



St. Paul Hospital Millennium Medical College
Graduate Study Program

Pattern and Outcome of abdominal trauma among patients
presented to Addis Abeba Emergency and Trauma hospital

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Addis Ababa, Ethiopia
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St. Paul Hospital Millennium Medical College

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Pattern and Outcome of abdominal trauma among patients presented to Addis Abeba Burn Emergency and Trauma hospital a quantitative cross-sectional study from January 1, 2024, to October 31, 2025

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Acronyms and Abbreviation

AaBET: Addis Ababa Burn, Emergency and Trauma

ARDS: Acute respiratory distress syndrome

ED: Emergency department

E-FAST: Extended focused assessment with sonography for trauma

HAP: Hospital-acquired pneumonia

ICU: Intensive care unit

OR: Operating Room

RTA: Road traffic accidents

RTS: Revised Trauma Score

SPHMMC: St. Paul's Hospital Millennium Medical College

SSI: Surgical site infection

UTI: Urinary tract infection.

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ABSTRACT

Background: Abdominal trauma continues to be a major cause of trauma admission all over the world and contributes significantly to high morbidity and mortality. Abdominal injury can be intentional or unintentional (accidental). The mechanism of injury can also be blunt or penetrating. In low and middle income countries like Ethiopia Abdominal trauma contributes significant morbidity and mortality. Hence this study will assess the common mechanism of injury, treatment options with their outcomes.

Objective: To assess the pattern and management outcome of patients presented with abdominal injury in AaBET hospital.

Methods: A quantitative cross-sectional study design will be used for this study. The total sample size will be 220 patients. The data will be collected by developing and using a questionnaire that helps to achieve the objective of the study. The collected data will be coded and entered to EPI info software and will export to window based statistical package for social sciences (SPSS). Descriptive and inferential statistics will be applied. Binary logistics regression will be used to analysis the factors associated with the outcome. The odds ratios (OR) with 95% confidence interval (CI) and P-values <0.05 will be used to declare to be statistically significant.

Result: A total of two hundred (200) charts of patients admitted to emergency department were included in this study. The majority of patients (66%) were in the age group 25–54 years, followed by 15–24 years (16%).The most common mechanism of injury was road traffic accident (RTA), accounted for 46% of cases, A slightly higher proportion of patients were managed conservatively (55%).Postoperative or in-hospital complications occurred in 27% of patients.

Conclusion and recommendation: This study demonstrated that abdominal trauma predominantly affects young males and is most commonly caused by RTA, resulting in a higher proportion of blunt injuries. Ensure rapid assessment and timely intervention of life-threatening abdominal injuries is the recommendation.

Key Word: Abdominal Trauma, Injury Pattern, Cross-sectional study, Clinical Outcome

1. Introduction

1.1. Background

Trauma or injury is defined as bodily damage resulting from an exchange of environmental energy that exceeds the body's ability to withstand it[1]. Trauma is a major global public health problem and a leading causes of death and disability in both developed and developing countries[2]. The abdomen is a diagnostic black box, injury to this abdomen causes significant morbidity and mortality[1].

According to the World Health Organization's (WHO) global burden of injury estimate, injuries rank among the top ten leading causes of death, accounting for approximately 5 million deaths annually, with men in Africa having the highest injury-related mortality rate globally[3]. Trauma is the second leading cause of illness, accounting for 16% of the global disease burden, with the highest incidence occurring between the ages of 15 and 45 years. According to WHO, over 90% of all injuries occur in low and middle-income countries with Africa, particularly the Sub-Saharan region, contributes 21% of these cases[4].

The abdomen is vulnerable to injury since there is minimal bony protection for underlying organs[5]. The causes and mechanisms of abdominal trauma reported in the literature vary across different regions of the world, largely due to differences in infrastructure, civil violence, wars, and crime[6].

1.2.Statement of the problem

Abdominal trauma remains a leading cause of trauma admissions worldwide and plays a significant role in high rates of morbidity and mortality[5]. Abdominal injury can be intentional or unintentional (accidental)[7]. The mechanism of injury can also be blunt or penetrating[8]. Blunt abdominal trauma occurs when the abdomen is struck directly, such as by the bottom edge of a steering wheel or a forceful car door during an accident, leading to compression and crushing of internal organs. Penetrating abdominal trauma, on the other hand, involves injuries from stab wounds or gunshots, which tear and cut through the fascia, resulting in damage to the internal organs[9, 10].

In Ethiopia the majority of abdominal trauma patients are in the 2nd and 4th decade of life, representing economically productive age groups[11]. In one study done at Yekatit 12 Memorial Hospital in 2024, The mechanism of abdominal trauma was penetrating in 54.8% of patients and blunt in 45.2% of patients[12]. In other study done at St. Paul hospital in 2022, showed 62% of abdominal injuries requiring laparotomy were penetrating injuries and 38% were blunt abdominal injuries[13]. A survey conducted at Dilchora Hospital in Eastern Ethiopia found 3.14% out of 382 trauma patients had abdominal injuries[14]. In Tikur Anbesa, Addis Ababa, of 328 patients screened for abdominal surgical emergency 12.5% had penetrating abdominal injuries and 9.4% had a blunt abdominal injury[15].

According to a study done in 2013 in Tanzania, around one-third of trauma patients suffer from abdominal injuries, necessitating careful triage for proper intervention, as about 25% of these cases require surgery[16]. Abdominal trauma was treated surgically in some patients and conservatively in others. Tenderness, guarding, and rigidity are the best physical signs, but initially there may be no evidence of the presence abdominal injury[7, 8].

