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Pattern, treatment outcome and associated factors of non-traumatic shock among patients presenting to adult emergency department of Tibebe Ghion specialized hospital from January 1, 2022, to December 31, 2025

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BAHIRDAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCE

SCHOOL OF MEDICINE

DEPARTMENT OF EMERGENCY MEDICINE AND CRITICAL

CARE MEDICINE

PATTERN, TREATMENT OUTCOME AND ASSOCIATED FACTORS OF
NON-TRAUMATIC SHOCK AMONG PATIENTS PRESENTING TO
ADULT EMERGENCY DEPARTMENT OF TIBEBE GHION SPECIALIZED
HOSPITAL FROM JANUARY 1, 2022, TO DECEMBER 31, 2025

BY:

DR. MELAKU MENGIST (EMERGENCY AND CRITICAL CARE
MEDICINE

FEBRUARY, 2026

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BY:

DR. MELAKU MENGIST

A RESEARCH THESIS SUBMITTED TO THE DEPARTMENT OF
EMERGENCY AND CRITICAL CARE MEDICINE, FOR THE PARTIAL
FULFILLMENT OF SPECIALITY TRAINING IN EMERGENCY AND
CRITICAL CARE MEDICINE.

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FEBRUARY, 2026

BAHIR DAR

III. Declaration

I, the undersigned, declared that this is my original work, has never been presented in this university, and that all the resources and materials used for the research, have been fully acknowledged.

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I hereby certify that I have supervised, read, and evaluated this thesis titled **“Pattern, treatment outcome and associated factors of non-traumatic shock among patients presenting to adult emergency department of Tibebe Ghion specialised hospital, Bahir Dar, Ethiopia, 2026”** prepared under my guidance. I recommend that the thesis be submitted for oral defence.

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My profound gratitude goes to almighty God, to him alone be ascribed all the glory and honour.

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List of Acronyms/ Abbreviations

AOR	Adjusted Odds ratio
CLD	Chronic Liver Disease
COPD	Chronic Obstructive Pulmonary Disease
COR	Crude Odds Ratio
CHF	Congestive Heart Failure
CI	Confidence interval
DALYs	Disability-Adjusted Life Years
ED	Emergency department
HIV	Human Immunodeficiency Virus
ICU	Intensive care unit
LMICs	low- and middle-income countries
SBP	Systolic blood pressure
SPSS	Statistical Package for social science
MAP	Mean arterial pressure
TGSH	Tibebe Ghion Specialised Hospital
VIF	Variance Inflation Factor

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Abstract

Background: Non-traumatic shock is a major cause of morbidity and mortality in emergency departments worldwide. In resource-limited countries like Ethiopia, where emergency care systems experience significant constraints, early identification and management of shock are critical yet often challenging. However, evidence on its patterns, outcome, and predictors of mortality remains limited in Ethiopia and the study area as well.

Objective: This study aimed to assess the pattern, treatment outcome, and associated factors of non-traumatic shock among adult patients presenting to the emergency department of Tibebe Ghion Specialized Hospital, Ethiopia, between January 1, 2022, and December 31, 2025.

Methods: A hospital-based retrospective cross-sectional study was conducted among adult patients admitted with non-traumatic shock between January 1, 2022, and December 31, 2025. Medical records were reviewed to extract socio-demographic, clinical, laboratory, and treatment-related data. Data quality was ensured through pretested tools and regular supervision. Descriptive statistics were used to summarise patient characteristics. Multivariable binary logistic regression analysis was performed to identify independent predictors of mortality, with adjusted odds ratios (AOR) and 95% confidence intervals (CI).

Results: A total of 422 patient cards were identified for assessment, of which 32 incomplete records were excluded, resulting in 390 eligible cards and a response rate of 92.4%. Septic shock was the most common type of non-traumatic shock (43.1%), followed by hypovolemic shock (33.1%) and cardiogenic shock (14.9%). The overall mortality was 17.7%. Night-time presentation to the emergency department (AOR = 2.0, 95% CI: 1.10–3.64), use of vasopressors (AOR = 2.28, 95% CI: 1.04–5.01), elevated creatinine levels >1.2 mg/dl (AOR = 4.34, 95% CI: 1.72–10.9), and presence of chronic liver disease (AOR = 3.81, 95% CI: 1.40–10.4) were significantly associated with mortality.

Conclusion and Recommendation: Non-traumatic shock remains a significant contributor to mortality in the emergency department, with septic shock being the most common type. Mortality is strongly influenced by both patient and system-related factors. Therefore, strengthening night-shift staffing, improving renal monitoring capacity, ensuring wise use of vasopressors and prioritising care for patients with chronic liver disease are essential strategies for reducing mortality.

Keywords: Non-traumatic, Shock, TibebeGhion, Emergency, adult,Ethiopia, treatment outcome

1. Introduction

1.1 Background

Shock remains one of the most critical emergencies encountered in adult emergency department characterized by inadequate tissue perfusion progressing to cellular dysfunction, organ failure, and ultimately leading to death (1). Non-traumatic shock, on the other hand, is defined as inadequate tissue perfusion and oxygenation without having physical injury manifested clinically as altered mental status, cold, clammy skin, and delayed capillary refill. It affects a wide range of patients from those with sepsis and gastrointestinal bleeding to individuals with endocrine and cardiac emergencies (2, 3).

Shock is a heterogeneous clinical syndrome with multiple aetiologies, broadly classified into hypovolemic, cardiogenic, distributive and obstructive types each requiring rapid recognition and tailored interventions (1, 2). Hypovolemic shock is the consequence of a loss of intravascular volume of 15% or more, resulting in insufficient perfusion of the tissues. Hypovolemic shock occurs when the volume of the circulatory system is depleted, so that it can no longer support adequate blood flow to the body tissues (4).

Distributive shock is the predominant type of circulatory shock in severely ill patients. Sepsis is the leading cause, with the other causes including anaphylaxis, capillary leak syndrome, adrenal insufficiency, post-cardiopulmonary bypass vasoplegia syndrome, or pharmacologic toxicity (5). Patients with septic shock can be diagnosed clinically by the need for a vasopressor to maintain a MAP of 65 mm Hg or higher and a blood lactate level greater than 2 mmol/L (>18 mg/dL) in the absence of hypovolemia. This combination is linked with in-hospital mortality rates of more than 40%. Septic shock is a subtype of sepsis, where circulatory, cellular, and metabolic problems cause higher mortality (6). Cardiogenic shock is a clinical illness defined by a main cardiac problem that causes both clinical and biochemical indications of tissue hypoperfusion due to insufficient cardiac output, which can lead to multiorgan failure and death. The presence of clinical signs of hypoperfusion (e.g., cold, clammy extremities, oliguria, mental confusion, dizziness, and narrow pulse pressure) as well as biochemical manifestations of hypoperfusion (e.g., elevated serum creatinine, metabolic acidosis, and elevated serum lactate) is critical for diagnosis (7). Obstructive shock is uncommon (1%), and it is caused by a decrease in venous return or cardiac compliance as a result of increased left ventricular outflow obstruction or a significant preload decrease (8). This study at Tibebe Ghion aims to delineate these patterns, outcomes, and associated factors to inform context-specific protocols enhancing survival in Ethiopia's public health emergency systems.

1.2 Statement of the Problem

Despite decades of research and breakthroughs in resuscitation technology, shock is still a primary cause of morbidity and mortality in emergency departments around the world(9, 10). Non-traumatic shock, in particular, is becoming more well recognised as a key contributor to acute medical emergencies owing to sepsis, cardiac dysfunction, metabolic abnormalities, and other non-injury-related causes(10, 11). Non-traumatic shock,unlike traumatic shock, has a wide range of clinical patterns that necessitate sophisticated diagnostic and treatment approaches(10, 12).

