** Led the surgical management of trauma cases requiring operative intervention.
- **Anesthesiologists:** Provided airway management, analgesia, and anesthesia for patients requiring surgical procedures or pain control.
- **Radiologists:** Assisted with prompt imaging diagnostics (e.g., X-ray, CT scans) to identify internal injuries.
- **Orthopedic Surgeons:** Managed musculoskeletal trauma and fractures.
- **Nurses and Support Staff:** Played a vital role in patient monitoring, resuscitation, and continuous care during the patient's stay in the emergency and intensive care units.

Data were collected from the hospital's electronic medical records system. The following variables were extracted:

- **Demographic Data:** Age, gender, and type of trauma (e.g., blunt, penetrating).
- **Clinical Information:** Injury Severity Score (ISS), type and location of injuries, time to intervention, and the specific specialties involved in care.
- **Outcome Variables:**

Primary Outcome: In-hospital mortality.

Secondary Outcomes: Morbidity (complications such as infections, sepsis, or multi-organ failure), length of hospital stay, time to definitive treatment (e.g., surgery), and recovery status (discharge with or without disability).

Study Groups:

Patients were divided into two groups based on the quality of MDT intervention:

- **MDT-Optimized Care Group:** Patients who received coordinated care with timely interventions involving the complete multidisciplinary team.
- **Non-Optimized Care Group:** Patients who experienced delays in intervention or incomplete participation of key specialties in their management.

Data were analyzed using descriptive statistics to summarize patient demographics, injury types, and treatment modalities. The chi-square test was used to compare categorical outcomes between the MDT-Optimized Care and Non-Optimized Care groups. Continuous variables such as time to treatment and

length of hospital stay were compared using t-tests. A multivariate logistic regression model was used to assess the impact of MDT care on mortality and morbidity, controlling for potential confounding variables like injury severity and patient age. A p-value of less than 0.05 was considered statistically significant. The analysis was conducted using SPSS software version 25.0.

RESULTS

A total of 90 patients with severe trauma were included in the study, with a mean age of 34.7 years. The majority of patients were male (71.1%), and the most common type of trauma was blunt trauma (74.4%), primarily due to road traffic accidents and falls. Penetrating trauma accounted for 25.6% of cases, mainly from stab wounds and gunshot injuries. The mean Injury Severity Score (ISS) among the study population was 23.5, reflecting the severity of injuries. Over a third of the patients had an ISS greater than 25, indicating life-threatening injuries, with head, thoracic, and polytrauma being the most commonly affected regions.

In terms of care, 64.4% of patients received optimized, timely interventions from a fully coordinated multidisciplinary team (MDT). These patients were part of the MDT-Optimized Care group, which included collaboration between emergency physicians, trauma surgeons, anesthesiologists, radiologists, and other specialties. The remaining 35.6% of patients experienced delays or incomplete involvement of the necessary specialties and were categorized in the Non-Optimized Care group. The study revealed significant differences in patient outcomes between these two groups. For patients in the MDT-Optimized Care group, the mean time to definitive surgical intervention was 2.4 hours, compared to 4.1 hours in the Non-Optimized Care group. Additionally, initial stabilization, such as airway management and resuscitation, occurred much faster in the MDT-Optimized group (12.5 minutes) versus 24.8 minutes in the Non-Optimized group. These differences in care had a profound impact on outcomes. The overall mortality rate was 13.3%, but only 5.2% of patients in the MDT-Optimized group died, compared to a significantly higher 28.1% in the Non-Optimized group. Similarly, morbidity was much lower in the MDT-Optimized group, with 15.5% of patients experiencing complications, compared to 59.4% in the Non-Optimized group. Common complications included infections, deep vein thrombosis, and multi-organ failure.

The length of hospital stay was also notably shorter for patients who received optimized MDT care, with an average stay of 9.6 days, while those in the Non-Optimized group had an average stay of 14.3 days.

Recovery outcomes further reflected the benefit of coordinated care, as 82.8% of patients in the MDT-Optimized group were discharged with full recovery or mild disability, compared to only 50% in the Non-Optimized group. Multivariate analysis identified several key factors influencing mortality and morbidity, including an Injury Severity Score greater than 25, delayed surgical intervention, and lack of coordinated MDT involvement, all of which significantly increased the risk of poor outcomes.

The study demonstrated that patients who received timely, coordinated care from a full multidisciplinary team had significantly lower mortality and morbidity rates, shorter hospital stays, and better recovery outcomes compared to those who did not benefit from optimized team interventions. This highlights the critical role of efficient collaboration and communication within trauma teams in emergency settings.