In summary, abdominal trauma is a major contributor to morbidity and mortality in Ethiopia, particularly among young, economically active individuals. The burden of this injury highlights the need for comprehensive research to better understand the patterns, mechanisms, and outcomes of abdominal trauma. Such research is crucial in developing evidence-based strategies to improve trauma care, reduce mortality, and mitigate the socio-economic impact of abdominal injuries.

1.3. Significance of the study

Abdominal trauma is a significant issue globally, particularly because of its high incidence among young people, which has a negative impact on the country's economic well-being[17]. Abdominal injuries account for 10% of trauma-related deaths. Delays in early diagnosis or incorrect diagnoses are key factors contributing to the high mortality and morbidity associated with abdominal trauma[18]. Despite the growing burden of abdominal trauma due to different reasons there is limited comprehensive data and local research conducted on the patterns, management and outcomes of this injury in Ethiopia, particularly at AaBET hospital.

Previous studies done at SPHMMC, AaBET and Yekatit 12 hospitals showed the critical significance of this data to have a targeted intervention. Hence this study will assess the common mechanism of injury, treatment options with their outcomes and predictors including effect of time from injury to intervention, providing evidence-based insights to the managing clinicians, the hospital management and scientific community at large.

2. LITERATURE REVIEW

As described in the previous chapter abdominal trauma is a major cause of trauma admission all over the world. Subsequent section of literature summary describes the pattern, outcomes and factors contribute to the outcome of patients presented with abdominal trauma in the emergency department.

In 2023 G.C institutional based longitudinal study was done in Yekatit 12 memorial hospital where 42 patients were seen during the study period. Among them 35 patients were males making male to female ratio of 5:1. Majority of the patients were young in the range of 20-29 years (40.5%) and 76.2% were living in urban areas. penetrating injury account 54.8% of patients and blunt in 45.2%. Mortality rate was 4.78%. Most of the patients 97.3% were operated within 6 hours of admission, among them 94.6% of patients had positive findings[12].

Hospital-based cross-sectional study done at SPHMMC and AaBET hospitals from January 2018 to December 2019 showed penetrating injuries as a commonest mechanism of injury in 51.5% of cases. From the causes of injury majorities sustained RTA (32.1%) followed by stub (28.5%) and gunshot (20.6%). 79.4% patients were managed surgically, while 20.6% patients were managed conservatively. From operated patients, 23% patients had spleen injury, of this 78.9% had a blunt abdominal injury. The mortality rate was 3.6%, of which 67% had penetrating mechanism of injury[11].

From all adult patients who underwent laparotomy at SPHMMC from January 2014 to December 2016 Trauma accounted for 15.3%. Laparotomy for abdominal injury contributed 34% of trauma procedures and it was the third leading cause of emergency laparotomy following appendicitis and large bowel obstruction. Penetrating abdominal injury was the leading indication for trauma laparotomy (62%) and the negative laparotomy rate was (4.7 %). In this study the commonest extra abdominal injury was chest injury (72%).[13]

The majority of patients (77.5%) had deranged vital signs at the time of presentation from those patients having both hypotension and tachycardia had a 33.3% chance of death. From those presented with deranged vital signs penetrating abdominal injury had a better outcome than blunt injury (50% vs. 21.4%). The leading injured organs were small intestine, followed by colon and liver irrespective of the mechanism of injury. Overall complication occurred in 17.8% of patients, which is irreversible shock and the rate was higher in patients with blunt abdominal

injuries (10.2% vs. 2.5%). Mortality was higher in patients who had Extra-abdominal injuries (16.2% vs. 4.7%) and overall mortality rate was 8.5%[13].

In other study conducted in Nigeria Forty-five patients were seen during the study period, majority of patients had penetrating injury (73.3%) gunshot to the abdomen being the commonest etiology (63.6%). (26.7%) of patients had blunt trauma RTA being the commonest mechanism (58.3%). mortality rate was 4.4%. small bowel and spleen were commonly injured following penetrating (42.4%) and blunt (41.7%) trauma respectively [8].

But in Uganda one research showed Blunt Abdominal injury as a commonest pattern 85.7% and Spleen was the most commonly injured organ (7.8%). Eighty one patients (68.1%) were not operated. the colon was the commonest organ (17.6%) injured in penetrating trauma. In this study most patients (65%) arrived at the hospital by public or private means of transport which shows gaps in the referral system and lack of pre-hospital care[7].

One study showed motor car accident as immediate cause of the abdominal traumas 62.8% and was associated with additional comorbid injuries in 66.1% of cases, Injury of extremities being the commonest 51.2%. 28.3% of the abdominal trauma cases managed surgically. A delay of 60 to 90 minutes prior to intervention found to be important risk factor for ED fatality. The overall mortality rate among abdominal trauma patients was 25.8%, which is relatively high[9].

According to a prospective study conducted in civil hospital in India blunt abdominal trauma was the common mechanism of injury (74%), while penetrating abdominal trauma accounts (26%). In this study road traffic accidents was commonest mechanism of injury accounting 48% followed by fall down accident (32%) and stab injury (18%) respectively. Rate of isolated organ injury is found to be 66 %, while 30% of patients had multiple intra-abdominal organ injury. Commonly involved organs are liver (32%) followed by spleen (30%), small bowel (24%). Thoracic injury was associated with 27% abdominal trauma while orthopedic injuries were associated with 14.68%, but 46% of patients found to have isolated abdominal trauma[2].