Globally, shock is a significant burden in emergency departments, accounting for 0.4% to 1.3% of all presentations, with unacceptably high fatality rates despite advances in critical care (2, 3). Shock-related mortality has decreased in high-income nations due to improved surveillance and treatment, but it remains a major cause of hospital mortality in low- and middle-income countries (LMICs), including Ethiopia. Furthermore, the impact is exacerbated by delayed presentation, poor diagnostic tools, and restricted therapy alternatives in these settings(13-15). Sepsis, the greatest cause of non-traumatic shock worldwide, is responsible for 48.9 million cases and 11 million fatalities per year, accounting for over 20% of all global mortality(16). In Ethiopia, a recent study conducted in the eastern part of the country reported mortality of 28% among shock patients in a tertiary hospital, with septic shock being the leading cause (11). In the Amhara region, where this study is conducted, septic shock patients admitted to intensive care units demonstrated an overall mortality incidence rate of 10.4 per 100-person day of observation from septic shock, highlighting the severity of the problem locally(17).In addition, a study conducted in Rwanda shows that the mortality rate was 82.1% for septic shock (18). These systemic challenges often translate into poor outcomes, underscoring the need for context-specific evidence to guide clinical practice and policy(14).

The effects of non-traumatic shock go beyond individual health outcomes. Clinically, it causes longer hospital stay, an increased risk of multiorgan dysfunction, and a high mortality rate(19, 20). Shock-related morbidity and mortality impose considerable costs on families and health systems, including lost productivity, catastrophic health expenses, and resource-intensive emergency care (21). Non-traumatic shock typically affects the productive age group (20-60 years), resulting in a large reduction in Disability-Adjusted Life Years

(DALYs). Non-traumatic shock typically affects the productive age group (20-60 years), resulting in a large reduction in Disability-Adjusted Life Years (DALYs)(22).

While the Ethiopian Public Health Emergency Management 10-year strategic plan (2024-2034) attempts to build resilient systems, it remains focused on outbreaks and disasters, leaving a vacuum in the standardised management of individual clinical shock cases(23). This directly impedes progress toward SDG 3.8, which requires universal access to quality essential health-care services(24).

Previous studies in Ethiopia, such as those conducted at Hiwot Fana Comprehensive Specialised Hospital(11) and the University of Gondar(13), have highlighted the complexity of shock management in EDs, revealing high mortality rates and identifying factors such as delayed presentation, comorbidities, and inadequate resuscitation as key determinants of poor outcomes. However, these findings are institution-specific and cannot be applied to other healthcare facilities due to variances in patient demographics, resource availability, and therapeutic practices. Furthermore, previous studies conducted in Ethiopia have primarily examined shock as a broad clinical entity without differentiating between traumatic and non-traumatic causes. This lack of distinction has limited the understanding of the unique patterns, predictors and outcomes associated with non-traumatic shock. So, evidence guiding clinical management and health system responses to non-traumatic shock remains inadequate. As a result, this study aimed to assess patterns, treatment outcome and associated factors of non-traumatic shock among patients presenting to the adult ED of Tibebe Ghion Specialised Hospital.

1.3 Significance of the Study

The study on the pattern, treatment outcome, and associated factors of non-traumatic shock among patients presenting to the adult emergency department of Tibebe Ghion Specialised Hospital in Bahir Dar, Ethiopia, is highly significant as it addresses a critical gap in emergency medicine within a resource-limited setting. Unlike previous investigations that often combined both traumatic and non-traumatic shock, this study focused exclusively on non-traumatic cases, thereby providing a clearer understanding of their unique clinical characteristics, management challenges, and outcomes. By identifying the common patterns of presentation and evaluating treatment outcome, this study will provide evidence that can help clinicians recognize shock at an early stage and intervene in time through the identification of common patterns of presentation, assessment of treatment outcome, and analysis of factors related to patient outcome. Besides that, the findings will be useful to hospital officials and policymakers in deciding how to deploy limited resources more effectively, enhance emergency protocols, and train healthcare workers better. From a scholarly perspective, the paper adds to the scant literature on non-traumatic shock in Ethiopia by providing locally relevant data which can be utilised as a base for further research and cross-country studies. In the end, the findings could lead to better patient care, avoid unnecessary deaths, and a higher standard of emergency medical services in the area.

2. Literature Review

2.1 Pattern of Non-traumatic shock Among Patients Presenting to Adult Emergency Departments

The distribution of non-traumatic shock among adult patients presenting to emergency departments has been investigated in multiple international studies, and the findings reveal considerable variation across regions and health systems. In Denmark, a population-based cohort study published in 2019 examined 1,553 shock patients and found that septic shock accounted for 27.2%, cardiogenic shock 14%, hypovolemic shock 30.8%, and obstructive shock 0.9%(25). In the United States, a prospective cohort study conducted at Washington School of Medicine between November 2012 and September 2013 focused on patients presenting with hypotension and identified cardiogenic shock in 15.3% of cases(26).

Similarly, a population-based cohort study in Australia, which linked 12,695 patients treated by emergency medical services between 2015 and 2019, reported that 28.5% had cardiogenic shock, 31.5% septic shock, 11.5% hypovolemic shock, and 28.6% other causes (10).

Evidence from Asia highlights further differences in shock distribution. A retrospective cohort study in Thailand, conducted between January 2017 and December 2018, screened 113,651 adult ED visits and identified 876 cases of shock. Among these, septic shock was the most common (67.8%), followed by hypovolemic shock (26.1%), cardiogenic shock (2.9%), distributive shock (2.5%), and obstructive shock (0.6%)(27).

In China, a large multicentre cross-sectional survey across 1,064 tertiary hospitals in 2018 reported hypovolemic shock in 44.4%, septic shock in 42.0%, cardiogenic shock in 15.4%, obstructive shock in 1.1%, and mixed shock in 2.8%(28).

Taiwan's National Health Insurance research database, which reviewed over 22 million inpatients between 1995 and 2012, documented 2,289 cases of anaphylactic shock, with an incidence ranging from 12.7 to 13.2 per million, most commonly drug-related(29).

Studies from South Asia and Africa also provide important insights. A cross-sectional observational study conducted at Patan Hospital in Nepal between September and November 2014 found septic shock in 49.7% of patients, hypovolemic shock in 26.3%, cardiogenic

shock in 18.4%, and unclassified shock in 10.5%(30). In Egypt, a cross-sectional cohort study at Zagazig University Medical ICU in 2013 examined 694 critically ill patients with circulatory shock. Hypovolemic shock was the most common subtype (51.4%), followed by septic shock (36.5%) and cardiogenic shock (12.1%). Outcome varied by subtype, with hypovolemic shock showing the most favourable prognosis, while cardiogenic shock was associated with the worst outcome(31).

More recently, a one-year retrospective hospital-based study at Hiwot Fana Comprehensive Specialised Hospital in Ethiopia (2023) reported septic shock as the predominant type (45%), followed by hypovolemic shock (30%), cardiogenic shock (15%), and obstructive/anaphylactic shock (10%)(11). Another study conducted in Ethiopia and septic shock was found to be 39.3% (42).

In general, these findings highlight that septic shock consistently emerges as the most common subtype of non-traumatic shock in adult emergency departments worldwide, especially in low- and middle-income countries, followed by hypovolemic and cardiogenic shock. The relative proportions, however, vary considerably. Rare forms such as obstructive and anaphylactic shock occur in small proportions but remain clinically relevant, pointing to the importance of context-specific preparedness and diagnostic accuracy in emergency care.