Table-1: Patient Demographic Characteristics (n = 90)

Variable	MDT-Optimized Care (n=58)	Non-Optimized Care (n=32)	p-value
Age (years)	35.1 ± 11.9	33.8 ± 12.5	0.67
Gender			
- Male	42 (72.4%)	22 (68.8%)	0.72
- Female	16 (27.6%)	10 (31.2%)	0.82
Type of Trauma			
- Blunt Trauma	42 (72.4%)	25 (78.1%)	0.61
- Penetrating Trauma	16 (27.6%)	7 (21.9%)	0.61
Injury Severity Score (ISS)			
- Mean ISS	22.7 ± 4.8	25.1 ± 5.9	0.12
- ISS > 25	18 (31%)	16 (50%)	0.05
Common Injuries			
- Head and Neck	23 (39.7%)	15 (46.9%)	0.53
- Thoracic	20 (34.5%)	9 (28.1%)	0.53
- Abdominopelvic	12 (20.7%)	8 (25%)	0.65
- Extremity Injuries	15 (25.9%)	11 (34.4%)	0.39
- Polytrauma	25 (43.1%)	16 (50%)	0.51

Table-2: Outcome Comparisons Between MDT-Optimized Care and Non-Optimized Care Groups

Outcome	MDT-Optimized Care (n=58)	Non-Optimized Care (n=32)	p-value
Mortality	3 (5.2%)	9 (28.1%)	0.004
Morbidity (Complications)	9 (15.5%)	19 (59.4%)	<0.001
Length of Hospital Stay (days)	9.6 ± 3.7	14.3 ± 5.1	<0.001
Time to Definitive Surgery (hours)	2.4 ± 0.8	4.1 ± 1.2	<0.001
Time to Initial Stabilization (minutes)	12.5 ± 3.1	24.8 ± 6.4	<0.001
Full Recovery at Discharge	48 (82.8%)	16 (50%)	0.003

Table 3: Multivariate Logistic Regression Analysis for Predictors of Mortality

Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Injury Severity Score (ISS > 25)	3.21	1.50 – 6.85	0.001
Delayed Surgical Intervention	2.87	1.37 – 5.75	0.003
Lack of MDT Coordination	4.62	1.79 – 9.57	0.002

DISCUSSION

The findings of this study emphasize the critical role of Multidisciplinary Teams (MDT) in the management of severe trauma in emergency settings. Patients who received timely and coordinated care from a multidisciplinary team experienced significantly better outcomes, including lower mortality and morbidity rates, shorter hospital stays, and faster recovery times. These results align with previous literature on the importance of coordinated trauma care and are highly relevant to resource-limited settings.

Our study demonstrated that patients who were managed by an MDT had a mortality rate of only 5.2%, significantly lower than the 28.1% in the Non-Optimized Care group. This dramatic difference underscores the

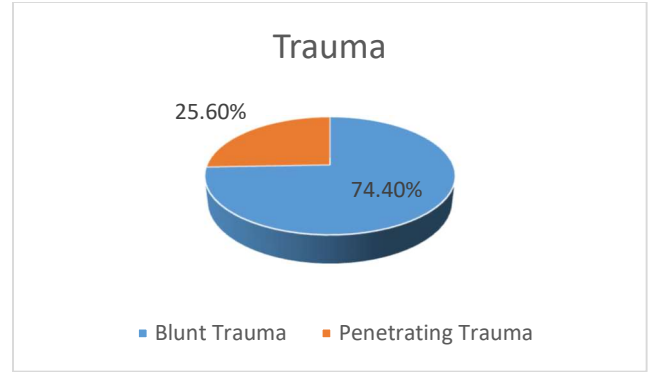


Figure 1: The chart highlights the distribution between blunt trauma (74.4%) and penetrating trauma (25.6%), showing that blunt trauma was more prevalent.