3. OBJECTIVE

3.1 General objective

To assess the pattern and management outcome of patients presented with abdominal injury in AaBET hospital from January 1, 2024 to October 30, 2025.

3.2. Specific objectives

- I. To evaluate the prevalence of abdominal trauma in AaBET hospital from January 1, 2024 to October 30, 2025.
- II. To describe common types and mechanisms of abdominal trauma patients in AaBET hospital from January 1, 2024 to October 30, 2025.
- III. To identify surgical management outcomes and their determinants in AaBET hospital from January 1, 2024 to October 30, 2025.
- IV. To identify non-surgical management outcomes and their determinants in AaBET hospital from January 1, 2024 to October 30, 2025.

4. METHODOLOGY

4.1.Study area

This study was conducted in AaBET hospital located in Addis Abeba Ethiopia. The hospital has four main departments; Emergency Medicine and Intensive care, Plastic Reconstructive and Hand Surgery, Orthopedic & Traumatology and Neurosurgery. It has a total of 158 beds and 34 emergency beds and 106 emergency room staff nurses, 20 emergency medicine and critical care physicians, 3 general surgeons, 6 neurosurgeons, 8 orthopedic surgeon, 5 plastic and reconstructive surgeons, This hospital serve as the main trauma center in the country and provide emergency service by categorizing patients to Red, Orange and Yellow green zones based on their severity of illness.

4.2.Study Period:

This study was conducted from January 1st 2025 to December 2025.

4.3.Study Design:

A quantitative cross-sectional study was conducted in AaBET hospital.

4.4.Population:

4.4.1. Source population

All patients with abdominal trauma admitted to AaBET from January 2025 to December 2025.

4.4.2. Study population

All systematically selected abdominal trauma patients admitted to AaBET hospital from January 2025 to December 2025.

4.4.3. Study Unit

Individual patients

4.5.Eligibility Criteria

4.5.1. Inclusion criteria

All patients with a history of abdominal trauma present to AaBET hospital ED both blunt and penetrating trauma.

4.5.2. Exclusion criteria

All deaths before or upon emergency arrival

Those who was not have complete documentation

4.6.Sampling method and Sample size

A single population proportion formula was used to estimate the sample size and the following assumptions were made: proportion (P) of abdominal injury was 15.4%, a confidence level of 95% (1.96), and 5% margin of error (d) based on the study conducted on assessment of prevalence of abdominal trauma and associated factors in Arbaminch general hospital, Arbaminch, Gamo Gofa zone, Southwestern Ethiopia[19]. Based on this assumption the sample size was calculated by using a single population proportion formula:

$$n = \frac{(Z_{\alpha/2})^2 p (1-p)}{d^2}$$

Where; n = estimated sample size $Z_{\alpha/2}$ = is a standard normal value which corresponds 95% of confidence level = 1.96 p = estimated prevalence of abdominal injuries is (0.154). d = tolerable sampling error = 0.05. After substitution the estimated sample size yields 200, then by adding 10% of nonresponse rate for missed and incomplete charts final sample size will be $200 \times 10\% + 200 = 20 + 200 = 220$.

4.7.Sampling procedure

Patients' cards were screened and a systematic random sampling method was applied. A patient card was selected for each K value calculated from the population and sample size. $K = \text{source population} / \text{sample size}$. Patient card selection was made every k out of the total charts. The 1st card was drawn randomly from the 1st 2 patient documents ordered, then the remaining cards were selected every k patient card intervals.

4.8.Variables

4.8.1. Dependent Variables

Management outcome: Discharged improved or Died

4.8.2. Independent Variables

- ❖ Socio-demographic variables: Age of patient ,Sex, Residency
- ❖ Types of injury : Blunt or Penetrating
- ❖ Mode of arrival : ambulance, private car, taxi, foot
- ❖ Systolic Blood Pressure at presentation
- ❖ Time from presentation to operation
- ❖ Organs injured, intraoperative findings

- ❖ Complications related with direct trauma and hospitalization

4.9.Data collection tools and procedures

Data were collected using a structured checklist prepared for secondary data review. This tool includes socio- demographic characteristics, pattern of abdominal injury and patient status at discharge. This checklist was administered to patient document charts, resident's notes, hospital records, OR documentation logbooks, and morbidity and mortality reports of AaBET hospital.

4.10. Operational definitions

Management Outcome:- is condition of the patient on discharge, either improvement or death[20].

Patterns:- It refers to characteristics of abdominal trauma with respect to type, mechanism, affected abdominal organs, associated extra abdominal trauma and treatment of abdominal trauma patients included in the study[20].

Mechanism of injury:- refers to the way damage occurs in skin, muscles, organs and bones[10].

Penetrating Abdominal Trauma:- it occurs when a foreign body penetrates the skin and either lodges in the tissue or passes through the tissues and creating a wound[9].

Blunt Abdominal Trauma:- Injuries resulting from an impact with a dull hard surfaces or blunt objects[10].

Intent of injury:- mechanism by which damage is caused intentional or unintentional[21].

Revised trauma score (RTS):- is one of the most widely used physiological rating systems: Include the Glasgow coma scale (GCS), systolic blood pressure, and respiratory rate (RR). The degree of dysfunction in each parameter is scored from 0-4 and the RTS is determined by adding each of the coded values together; therefore, RTS scores range from 0 to 12[9].