2.2 Treatment Outcome of Non-Traumatic Shock Among Patients Presenting to Adult Emergency Departments

The outcome of non-traumatic shock has been extensively studied across different regions, with mortality rates and prognostic factors varying according to shock subtype, patient characteristics, and health system capacity. For instance, in France, a large retrospective cohort study conducted between 2010 and 2015 analysed 737,147 patients with sepsis and 492,902 patients with septic shock. The incidence of both conditions increased over time, from 206 to 243 cases per 100,000 population for sepsis and from 135 to 171 per 100,000 for septic shock. Case fatality remained stable at 34% for sepsis but decreased slightly from 46% to 44% for septic shock, reflecting improvements in care delivery(32).

A systematic review published in 2015 by Odense University Hospital in Denmark examined non-traumatic hypotension and shock in emergency and pre-hospital settings. Out of 11,880 identified papers, six observational studies were eligible for analysis. The review concluded that evidence was limited, but suggested that approximately 2% of EMS contacts present with non-traumatic hypotension, while 1–2% present with shock. In-hospital mortality for

pre-hospital shock ranged between 33% and 52%, while hypotension in the ED carried an in-hospital mortality of 12% (33).

Specific outcomes have also been reported for obstructive and cardiogenic shock. A study conducted in Italy between 1995 and 1998 investigated obstructive shock in pulmonary embolism and the role of thrombolytic therapy. Among 236 PE cases, 24 (10.2%) developed obstructive shock. Of these, 13 patients received thrombolysis, and all survived to discharge, while 9 of 11 patients who did not receive thrombolysis died in hospital, yielding an overall mortality rate of 37.5% (35). Similarly, an American Heart Association study analyzing nationwide inpatient data between 2002 and 2011 focused on heart failure patients with cardiogenic shock, excluding those with acute myocardial infarction. Out of 10,126,635 patients with heart failure, 56,314 (0.6%) developed cardiogenic shock. During the study period, in-hospital mortality decreased significantly from 44.2% to 26.1%, indicating improved management strategies (34).

A study published by AHA on Trends in Incidence, management and outcome of Heart failure patients with cardiogenic shock patients with primary discharge diagnosis of heart failure with cardiogenic shock were analyzed from the Nationwide Inpatient sample between 2002- 2011 excluding patients with AMI diagnosis. From 10,126,635 patients with heart failure cardiogenic shock was present in 56,314 (0.6%). During the study period there was a steady increase in Congestive Heart Failure (CHF) patients with cardiogenic shock and In-hospital mortality decreased from 44.2% to 26.1% during the study period (35).

Other studies have highlighted the prognostic significance of hypotension severity and shock subtype. A secondary analysis conducted at Carolinas Medical Center in the United States (2002–2003) included 190 patients with ED hypotension and found that 81 experienced adverse hospital outcome, including 29 in-hospital deaths (15%), prolonged ICU stays, vasopressor dependence, and organ failure. Patients with adverse outcome had higher pulse and respiratory rates and lower oxygen saturation compared to those without complications (36).

On a study published in 2024, a retrospective cross-sectional study was done on Incidence of Mortality and Predictors among Patients with Shock Managed in the Emergency Room of a Large Tertiary Referral Hospital in Ethiopia. A retrospective chart review study was conducted between July to September 2022 among 178 eligible adult patients who were

managed at hospital between October 2021 and May 2022;The incidence of death was 6.87 deaths per 1000 PH(14).

Overall, these findings demonstrate that the treatment outcome of non-traumatic shock remains poor, particularly for septic and cardiogenic subtypes, though improvements in care have reduced mortality in some contexts. Hypovolemic shock tends to have a more favorable outcome, while obstructive and anaphylactic shock, though less common, carry high mortality when not promptly treated. The evidence highlights the importance of early recognition, appropriate resuscitation, and context-specific management strategies to improve survival among patients presenting with shock.

2.3 Factors Associated with Treatment Outcome of Non-Traumatic Shock

The treatment outcome of non-traumatic shock is influenced by a wide range of factors, which can be broadly categorized into sociodemographic characteristics, clinical parameters, health system and management-related variables. Evidence from international and Ethiopian studies highlights the complexity of these associations.

2.3.1 Sociodemographic Factors

Age and sex have consistently been linked to outcome in shock patients. Older age is associated with higher mortality due to reduced physiological reserve and increased comorbidities. A population-based cohort study in Australia and Ethiopia found that shock incidence and mortality were higher among older patients and men, particularly in socioeconomically disadvantaged areas (10, 37).

2.3.2 Clinical Factors

Several clinical parameters strongly predict treatment outcome. A study conducted by the American Heart Association examined the relationship between hospital cardiogenic shock case volume and patient outcome, utilizing data from the Nationwide Inpatient Sample. The analysis included 533,179 patient discharges from 2,675 hospitals across the United States between 2004 and 2011, all of whom were diagnosed with cardiogenic shock. The primary outcome assessed was in-hospital mortality. The findings demonstrated a significant association between hospital case volume and mortality rates, with higher case volumes linked to increased mortality(42).

In the United States, a secondary analysis of ED hypotension demonstrated that severity of hypotension, tachycardia, tachypnea, and hypoxemia were associated with adverse hospital outcomes, including death, prolonged ICU stay, and multi-organ failure (26). Similarly, in France, case fatality in septic shock remained high despite improvements in care, underscoring the role of disease severity and multi-organ dysfunction (32).

A study in Ethiopia at Hiwot Fana Comprehensive Specialized Hospital and Addis Ababa reported the impact of comorbid conditions on patient outcome. The presence of underlying chronic diseases was associated with a higher risk of death, reflecting the compounded vulnerability of patients whose physiological reserves are already compromised. Comorbidities such as cardiovascular disease, diabetes, or chronic respiratory illness can exacerbate the severity of shock, limit the body's ability to compensate, and increase susceptibility to complications(11, 37). In addition study done in India also revealed the heightened risk of death among patients with chronic liver disease (CLD) (38).

The evidence also shows that AKI elevates mortality risk in shock patients. For example, a study done in Germany(39) also highlighted that acute kidney injury increases the risk of death among patients with cardiogenic shock. Another study from China also reported similar findings(40).

A retrospective study conducted in England on hospital admissions following emergency department attendance found that both the mode of arrival and the time of admission significantly influenced patient outcome. Specifically, patients arriving by ambulance demonstrated variations in mortality depending on the timing of their admission, with night-time arrivals associated with poorer outcomes compared to daytime presentations(41).

In Egypt, outcomes varied by shock subtype, with hypovolemic shock showing the most favorable prognosis and cardiogenic shock the worst, underscoring the importance of tailored management approaches (31).

A study conducted among patients with shock managed in the emergency department in Ethiopia revealed several important predictors of mortality. Individuals presenting with a great shock index were more vulnerable, highlighting the usefulness of this simple bedside measure in detecting hemodynamic instability. Septic shock emerged as a particularly strong determinant of poor outcome, reflecting the severe systemic consequences of infection-related circulatory collapse(11, 14).The requirement for vasopressor therapy was also

strongly associated with poor outcome, reflecting the severity of circulatory failure when pharmacological support becomes necessary to maintain blood pressure. Likewise, the development of organ failure significantly increased the risk of death, underscoring the cumulative impact of multi-organ dysfunction on patient survival(11, 14, 43-45).

2.3.3 Health System and management related Factors

Prehospital and system-level factors also play a critical role. A systematic review from Denmark highlighted that 2% of EMS contacts present with non-traumatic hypotension, with in-hospital mortality ranging between 33% and 52% for prehospital shock, reflecting the importance of timely recognition and referral(25). A state-wide linkage study in Australia further emphasized that prehospital delays, inadequate resuscitation, and socioeconomic disadvantage were associated with increased mortality in shock patients (10). In Ethiopia, patients arriving through peripheral hospital transfers had poorer outcomes compared to those admitted directly, suggesting that delays in definitive care contribute to mortality (11).