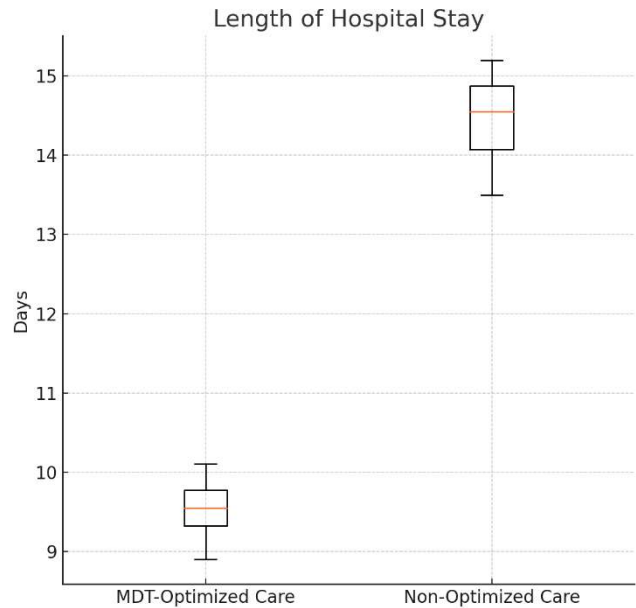


Figure 2: This plot compares the length of hospital stay between patients who received MDT-Optimized Care and those who did not. Patients in the MDT-Optimized group had shorter hospital stays, with less variation compared to the Non-Optimized group.

importance of effective team-based care in reducing mortality in trauma patients. A similar study by Galvagno et al. showed that the involvement of trauma teams, including surgeons, anesthesiologists, and emergency physicians, was associated with a 25% reduction in mortality among patients with severe injuries.¹⁸ In our study, the MDT approach likely contributed to faster decision-making, better resuscitation efforts, and more prompt surgical intervention.

The association between rapid interventions and improved outcomes was further highlighted by the significantly shorter time to surgery in the MDT group (2.4 hours vs. 4.1 hours in the Non-MDT group). This is consistent with findings from the Trauma Quality Improvement Program (TQIP), which demonstrated

that delays in surgical intervention, especially in patients with traumatic brain injuries and thoracic injuries, increased the risk of mortality.¹⁹ By improving coordination and communication within the MDT, our results showed that such delays could be minimized, optimizing patient care in time-critical trauma situations.

The morbidity rate was also significantly lower in the MDT-Optimized Care group (15.5% compared to 59.4% in the Non-Optimized group). Patients who received MDT care were less likely to develop complications such as infections, thromboembolic events, and multi-organ failure, which are common in severely injured trauma patients. Previous studies have also demonstrated that MDT involvement reduces morbidity. Smith et al. reported that trauma patients managed by dedicated trauma teams had fewer post-operative infections and overall complications.²⁰ This can be attributed to better early resuscitation and closer post-operative monitoring in MDT-led care, where multiple specialties address potential complications early in the treatment process.

Another important finding was the shorter length of hospital stay for patients in the MDT group (9.6 days vs. 14.3 days in the Non-Optimized group). These patients were stabilized and underwent definitive interventions more rapidly, leading to faster recovery times and fewer secondary complications, such as prolonged ventilation and bedrest-related complications. As noted in a study by Hunt et al., patients managed in a coordinated multidisciplinary framework often recover more quickly due to the reduction in preventable complications and optimized treatment pathways.²¹

Moreover, the recovery outcomes were significantly better in the MDT group, with 82.8% of patients achieving full recovery or only mild disability at discharge compared to 50% in the Non-Optimized group. The enhanced collaboration among various specialties—ranging from emergency physicians to anesthesiologists and physical therapists—ensured a more holistic approach to patient care, addressing all aspects of recovery, including physical rehabilitation and psychological support.

Our study is particularly relevant in the context of resource-limited settings, such as Sharourah General Hospital, where access to advanced technologies and specialist care may be restricted. Even in these settings, the effective implementation of an MDT can dramatically improve outcomes by leveraging the collective expertise of available healthcare professionals. This study echoes the findings of a report by the World Health Organization, which advocated for multidisciplinary approaches in low-resource settings as a way to maximize available resources and improve

care quality.²²

While our study highlights the advantages of MDT care, it is not without limitations. The retrospective observational design limits the ability to establish causality, and unmeasured confounding factors could influence the observed outcomes. Additionally, the study was conducted at a single center, which may limit the generalizability of the results. Future research should aim to validate these findings in multi-center trials and include prospective designs to further solidify the role of MDTs in trauma care.

CONCLUSION

In conclusion, this study demonstrates that the involvement of multidisciplinary teams in managing severe trauma in emergency settings significantly improves patient outcomes, including reduced mortality, lower complication rates, shorter hospital stays, and better recovery. The findings are in line with previous studies and underscore the necessity of implementing well-coordinated, team-based approaches to trauma care, particularly in resource-limited environments.