4.11. Data Quality Assurance

Data quality assurance was ensured through several measures. The data collection tool was piloted at a similar facility, ALERT hospital to include 5% of the sample size and training of data collectors on proper documentation review, and daily supervision to verify completeness and consistency of collected data. Data were double-checked for accuracy before entry into SPSS,

and incomplete or inconsistent records were excluded from analysis to maintain the integrity and reliability of the study findings.

4.12. Data Processing and Analysis

Data were checked for completeness and cleaned, coded, and entered into Epi Info and exported to the SPSS software package for analysis. Incomplete and inconsistent data were excluded from the analysis. A descriptive statistics was used to describe the data. The results of the descriptive statistics expressed as percentages and frequencies. Tables and graphs were created to display the data.

4.13. Ethical consideration

This study was approved by the Institutional Review board of St. Pauli Millennium Medical College before data collection. Additionally, the objective of the study was explained to the hospital administrators, medical director, and Physicians. Confidentiality of the patient's information was assured by using code numbers and by keeping questionnaires locked.

5. RESULT

5.1.Socio-demographic characteristics

A total of two hundred (200) charts of patients admitted to emergency department were included in this study. The majority of patients (66%) were in the age group 25–54 years, followed by 15–24 years (16%) with a mean age of 30.4 years and a standard deviation of ± 14.057 years. Most of the participants were female (72%) and 55% were urban residents.

Table 1: Socio-demographic characteristics to assess the pattern and management outcome of patients presented with abdominal injury in AaBET hospital, Ethiopia, 2025.

Variables	Category	Frequency (%)
Age	2-14 years	26 (13.0)
	15-24 years	32 (16.0)
	25-54 years	132 (66.0)
	≥ 55 Years	10 (5.0)
Gender	Female	56 (28.0)
	Male	144 (72.0)
Residence	Urban	110 (55.0)
	Rural	90 (45.0)

5.2.Clinical characteristics

The most common mechanism of injury was road traffic accident (RTA), which accounted for 46% of cases, followed by stab injuries (18%) and gunshot (17%). Blunt injuries were more frequent (61%) than penetrating injuries (39%). At presentation, 25% of patients had a systolic blood pressure < 90 mmHg. Regarding triage, 55% were categorized as red and 32% orange. E-FAST was positive in 67% and negative in 28% of patients. The majority of patients (97%) had an RTS score ≥ 4 and associated injuries were noted in 68% of patients, of which chest (47%), pelvic (20%), extremity (19%) injuries were occurred most frequently. Roughly 22% of patients sustained multiple traumas.

Table 2: Clinical characteristics to assess the pattern and management outcome of patients presented with abdominal injury in AaBET hospital, Ethiopia, 2025.

Variables	Category	Frequency (%)
Causes of injury	Blast	6 (3.0)
	Falling	18 (9.0)
	Gunshot	34 (17.0)
	Horn	4 (2.0)
	RTA	92 (46.0)
	Stab	36 (18.0)
	Stick	10 (5.0)
Type of injury	Blunt	122 (61.0)
	Penetrating	78 (39.0)
Systolic Blood Pressure at presentation	<90mmHg	50 (25.0)
	≥90mmHg	150 (75.0)
Triage site	Red	110 (55.0)
	Orange	64 (32.0)
	Yellow-green	26 (13.0)
E-FAST	Positive	134 (67.0)
	Negative	55 (28.0)
	Not done	10 (5.0)
RTS-score	<4	6 (3.0)
	≥4	194 (97.0)
Associated injury	Yes	136 (68.0)
	No	64 (32.0)
Pelvic injury	Yes	40 (20.0)
	No	160 (80.0)
Chest injury	Yes	94 (47.0)
	No	106 (53.0)
Extremity injury	Yes	38 (19.0)
	No	132 (81.0)
Head injury	Yes	16 (8.0)
	No	184 (92.0)
Spine	Yes	12 (6.0)
	No	188 (94.0)
Multi-trauma	Yes	44 (22.0)

Mode of arrival to hospital	No	156 (78.0)
	Ambulance	142 (71.0)
	Private car	20 (10.0)
	Public taxi	36 (18.0)
	Others	2 (1.0)