A prospective observational study examining the characteristics, treatment, and outcome of emergency department patients who met criteria for septic shock reported that specific management strategies were closely linked to survival. Greater volumes of intravenous fluid administration were associated with improved outcome, emphasizing the importance of adequate early resuscitation in stabilizing circulation. In addition, the timely initiation of vasopressor therapy in appropriate patients was found to enhance survival, reflecting the critical role of early hemodynamic support in preventing progression to irreversible shock(46).

Treatment strategies significantly influence outcome. In the United States, in-hospital mortality among heart failure patients with cardiogenic shock decreased from 44.2% to 26.1% between 2002 and 2011, reflecting advances in management strategies such as mechanical support and optimized pharmacotherapy (47).

2.4 Conceptual Framework

2.4 Conceptual Framework

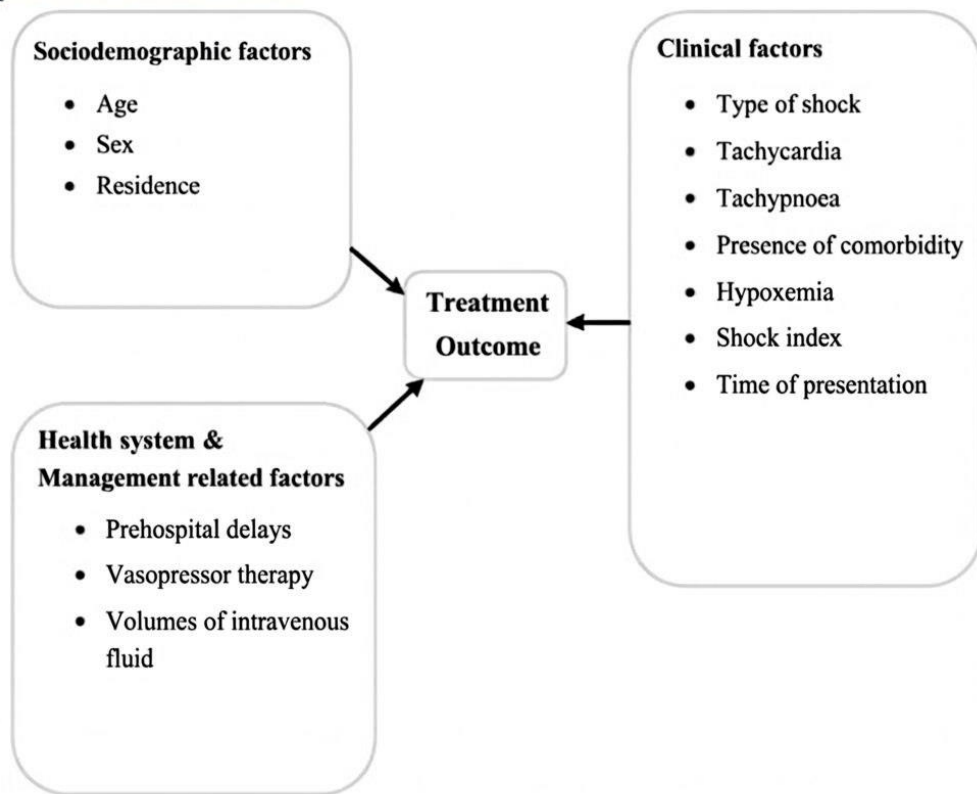


Figure 1: Conceptual framework for factors associated with treatment outcome among non-traumatic shockpatients, developed by reviewing related literature.

3 Objectives

3.1 General Objective

- To assess the pattern, treatment outcome and associated factors of non-traumatic shock among patients presented to the adult emergency department of Tibiae Ghion specialised hospital, Bahirdar, Ethiopia, from January 1, 2022, to December 31, 2025.

3.2 Specific Objectives

- To identify the pattern of non-traumatic shock among patients presented to the adult emergency department of Tibebe Ghion Specialised Hospital, Bahirdar, Ethiopia, from January 1, 2022, to December 31, 2025.
- To assess the treatment outcome of non-traumatic shock among patients presented to the adult emergency department of Tibebe Ghion specialized hospital, Bahirdar, Ethiopia, from January 1, 2022, to December 31, 2025.
- To identify factors associated with treatment outcome among non-traumatic shock patients presented to the adult emergency department of Tibebe Ghion specialised hospital, Bahirdar, Ethiopia, from January 1, 2022, to December 31, 2025.

4.Methods

4.1 Study Area

This research was done at Tibebe Ghion Specialized Hospital (TGSH), which is a tertiary level teaching and referral hospital situated in Bahir Dar, the capital city of the Amhara Regional State, Northwest Ethiopia. The hospital was launched in 2019 as part of College of Medicine and Health Sciences of Bahir Dar University. It is the major referral centre for the Amhara region and surrounding areas with a catchment population of over 5 million people. It offers specialized services such as emergency medicine, surgery, orthopaedics, internal medicine, paediatrics, obstetrics and gynaecology, intensive care, and neonatal care. The hospital has more than 500 inpatient beds that are reasonably distributed to different departments including emergency unit, specialized intensive care units (medical, surgical, and neonatal), and advanced diagnostic and imaging services. Besides, the hospital is a training centre for students, residents, and other health professionals.

4.2 Study Period

- Study was conducted among adult patients presented to the ED of Tibebe Ghion Specialized Hospital from January 1, 2022, to December 31, 2025 and data extraction from patient charts was done from December 1 to December 30, 2025

4.3 Study design

- An institution-based cross-sectional study was conducted at Tibebe Ghion Specialized Hospital. The study involved collecting data from eligible adult patients presenting with non-traumatic shock to the emergency department during the study period. It aimed to assess the patterns, treatment outcomes, and associated factors of non-traumatic shock among adult patients who presented to the emergency department from January 1, 2022, to December 31, 2025.

4.4Population

4.4.1 Source Population

- The source population included all adult patients presented to the ED of Tibebe Ghion Specialized Hospital with the diagnosis of non-traumatic shock.

4.4.2 Study Population

- The study population included all eligible adult patients (who fulfil inclusion criteria) presented to the ED of Tibebe Ghion Specialized Hospital with the diagnosis of non-traumatic shock from January 1, 2022, to December 31, 2025.

4.4.2 Inclusion and Exclusion Criteria

Adult patients with diagnosis of non-traumatic shock were included. Patients with incomplete medical records, left against medical advice before outcome was ascertained or were transferred to another facility prior to outcome assessment were excluded from the study.

4.5 Sample Size Determination

Sample size for this study was determined based on single population proportion formula considering the proportion of 50% there is no a previous study done which determined the prevalence of non-traumatic shock at the emergency in the setting similar to my study area which is at low income country emergency setting, 95% confidence level, 5% marginal error, and 10% non-response rate.

Using the formula:
$$n = \frac{(z_{\alpha/2})^2 \cdot \hat{p}\hat{q}}{d^2}$$

Where; N = Desired sample size

$Z_{\alpha/2}$ = Critical value = 1.96 (set at 1.96 which corresponds to the 95% CI)

P = Estimated Prevalence of non-traumatic shock

d = Degree of precision = 0.05

$$N = \frac{(1.96)(1.96)(0.50)(0.50)}{(0.05)(0.05)} = 384 \text{ plus } 38 \text{ (10\% incomplete data)} = 422.$$

4.6 Sampling Technique and Procedure

Card numbers of each Non-traumatic Shock patient who met the inclusion criteria were taken from the TGSH Adult ED hospital's registration log book. A simple random sampling technique using the Lottery method was employed after a survey of 750 non-traumatic shock patients seen during the study period. A special code was produced for each patient record. Each unique number was written on a separate small piece of paper. The folded piece of paper was held in a container and mixed thoroughly. Then numbers were drawn randomly.