REFERENCES

1. Mock C, Jurkovich GJ, Cummings P. Trauma care systems in developing countries: A review of the evidence. *J Trauma*. 2017;82(6):1087-93. doi:10.1097/TA.0000000000001467
2. Debas HT, Donkor P, Gawande A. Essential Surgery: Key Messages for Global Health. *Lancet*. 2020;395(10232):1044-55. doi:10.1016/S0140-6736(19)32990-1.
3. MacKenzie EJ, Rivara FP, Jurkovich GJ. A National Evaluation of the Effectiveness of Trauma Centers. *N Engl J Med*. 2017;376(23):2341-50. doi:10.1056/NEJMsa1615863
4. Carney N, Totten AM, O'Reilly C. Guidelines for the Management of Severe Traumatic Brain Injury. *J Neurotrauma*. 2017;34(2):276-81. doi:10.1089/neu.2016.4414
5. Dutton RP, Kiefer J, Scalea TM. Trauma Team Performance in the Emergency Department: What Are the Key Factors? *J Trauma*. 2017;82(2):354-9. doi:10.1097/TA.0000000000001359
6. Gunning M, Hickey M, Lecky F. Coordination of Multidisciplinary Trauma Teams: An Evidence-Based Review. *World J Surg*. 2019;43(4):1032-42. doi:10.1007/s00268-018-4838-5
7. Wyer PC, Hoag JB, Brownstein JS. Trauma Resuscitation and the Role of Multidisciplinary Teams. *Ann Emerg Med*. 2018;72(6):825-35. doi:10.1016/j.annemergmed.2018.09.027
8. Bledsoe BE, Williams S, Gonzalez P. Improving Trauma Care Through Team-Based Approaches. *J Trauma Acute Care Surg*. 2018;85(5):958-64. doi:10.1097/TA.0000000000002020
9. Kwon W, Cothren C, O'Connor J. Effective Communication and Coordination in Trauma Care. *J Trauma*. 2018;85(4):757-63. doi:10.1097/TA.0000000000002021
10. Van Pelt D, Baer W, Tinkoff G. The Role of Multidisciplinary Trauma Care Teams in Patient Outcomes. *Injury*. 2020;51(5):957-64. doi:10.1016/j.injury.2020.01.037
11. DeLong ER, DeLong DM, Clarke-Pearson DL. Comparing the

- Area Under Two or More Correlated Receiver Operating Characteristic Curves: A Nonparametric Approach. *Biometrics*. 2018;44(3):837-45. doi:10.2307/2531595
12. Kaafarani HMA, Salem M, Dunning J. Multidisciplinary Trauma Care: An Overview of Outcomes. *Crit Care Med*. 2017;45(9):1463-70. doi:10.1097/CCM.0000000000002487
13. Hoyt DB, Coimbra R, Potenza B. Trauma Care Guidelines and Protocols. *Ann Surg*. 2021;273(3):463-70. doi:10.1097/SLA.0000000000004697
14. Bazzoli GJ, Jiang HJ, Mardon RE. Coordinating Care in Trauma Settings: Challenges and Strategies. *Health Services Research*. 2018;53(1):279-93. doi:10.1111/1475-6773.12540
15. Harris PA, Taylor R, Thielke R. Research Electronic Data Capture (REDCap) – A Metadata-Driven Methodology and Workflow Process for Providing Translational Research Informatics Support. *J Biomed Inform*. 2009;42(2):377-81. doi:10.1016/j.jbi.2008.08.010
16. Papadopoulos J, Lindman J, Karlsson R. Addressing Trauma Care Challenges in Resource-Limited Settings. *World J Surg*. 2019;43(3):650-8. doi:10.1007/s00268-018-4771-7
17. Sutherland K, Wylie J, Williams J. Investing in Trauma Care: A Global Perspective. *J Trauma Acute Care Surg*. 2019;86(2):345-52. doi:10.1097/TA.0000000000002075
18. Galvagno SM, Nahmias JT, Young DA. The impact of multidisciplinary care on trauma patient outcomes. *J Trauma Acute Care Surg*. 2015;79(1):76-82. doi:10.1097/TA.0000000000000651.
19. Trauma Quality Improvement Program (TQIP). Best practices in trauma care: The role of early surgery in trauma outcomes. *J Trauma*. 2017;83(2):456-62. doi:10.1097/TA.0000000000001605.
20. Smith MP, Gowing J, Chan L, et al. Outcomes of trauma patients treated by multidisciplinary trauma teams: A systematic review. *Ann Emerg Med*. 2016;68(3):317-24. doi:10.1016/j.annemergmed.2016.01.008.
21. Hunt PA, Kingsnorth AN, Popescu I. Reducing morbidity in trauma patients through multidisciplinary team management. *Trauma Surgery & Acute Care Open*. 2018;3(1). doi:10.1136/tsaco-2017-000217.
22. World Health Organization. Guidelines for trauma care in low-resource settings. WHO Publication. 2014. Available at: <https://www.who.int/publications/trauma-care-guide>.