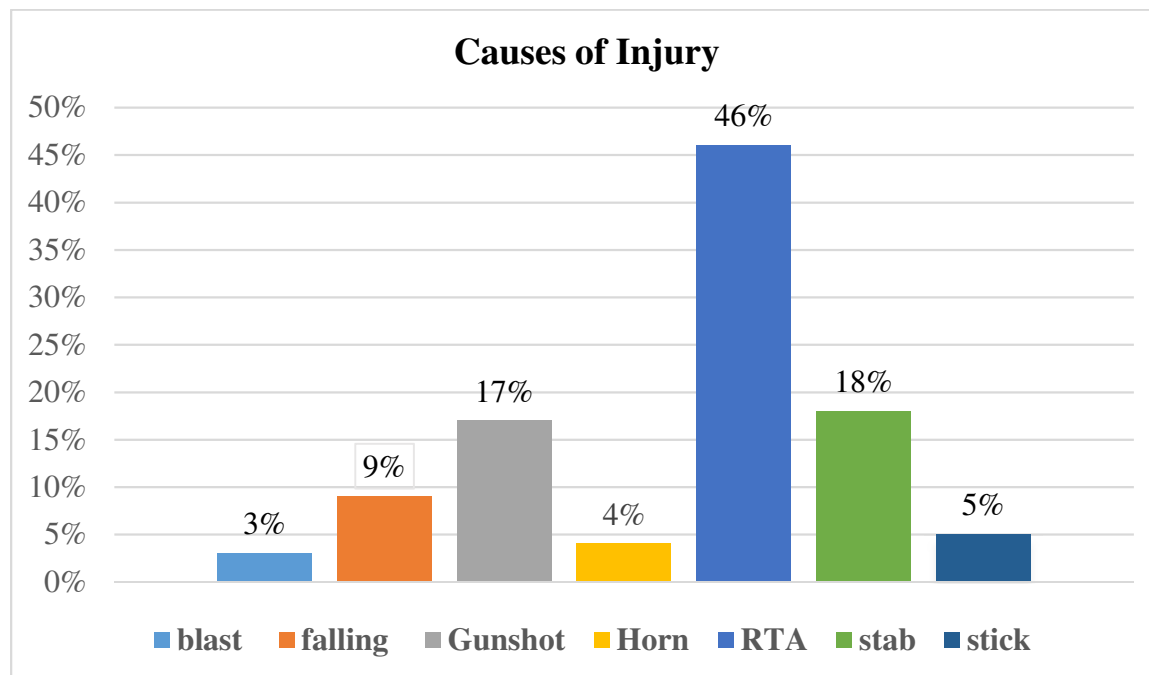


Figure-1: A graph illustrating causes of Injury assesses the pattern and management outcome of patients presented with abdominal injury in AaBET hospital from January 1, 2024 to October 30, 2025.

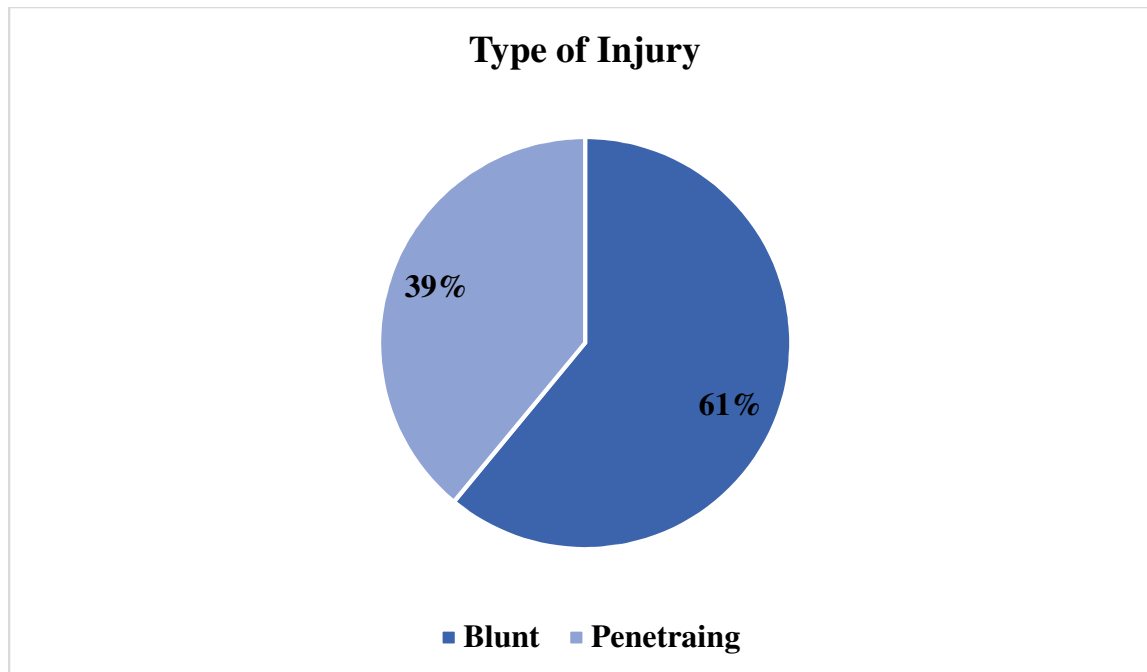


Figure-2: A graph illustrating Type of Injury assesses the pattern and management outcome of patients presented with abdominal injury in AaBET hospital from January 1, 2024 to October 30, 2025.

5.3.Management-Related Characteristics

A slightly higher proportion of patients were managed conservatively (55%) compared to surgically (45%). Blood transfusion was required in 44% of cases. Among surgical patients (n=90): 8.9% were operated within 1–2 hours of presentation, 15.6% within 2–3 hours, and 75.5% after more than 3 hours. Organ damage was identified in 66% of patients. The most commonly injured organs were: Liver (36.4%), followed by small bowel (27.3%) and spleen (27.3%),

Table 3: Management and related characteristics to assess the pattern and management outcome of patients presented with abdominal injury in AaBET hospital, Ethiopia, 2025.