4.7 Study Variables

4.7.1 Dependent Variable

- Treatment outcome of non-traumatic shock.

4.7.2 Independent Variables

- Sociodemographic factors, including sex, age, residence, and comorbidity
- **Clinical factors:** Type of shock, vital sign derangements, organ dysfunction, shock index, comorbidities, duration of illness, investigation results, mental status change, capillary refill time, time of arrival,
- **Health system & management related factors:** mode of arrival, source of referral, prehospital delays, fluid resuscitation, vasopressor therapy, time to initiation, antibiotics.

4.8 Operational Definitions and definition of terms

Non-traumatic shock: defined as SBP<90 mmHg or MAP <65mmHg with clinical signs of hypoperfusion(48).

Adult: is to mean patients whose age is 15 years or more

Pattern of non-traumatic shock: is to mean clinical classification into hypovolemic, cardiogenic, septic, anaphylactic, obstructive, mixed and undifferentiated(49).

Undifferentiated shock: shock is recognized but the cause is unclear(49).

Mixed shock: the presence of more than one type of shock(49).

Outcome: clinical status of patient after ED treatment(50).

Anaphylactic shock: shock that develops after taking a specific allergic substance, which couldn't be attributed to other causes of shock category(49).

Cardiogenic shock: insufficient organ perfusion resulting from cardiac dysfunction, systolic SBP<90 mm Hg for more than 30 min or the need for inotropes, vasopressors, or mechanical circulatory support (51).

Septic shock: can be defined by the presence of hyperlactemia and the need for vasopressors to maintain MAP >65mmHg(52).

Hypovolemic shock: SBP<90mmHg or MAP <65 mmHg with evidence of fluid loss(48).

Obstructive shock: SBP<90mmHg or MAP<65mmHg with evidence of mechanical obstruction to blood flow(53).

4.9 Data Collection Tool and Procedure

The data for this study were also extracted by applying a pretested structured data-extraction checklist created on Kobo Toolbox after an extensive review of relevant literature and context adaptation to the current research(10, 11, 14, 17). The instrument was adapted to extract required data from the medical records of Patients in the Adult emergency department of Tibebe Ghion Specialised Hospital. It comprised parts on sociodemographic features, clinical manifestation, comorbidities, laboratory results and treatment measures as well as patient outcome. Several features, such as drop-down menus, skip logic, and validation checks, were integrated to ensure accuracy and reduce the possibility of missing data. Before starting to collect data, two emergency and critical care nurses were trained to use Kobo

Toolbox and the standardised data extraction procedure, and the tool was pretested on 10 patient cards.

The data is directly extracted from the files of patients who were adults and were diagnosed with non-traumatic shock. Incomplete records were excluded.

4.10 Data quality assurance

To ensure the reliability and validity of the study findings, strict data quality assurance techniques were employed throughout the research process. Before the actual data collection, the data extraction tool was pre-tested on a small sample of patient records to ensure clarity and consistency. The data was collected by emergency and critical care nurses who were trained in standardised extraction protocols. The primary investigator had closely supervised the data extraction process. Daily monitoring was used to ensure adherence to the data collection protocol. Random cross-checking of selected patient cards was also done to find out and correct errors. Built-in validation tools in Kobo Toolbox, such as range checks, skip logic, and mandatory fields, helped to correct the errors during data entry and missing values. After collection, the dataset was exported into Excel for cleaning, where duplicate entries, incomplete records, and implausible values were systematically reviewed and corrected.

4.11 Data Processing and Analysis

After data collection, all records were exported from Kobo Toolbox into Microsoft Excel for initial cleaning. This process involved checking for completeness, removing duplicate entries, and correcting implausible values. The cleaned dataset was then imported into SPSS version 27 for further processing and analysis.

Descriptive statistics such as frequencies and percentages. Medians were used and computed to summarise socio-demographic characteristics, clinical presentations, treatment interventions, and patient outcomes. Cross-tabulations were used to explore the distribution of shock types and treatment outcomes across different patient groups.

For inferential analysis, binary logistic regression was employed to identify factors associated with the treatment outcome of non-traumatic shock. Variables with a p-value less than 0.2 in bivariate analysis were entered into the multivariable binary logistic regression model to control for potential confounders. Multicollinearity among independent variables was checked using the Variance Inflation Factor (VIF) and tolerance. The maximum VIF was 1.23 and the minimum tolerance was 0.8. Adjusted odds ratios (AORs) with 95% confidence intervals were reported to measure the strength of associations. Model fitness was assessed

using the Hosmer–Lemeshow goodness-of-fit test($p=0.33$ which is greater than 0.05), and statistical significance was declared at a p -value < 0.05 in the final model.

Finally, results were presented in tables, charts, and narratives to provide a clear and comprehensive understanding of the patterns, treatment outcome, and associated factors of non-traumatic shock among patients.

4.12 Ethical Consideration

The study was conducted following declaration of Helsinki. Ethical clearance for this study was obtained from the Institutional Review Board (IRB) of Bahir Dar University, College of Medicine and Health Sciences. A formal letter of cooperation was also secured from Tibebe Ghion Specialized Hospital administration prior to data collection. Patient confidentiality was strictly maintained throughout the study by excluding personal identifiers such as names and medical record numbers from the data extraction tool. Data were used solely for research purposes and stored securely in password-protected systems accessible only to the research team. Since the study involved retrospective review of patient cards, direct patient consent was not required; however, the IRB approved the use of secondary data with strict adherence to confidentiality protocols.

4.13 Dissemination of the finding

The findings of this study will be disseminated to multiple stakeholders to ensure that the results contribute to improved patient care and inform future research. A formal report will be submitted to Bahir Dar University, College of Medicine and Health Sciences, as part of the academic requirements. Copies of the findings will also be shared with Tibebe Ghion Specialized Hospital management and the Adult ED to guide clinical practice and strengthen shock management protocols. In addition, the results will be presented at workshops, and professional research conferences to engage healthcare providers and researchers in discussions on non-traumatic shock management. Efforts will be made to publish the study in peer-reviewed journals to reach a wider scientific audience.

5. Results

5.1 Sociodemographic characteristics of the study participants

A total of 422 patient cards were identified for assessment, of which 32 with incomplete records were excluded, resulting in 390 eligible cards and a completeness rate of 92.4%. The median age of participants was 43 with interquartile range of 29 to 60. Among these patients, the majority were younger than 60 years (311, 79.7%). In terms of sex distribution, 212 (54.4%) were male. Regarding place of residence, 244 (62.6%) were from rural areas. The source of referral showed that 216 (55.4%) arrived from government health facilities. The majority of patients presented during the day (279, 71.5%), compared to 111 (28.5%) during the night (**Table 1**).

Table 1: Sociodemographic characteristics among adult patient with non-traumatic shock admitted to adult emergency department of Tibebe Ghion specialized hospital, Bahir Dar, Ethiopia, from January 1, 2022, to December 31, 2025 (N=390).

Variables	Categories	Frequency	Percentage
Age of participants	<40	160	41
	40-60	151	38.7
	>60	79	20.25
Sex	Male	212	54.4
	Female	178	45.6
Place of residence	Rural	244	62.6
	Urban	146	37.4

5.2 Clinical/health system related factors of the study participants

Of the total study participants, 124 (31.8%) had comorbid diseases, with congestive heart failure, chronic liver disease, and malignancy being the most common. The majority of patients presented after ≥ 24 hours (72.8%) of symptom onset. Clinical features of shock were highly prevalent, with delayed capillary refill time, 372 (95.4%) and cold extremities, 343 (87.9%) being the most common.

Regarding shock type, septic shock was the most frequent, 168 (43.1%), followed by hypovolemic, 129 (33.1%), and cardiogenic shock, 58 (14.9%). Nearly all patients had a shock index ≥ 1 (99.0%). In terms of EDstay, most remained for more than 24 hours, 178 (45.6%), while only a small proportion stayed less than 6 hours, 5(1.3%). Baseline vital signs showed that almost all patients had SBP <90 mmHg, 384 (98.5%) and MAP <65 mmHg, (388, 99.5%)(**Table 2**).

Table 2: Baseline Clinical presentation of adult patient with non-traumatic shock admitted to adult emergency department of Tibebe Ghion specialized hospital, Bahir Dar, Ethiopia, from January 1, 2022, to December 31, 2025 (N=390).

Variables	Categories	Frequency	Percentage
Source of referral/arrival	Gov't health facilities	216	55.4
	Private health facilities	84	31.5
	Self-presented	90	23.1
Mode of arrival	Ambulance	107	27.4
	Private care	73	18.7
	Public transport	157	40.3
	Walk in	53	13.6
Time of presentation to health facility	Day	279	71.5
	Night	111	28.5
Prescience of comorbid disease	Yes	124	31.8
	No	266	68.2
Type of comorbidity (n=124)	DM	17	13.7
	HPN		
	CHF	8	6.5
	CLD	24	19.4
	Malignancy	23	18.5
	COPD	23	18.5
	Asthma	5	4.0
	HIV	3	2.4
	CNS	11	8.9
SBP	<90 mmhg	384	98.5
	≥ 90 mm Hg	6	1.5

Pulse rate	<60bpm	4	1.0
	60-100 bpm	24	6.2
	>100 bpm	362	92.8
Temperature	<360c	72	18.5
	36-380C	257	65.9
	>380C	61	15.6
Respiratory rate	<24 breath/min	138	35.4
	≥ 24 breath/min	252	64.6
O2 saturation	≤90	152	39.0
	91-94	105	26.9
	≥95	133	34.1
Duration of the symptoms	<24hour	106	27.2
	≥24hour	284	72.8
Symptom of shock	Cold extremities	343	87.9
	Delayed capillary refill time	372	95.4
	Altered mental status	152	39.0
Type of shock	anaphylactic	12	3.1
	Cardiogenic	58	14.9
	Hypovolemic	129	33.1
	Obstructive	4	1.0
	Septic	168	43.1
	Mixed	16	4.1
	Undifferentiated	3	0.8
Shock index	<1	4	1.0
	≥1	386	99.0
ED stay length	<6hrs	5	1.3
	6-12hrs	48	12.3
	12-24hrs	159	40.8
	>24hrs	178	45.6

5.3 Baseline Laboratory Investigation and treatment given for the participants

Of the study participants, only 21 (5.4%) received blood transfusion, with nearly half of them given more than two units. Fluid resuscitation was common, as 364 (93.3%) received intravenous fluids, with normal saline (332, 91.2%) being predominantly used fluid. Vasopressor support was widely used, with 266 (68.2%) patients requiring it, and norepinephrine was the most frequently administered, 207 (77.8%). Nearly half of vasopressors were initiated within the first hour, 117 (43.9%).

Antibiotics were given to 227 (58.2%) patients, most within two hours of presentation. Laboratory investigations revealed that anaemia was common, 196 (50.3%), while leucocytosis, 156 (40.0%) and thrombocytopenia, 112 (28.7%) were also frequent findings. Elevated creatinine levels (>1.2 mg/dl) were observed in a considerable proportion, 156 (40%) (

Table 3).

Table 3: Baseline Laboratory Investigation and treatment given for the patient with non-traumatic shock admitted to adult emergency department of Tibebe Ghion specialized hospital, Bahir Dar, Ethiopia, from January 1, 2022, to December 31, 2025 (N=390).

Variables	Categories	Frequency	Percentage
Blood given	Yes	21	5.4
	No	369	94.6
Amount of blood given (n=21)	2unit	11	52.3
	>2unit	10	47.7
Fluid given	Yes	364	93.3
	No	26	6.7
Type of fluid given	Normal saline	332	91.2

(n=364)	Ringer lactate	32	0.8
Vasopressor use	Yes	266	68.2
	No	144	31.8
Vasopressor given (n=266)	Dopamine	9	3.3
	Epinephrine	96	36.1
	Norepinephrine	207	77.8
Time of vasopressor initiation (n=266)	Within 1hr	117	43.9
	Within 2hr	86	32.3
	After 2hr	63	23.8
Antibiotics given	Yes	227	58.2
	No	163	41.8
Time of antibiotics initiation (n=227)	Within 1hr	68	29.9
	Within 2hr	87	38.3
	After 2hr	72	31.7
Haemoglobin	Anaemia	196	50.3
	Normal	193	49.5
	Polycythaemia	1	0.3
White blood cell	Leukopenia	50	12.8
	Normal	184	47.2
	Leucocytosis	156	40.0
Platelet	Thrombocytopenia	112	28.7
	Normal	213	54.6
	Thrombocytosis	65	16.7
Creatinine	< 0.6	101	25.9
	0.6-1.2	133	34.1
	>1.2	156	40.0

5.4 Treatment outcome of non-traumatic shock

Among the 390 patients with non-traumatic shock, 104 (26.7%) improved and were discharged home, while 96 (24.6%) were admitted to the intensive care unit. A total of 69

patients died, giving a mortality prevalence of 17.7% (95% CI: 14.1-21.8%). The leading causes of death were septic shock, 37 (53.6%), followed by cardiogenic shock, 16 (23.2%), hypovolemic shock, 9 (13.0%), with smaller proportions attributed to mixed shock, 6 (8.7%) and anaphylactic shock, 1 (1.4%)(Figure 2).

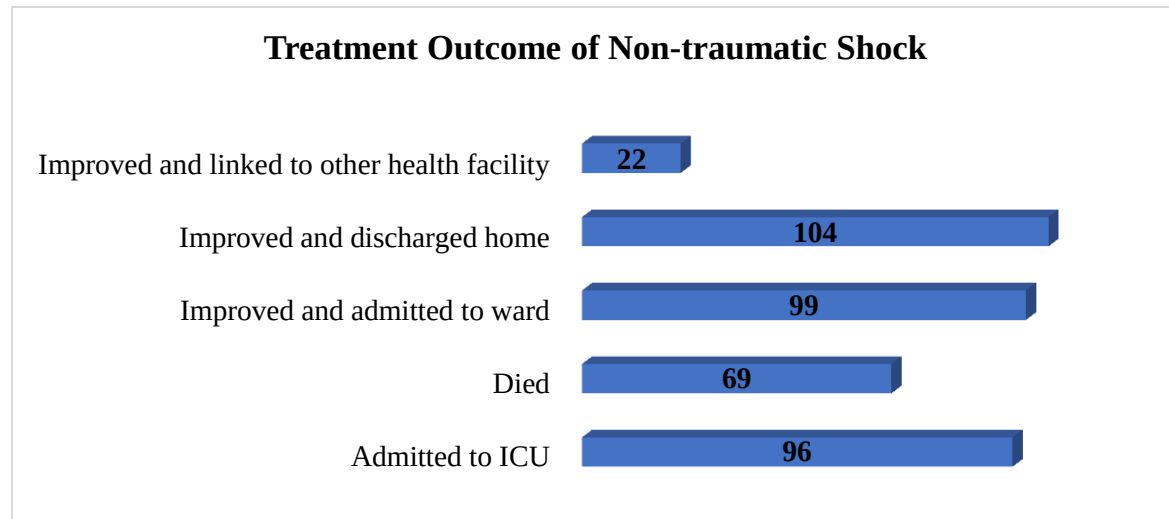


Figure 2: Treatment outcome of non-traumatic shock among non-traumatic shock patients admitted to the adult emergency department of Tibebe Ghion specialised hospital, Bahir Dar, Ethiopia, from January 1, 2022, to December 31, 2025 (N=390).