Variables	Category	Frequency (%)
Management	Surgical	90 (45.0)
	Conservative	110 (55.0)
Transfusion	Yes	88 (44.0)
	No	112 (56.0)
Time from presentation to operation	1-2hrs.	8 (8.9)
	2-3hrs.	14 (15.6)
	>3hrs	68 (75.5)
	Total	90 (100)
Organ damage	Yes	132 (66.0)
	No	68 (34.0)
Diaphragm	Yes	12 (9.1)
	No	120 (90.9)
	Total	132 (100)
Colon	Yes	18 (13.6)
	No	114 (86.4)
	Total	132 (100)
Small bowel	Yes	36 (27.3)
	No	96 (72.7)
	Total	132 (100)
Liver	Yes	48 (36.4)
	No	84 (63.6)
	Total	132 (100)
Gall bladder	Yes	10 (7.6)
	No	122 (92.4)
	Total	132 (100)

Duodenum	Yes	2 (1.5)
	No	130 (98.5)
	Total	132 (100)
Stomach	Yes	6 (4.5)
	No	126 (95.5)
	Total	132 (100)
Pancreas	Yes	2 (1.5)
	No	130 (98.5)
	Total	132 (100)
Spleen	Yes	36 (27.3)
	No	96 (72.7)
	Total	132 (100)
Kidney	Yes	4 (3.0)
	No	128 (97.0)
	Total	132 (100)

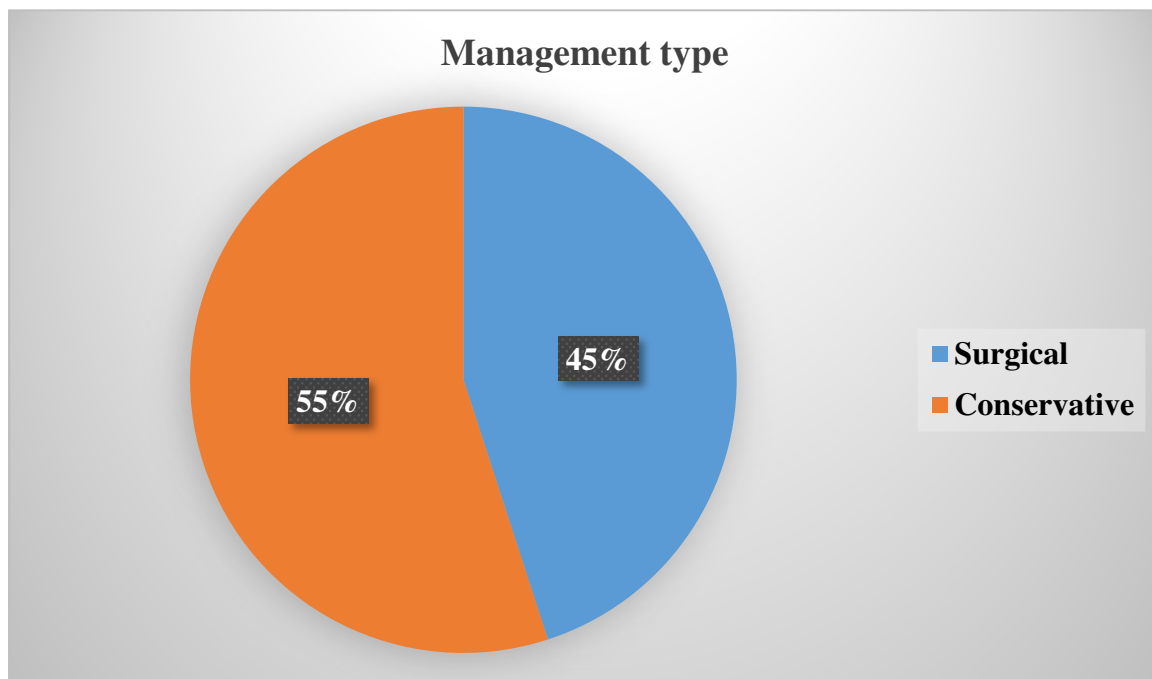


Figure-3: A graph illustrating Type of Management assesses the pattern and management outcome of patients presented with abdominal injury in AaBET hospital from January 1, 2024 to October 30, 2025.

5.4. Complications and outcomes

Postoperative or in-hospital complications occurred in 27% of patients. The major complications were peritonitis (85.2%), surgical site infection (22.2%) and Hospital-acquired pneumonia (18.5%). At discharge, 86.5% of patients improved, while 13.5% died during hospital stay.

Table 4: Complications and outcomes to assess the pattern and management outcome of patients presented with abdominal injury in AaBET hospital, Ethiopia, 2025.

Variables	Category	Frequency (%)
Any complication	Yes	54 (27.0)
	No	146 (73.0)
Peritonitis	Yes	46 (85.2)
	No	8 (14.8)
	Total	54 (100)
HAP	Yes	10 (18.5)
	No	44 (81.5)
	Total	54 (100)
Post-op intra-abdominal collection	Yes	8 (14.8)
	No	46 (85.2)
	Total	54 (100)
SSI	Yes	12 (22.2)
	No	42 (77.8)
	Total	54 (100)
ARDS	Yes	2 (3.7)
	No	52 (96.3)
	Total	54 (100)
Wound dehiscence	Yes	2 (3.7)
	No	52 (96.3)
	Total	54 (100)
UTI	Yes	6 (11.1)
	No	48 (88.9)
	Total	54 (100)
Condition on discharge	Died	27 (13.5)
	Discharged with improvement	173 (86.5)