5.5 Factors associated with treatment outcome among non-traumatic shock patients

The bivariable binary logistic regression analysis identified several factors that showed significant associations with mortality among patients presenting with non-traumatic shock, including sex of participants, source of referral, duration of symptoms, presentation time, vasopressor use, SPO₂ level, creatinine level, and presence of chronic liver disease.

However, the multivariable binary logistic regression model revealed that four variables remained independently associated with mortality among patients presenting with non-traumatic shock. Presentation during the night was significantly associated with higher odds of death (AOR = 2.0, 95% CI: 1.10–3.64, $p = 0.023$), compared to daytime presentation. The use of vasopressors was also associated with increased mortality (AOR = 2.28, 95% CI: 1.04–5.01, $p = 0.041$). Elevated creatinine levels greater than 1.2 mg/dl showed a much higher likelihood of death (AOR = 4.34, 95% CI: 1.72–10.9, $p = 0.002$) compared to its

counterpart, and patients with chronic liver disease had significantly greater odds of mortality (AOR = 3.81, 95% CI: 1.40–10.4, $p = 0.009$)(

Table 4).

Table 4: Bivariable and multivariable Binary Logistic Regression of factors associated with treatment outcome among non-traumatic shock patients presented to the adult emergency department of Tibebe Ghion specialised hospital, Bahir Dar, Ethiopia, from January 1, 2022, to December 31, 2025 (N=390).

Variables	Categories	Treatment Outcome		COR (95% CI)	AOR (95%CI)	p-value
		Dead, n (%)	Alive, n (%)			
Sex of participants	Male	45(21.2)	167(78.8)	1.72(1.07-2.97)	1.49(0.82-2.71)	0.194
	Female	24(13.5)	154(86.5)	1	1	
Source of referral	Gov't health facilities	43(19.9)	173(80.1)	2.55(1.14-5.67)	1.59(0.66-3.84)	0.306
	Private health facilities	18(21.4)	66(78.6)	2.79(1.14-6.83)	1.68(0.63-4.45)	
	Self-presented	8(8.9)	82(91.1)	1	1	
Duration of symptoms	≥ 24 hours	57(20.1)	227(79.9)	1.97(1.01-3.83)	0.79(0.36-1.75)	0.565
	< 24 hours	12(11.3)	94(88.7)	1	1	
Presentation time	Night	28(25.2)	83(74.8)	1.96(1.14-3.37)	2.0 (1.10-3.64)	0.023*
	Day	41(14.7)	238(85.3)	1	1	
Vasopressor use	Yes	59(22.2)	207(77.8)	3.25(1.60-6.60)	2.28(1.04-5.01)	0.041*
	No	10(8.1)	114(91.9)	1	1	
SPO2	≤ 90	44(28.9)	108(71.1)	3.21(1.69-6.09)	1.63(0.79-3.34)	0.184
	91-94	10(9.5)	95(90.5)	0.83(0.36-1.93)	0.58(0.23-1.44)	0.239
	≥ 95	15(11.3)	118(88.7)	1	1	

Creatinine level	>1.2	47(30.1)	109(60.9)	6.82(2.80-16.7)	4.34(1.72-10.9)	0.002*
	0.6-1.2	16(12.0)	117(88.0)	2.17(0.82-5.75)	1.49(0.55-4.09)	0.429
	<0.6	6(5.9)	95(94.1)	1	1	
Have CLD	Yes	9(39.1)	14(60.9)	3.29(1.36-7.95)	3.81(1.40-10.4)	0.009*
	No	60(16.3)	307(83.7)	1	1	

Legends: 1: Reference Category, AOR: Adjusted Odds Ratio, COR: Crude Odds Ratio, CI: Confidence Interval, *: p-value <0.05, SPO₂(Peripheral capillary Oxygen Saturation), and CLD (Chronic liver disease).

6. Discussion

This research was conducted to determine the pattern, outcome of treatment, and factors associated with nontraumatic shock among patients who presented to the adult emergency department of Tibebe Ghion Specialised Hospital based on the patients admitted over the three years before the study (from January 1, 2022 to December 31, 2025).

The results showed that septic shock was the predominant type of nontraumatic shock seen in 43.1% of the patients, followed by hypovolemic shock (33.1%) and cardiogenic shock (14.9%). The study also revealed that the prevalence of mortality was 17.7% among non-traumatic shock. Besides these, a number of factors were identified to be significantly related to death. These factors were a nighttime visit to the ED, administration of vasopressors, chronic liver disease, and high levels of creatinine.

Septic shock being prevalent in this study aligns with international data that show septic shock and hypovolemic shock as the top causes of shock cases in adult ED. For instance, studies done in Denmark (27.2%) (2), Australia (31.5%)(10), Thailand (67.8%)(27), Nepal (49.7%)(30) revealed that septic shock as major cause of ED admission. Besides, this finding is consistent with the work of other researchers in Ethiopia who have also reported septic shock as the main adult ED presentation. One example is the Hiwot Fana Comprehensive Specialised Hospital study that showed septic shock (42.1%) as the major type of shock, and hypovolemic shock also accounted for a considerable share, mainly due to dehydration and bleeding(11). Similarly, research from an Addis Ababa hospital, at St. Paul's hospital, identified hypovolemic (42.1%) and septic shock (41%) as the most frequent cause of shock admissions(14). Conversely, a study in America revealed that most emergency admissions were due to cardiogenic shock(26). The difference between Ethiopia and America

in the predominant types of shock presentations could be attributed to variations in disease burden, health system setting, and population makeup. In Ethiopia, there is a predominance of septic shock as a result of infectious diseases, which are still very common, the situation being worsened by late presentation, limited access to early antibiotics, and emergency care resource constraints(13). In contrast, in high-income countries like America, cardiogenic shock is more common because non-communicable diseases, particularly ischemic heart disease, are the leading cause of emergency admissions(54).

In this study, the overall mortality prevalence was 17.7%, a figure consistent with findings in Addis Ababa, where death rates were reported to be 16.5%(14). This prevalence is notably lower than reports from other Ethiopian hospitals. For example, a study conducted in eastern Ethiopia reported a mortality prevalence of 27.9%(11). The possible reason for variation could be differences in case inclusion, as the study from eastern Ethiopia encompassed all types of shock, whereas our study focused only on non-traumatic shock. The other possible reason for variation could also be related to differences in sample size and study period, which influence the representativeness and severity of cases included. Similarly, studies from France (31), Addis Ababa (55) and Gondar (56) also showed the higher mortality rate of 44%, 50.9% and 42%, respectively. The possible reason for the variation could be the type of shock targeted in each study. For example, the study in France focused exclusively on cardiogenic shock, while the studies in Addis Ababa and Gondar concentrated on septic shock. Since different types of shock carry distinct prognostic patterns and management challenges, this difference in case selection could explain the variation in mortality rates. Methodological differences could be the other reason for variation. For instance, the study in Addis Ababa was conducted as a prospective cohort, whereas this study employed a retrospective cross-sectional design. Prospective studies often capture outcomes more systematically and may reflect higher mortality rates compared to retrospective reviews, which depend on available records and may underreport certain outcomes(57). Variation in non-traumatic shock mortality across studies could also be explained by differences in study settings. This research was conducted in the adult ED, while studies from Addis Ababa and France were carried out in the ICU. Because ICU patients often present with more severe illness, their reported mortality rates are not directly comparable to those observed in the ED.