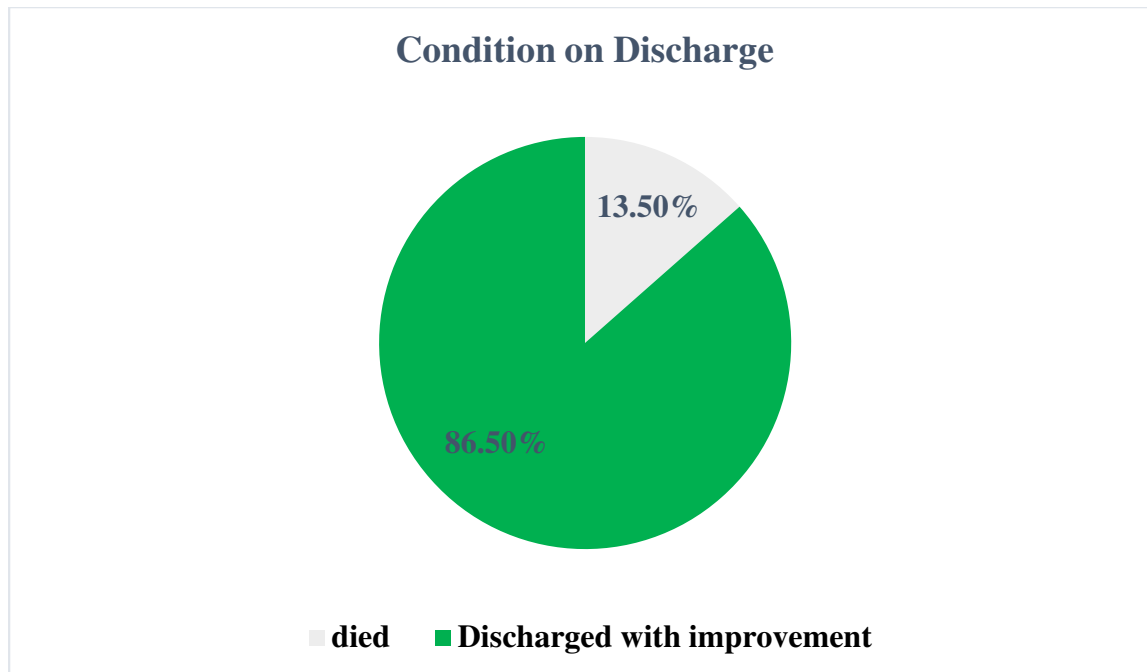


Figure 4: A graph illustrating Patient's condition on Discharge in the assessment of the pattern and management outcome of patients presented with abdominal injury in AaBET hospital from January 1, 2024 to October 30, 2025.

6. DISCUSSION

This study aimed to determine the pattern and management outcome of patients presented with abdominal injury in AaBET hospital during the study period. The study indicated that majority (72%) of the participants were male. This finding is consistent with similar studies conducted in Sudan [22], Tanzania [16], Nigeria [23] and Addis Ababa [11]. This could be attributed to frequent exposure and engagement to hazardous conditions like motor vehicle accidents, physical dispute, and occupational hazards. They are also frequently vulnerable to road traffic accidents, stab injuries, and gunshot wounds. Furthermore, males are more commonly affected to abdominal injuries due to their active and leading family, social, and occupational role than females [24].

This study revealed that RTA, stabbing, and gunshot were the most common mechanism of injury which is in line with the findings of studies in Nigeria [25], Tanzania [16], and Addis Ababa [11, 13]. It was also indicated that blunt traumas were more frequent than penetrating traumas which is consistent with similar studies in Tanzania [26] and Addis Ababa [27]. However, this finding was in contrast to the studies in Nigeria [25], Mauritania [28], Amhara region [29], Asella [30], AaBET and SPMMC of Addis Ababa [11]. This could be attributed to the natures or mechanisms of injuries in which the most common cause of injury in this study was RTA which commonly result in blunt injuries [31].

In this study, injuries to the chest, pelvic, and extremity were most frequently occurring associated injuries which is in line with the studies conducted in AaBET and SPMMC of Addis Ababa [11]. The finding is in contrast with the study conducted in Iran in which spleen, liver, and intestinal injuries were the most common associated injuries [32].

The study indicated that slightly lower than half of patients with abdominal trauma at AaBET hospital received surgical management, while most of the patients were managed conservatively. This is slightly consistent with the findings of a study in India in which 37% of the patients were managed surgically [33]. However, this finding was in contrast to the previous finding in Austria [34], Kenya [35] and AaBET and SPMMC [11] in which 82.6%, 70%, and 79.4% of patients with abdominal trauma were managed conservatively. This discrepancy could be attributed to the difference in the type of patients admitted and the mechanism of injury in which most

commonly, patients with penetrating injury are managed surgically while those with blunt trauma are commonly managed conservatively [36].

Among patients managed surgically, majority were managed after three hours which is in line with similar findings [37, 38]. This delay in surgical management could be due to delay in recognizing the severity of intra-abdominal injuries, especially in patients with subtle signs that in turn can postpone surgical intervention. Patients' previous medical conditions including severe comorbidities, shock, or other major conditions requiring stabilization prior to surgical management which further necessitate initial conservative treatment and a delay in surgical management. Limited operating rooms, personnel, equipment, and patient refusal can also delay the decision in surgical management [39, 40].

Majority of patients had associated organ damage and the most commonly identified organ injuries due abdominal trauma were liver, followed by small bowel and spleen. This is consistent with studies in Asella [30]. However, this finding showed some discrepancy with studies in Tanzania [26] and Addis Ababa [11] in which spleen was the most frequently damaged organ following abdominal trauma. This could be attributed to the difference in mechanism of injury in which penetrating injuries blunt traumas tends to cause injuries mainly to solid organs such as the liver, spleen, and kidneys and these organs are relatively fixed and vulnerable to injury from compression against the spine or rib cage. In contrast, penetrating injuries cause more frequent injury to hollow viscera like the small and large bowel, stomach, and diaphragm, due to direct organ penetration [41].

In this study, postoperative or in-hospital complications occurred in 27% of patients which is consistent with the finding of a study in Addis Ababa [11] in which 22% complications were reported. However, this finding was slightly lower than a study conducted in Tanzania in which 41.9% of patients with abdominal trauma developed post-operative or in hospital complications [26]. Peritonitis, surgical site infection, and hospital-acquired pneumonia were the most commonly reported complications in this study which is consistent with the finding of a study in Addis Ababa.

It is estimated that in hospital mortality of patients with abdominal trauma was 13.5% [95% CI: (9.0-18.0)] during the study period. This finding is in line with studies conducted in Tanzania

(13.2%) [26], Nigeria (17%) [42], and Asella (15.1%) [30], It is higher than studies carried out in Iran (6%) [32] and Addis Ababa (3.6%) [11].

Several factors may explain this difference. First, our study area received a large proportion of severely injured patients, as reflected by the very high proportion of cases triaged as red (55%) and orange (32%), compared with much lower high-acuity proportions in the referenced studies. This indicates that our patient population had greater physiological compromise at presentation, which is strongly associated with mortality in trauma literature. Another reason for the discrepancy could be attribute to delayed presentation and referral, which could have contributed to advanced complications, and reduced likelihood of successful operative or non-operative management. Furthermore, variations in mechanism of injury such as a higher burden of blunt trauma, and multi-trauma can also substantially increase mortality [43] .

7. LIMITATIONS

Since the study is descriptive, it didn't show what factors might affect the outcomes of patients with abdominal traumas. The findings of this study is generalizable to the general population since it is hospital-based.

8. CONCLUSION

This study demonstrated that abdominal trauma predominantly affects young males and is most commonly caused by RTA, resulting in a higher proportion of blunt injuries. Nearly half of the patients required surgical intervention. Liver, small bowel, and splenic injuries were the most common organ damages identified. Although the overall pattern aligns with regional and international studies, the mortality rate in this study was higher.

9. RECOMMENDATION

For Clinicians

Ensure rapid assessment and timely intervention by consistently using trauma protocols and bedside tools such as E-FAST to promptly identify life-threatening abdominal injuries.

For Policymakers

Strengthen trauma care systems by improving prehospital services, referral pathways, and resource availability—particularly operating rooms, diagnostic tools, and trained personnel.

For Future Researchers

Investigate factors contributing to delayed presentation and surgical intervention to better understand system gaps and guide targeted improvements in abdominal trauma care.

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Chapter Eight: Annex

8.2. Annex I

Questioners for Pattern and Outcome of abdominal trauma among patients presented to AaBET hospital.

Card No. _____.

Hospital stay: _____

	Questions		Response	Remark
1	Socio-demography			
	1.1	Age in years at presentation		
	1.2	Sex	A. Male B. Female	
	1.3	Region		
	1.4	Residence	A. Rural B. Urban	
2	Clinical Presentation			
	2.1	Causes of injury	A. RTA B. Stab C. Gunshot D. Horn E. Falling F. Blast G. Stick	
	2.2	Types of injury	A. Blunt B. Penetrating	
	2.3	Systolic Blood Pressure at	A. BP>90 mmHg	

		presentation	B. BP<90 mmHg	
	2.4	Triage site	A. Red B. Orange C. Yellow-Green	
	2.5	E-FAST	A. Positive B. Negative C. Not done	
	2.6	RTS-score	A. > 4 B. < or = 4	
	2.7	Associated injury	A. Pelvic B. Chest C. Extremity D. Head E. Spine F. Multi-trauma G. None	
	2.8	Mode of arrival to hospital	A. Ambulance B. Foot C. Private car D. Public taxi E. Others	
3	Management			
	3.1	Management	A. Surgical B. Conservative	
	3.2	Transfusion	A. Yes B. No	
	3.3	Time from presentation to operation	A. <1 HR B. 1-2 HRS C. 2-3HRS	

			D. >3HRS	
	3.4	Is there any organ damage	A. Yes B. No	
	3.5	If Yes for question number 3.4 what Injuries identified at operation	A. Diaphragm B. Colon C. Small bowel D. Liver E. Gallbladder F. Duodenum G. Stomach H. Pancreas I. Spleen J. Kidney	
4	Complication and condition on discharge			
	4.1	Is there any complication	A. Yes B. No	
	4.2	If Yes for question number 4.1 what Complications identified	A. Peritonitis B. HAP C. Post op intra-abdominal collection D. SSI E. ARDS F. Wound dehiscence G. Aspiration pneumonia H. UTI	
	4.3	Condition on discharge	A. Discharged Improved B. Died	

Assurance of Principal Investigator

I the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the research project. I will provide timely progress report to my advisors and seek the necessary advice and approval in the course of the research. I will communicate timely to all stakeholders involved in the study including any source of funding for this research.

Name of the student: Dr. Abrham Jember (ECCM Resident)

Signature: _____

Date: _____

Approval of the Primary Advisor

Name of the primary advisor: (Assistant Professor of ECCM)

Signature: _____

Date: _____

Approval of the Co-Advisor

Name of the co-advisor: (Assistant Professor of ECCM)

Signature: _____

Date: _____