Global evidence has shown that patients admitted to the ED during night shifts face significantly higher mortality risks than those admitted during the day(41, 58). This study also found that presentation during the night was significantly associated with higher odds of

death among non-traumatic shock patients. Several systemic and human factors can explain the increase in mortality associated with night admissions. For instance, most EDs tend to have fewer nurses and doctors at night, which can result in longer times for triage, diagnosis, and treatment. Staff members may also be tired; thus, their poor decision-making could affect the patient's outcome. Furthermore, getting diagnostic tests and seeing specialists are usually the most difficult hours at night; thus, critical interventions are delayed.

This study also showed that the use of vasopressors was associated with increased mortality among non-traumatic shock patients. The link between vasopressor uses with increased mortality among non-traumatic shock patients found in this study is in line with the existing worldwide evidence, where the need for vasopressor has been repeatedly recognised as a defining characteristic of severely ill patients and a poor prognosis. For example, in studies of patients with septic shock, it has been found that those who need vasopressors have a markedly higher risk of death, the main cause being the advanced state of circulatory failure and multiple organ dysfunction rather than the direct pharmacologic effects of the agents(44). Other evidence from multicentre cohort studies indicates that the need for vasopressors is very strongly associated with poor outcome, especially in patients with very low diastolic blood pressure and multiorgan dysfunction(45). Systematic reviews on the timing of vasopressor initiation demonstrate that initiation at a very early stage does not necessarily result in a decrease in mortality, thereby indicating that the prognosis is more a matter of disease severity than of vasopressor exposure(43). The possible reason that vasopressor use is associated with increased mortality among shock patients could be that it often reflects more severe or refractory shock, where patients already have a higher baseline risk of death. Vasopressors can also worsen tissue hypoperfusion through excessive vasoconstriction, leading to organ ischemia and failure(59).

This paper further highlighted that raised creatinine levels above 1.2 mg/dl yielded a significantly higher probability of death. Several studies worldwide have confirmed that acute kidney injury is one of the most frequent complications of shock, which results from ongoing hypoperfusion, ischemia, and systemic inflammatory responses. For example, a large retrospective cohort study from Germany demonstrated that AKI episodes in hospitalised patients were strongly associated with increased hospital mortality(39). Similarly, a study done in China reported that AKI is common in critically ill patients, including those with shock, and significantly elevates in-hospital mortality(40). This is justified by the fact that

creatinine elevation is a sign of diminished renal clearance and organ dysfunction that is usually accompanied by multi-organ failure(60).

Finally, this study found that non-traumatic shock patients with chronic liver illness had a considerably higher risk of death. The link found between chronic liver disease and higher fatality rates in non-traumatic shock patients is consistent with international research. For example, a study conducted in India found that patients with CLD who present to emergency departments had a considerably increased risk of death because hepatic dysfunction compromises metabolic, immunologic, and hemodynamic stability(38). This implies that strict attention should be given to patients with comorbidities to improve the treatment outcome among shock patients.

6.1 Strengths and Limitations of the Study

Strengths

Unlike prior Ethiopian research that treated shock as a single entity without distinguishing traumatic from non-traumatic causes, this study specifically focuses on non-traumatic shock. This distinction strengthens its contribution by providing clearer epidemiological insights and more targeted evidence to guide clinical management and health system responses.

Limitations

as a single-centre study, the findings may not be generalizable to all Ethiopian hospitals or other low-resource settings with differing patient populations and health system structures. Finally, the observational nature of the study limits causal inference; associations such as vasopressor use and mortality may reflect underlying severity of illness rather than direct drug effects.

7. Conclusion and Recommendation

7.1 Conclusion

This study revealed that septic shock was the most common type of non-traumatic shock (43.1%), followed by hypovolemic shock (33.1%) and cardiogenic shock (14.9%). The overall mortality prevalence was 17.7%. Furthermore, several factors were found to be significantly associated with mortality, including nighttime presentation to the ED, use of vasopressors, presence of chronic liver disease, and elevated creatinine levels. These results highlight both clinical and systemic determinants of poor outcome and emphasise the need

for targeted interventions to improve survival among non-traumatic shock patients in resource-limited emergency settings.

7.2 Recommendation

Based on the finding the following recommendations are forwarded.

To Tibebe Ghion Specialised Hospital and Zonal Health Bureau

- Increase staffing levels and ensure adequate supervision during night hours to reduce delays in triage and treatment.
- Provide point-of-care creatinine testing and improve access to laboratory services for early detection of renal dysfunction.
- The zonal and hospital administration should support hospitals with essential emergency care resources.

To health care providers working in ED:

- Pay special attention to patients presenting at night, ensuring rapid triage and timely initiation of treatment.
- Recognise that vasopressor requirement signals severe illness; use them carefully with close monitoring to minimize complications.
- Routinely assess creatinine levels and manage patients with elevated values aggressively to prevent progression to multi-organ failure.
- Provide tailored management for patients with chronic liver disease, including early consultation and supportive interventions.

To Future Researchers:

- Conduct larger, multi-hospital studies to improve generalizability and capture regional variations in outcome.

- Assess the impact of staffing, diagnostic availability, and treatment protocols on shock outcome to guide policy reforms.
- Study long-term outcomes of shock survivors, particularly those with chronic comorbidities, to inform comprehensive care strategies.

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9. Annex

Annex I: Information sheet and informed voluntary consent form for the head of hospital

My name is _____. I am working as data collectors for the study conducted by Dr. Melaku Mengist, who is studying pursuing his speciality in Emergency and critical care Medicine at Bahirdar University, College of Medicine and Health Science. I kindly request you to give me your attention to explain about the study and ways of selection for participations in this study.

Title of the project:Pattern, treatment outcome and associated factors of non-traumatic shock among patients presenting to adult Emergency department of Tibebe Ghion specialized hospital, Bahir Dar, Ethiopia, 2025.

Purpose of the Study: The primary objective of this study is to identify key areas requiring improvement in the management and care of patients with non-traumatic shock. The findings will provide valuable insights for hospital administrators, emphasizing the need to strengthen the healthcare workforce and enhance diagnostic capabilities.

At a broader level, the data generated will inform regional health authorities about the burden and outcome of non-traumatic shock within the community. This evidence will support the development of effective health education programs aimed at raising public awareness of shock risk factors, early symptoms, and the critical importance of seeking timely medical intervention during the golden window.

Furthermore, the results of this research will serve as a baseline reference for future investigations in the field. Finally, this study is undertaken as part of the requirements for the completion of a thesis in Emergency and Critical Care Medicine specialty training.

Procedure and Duration: Secondary data will be extracted from each patient's medical record chart, with an estimated time of approximately 25 minutes per case. Following this, medical records will be returned to the hospital card room after obtaining the necessary permissions.

Risks and Benefits: The process of collecting secondary data from patient files carries minimal risk. However, the anticipated benefits are significant: the study findings may provide valuable insights for hospitals, healthcare providers, and patients by highlighting areas for improvement in clinical care and outcome.

Confidentiality: All information obtained will be treated with strict confidentiality. No identifying details of individual participants will be disclosed. The results will be presented in aggregate form, reflecting trends within the study population rather than specific individuals. To ensure anonymity, checklists will be coded and names will be excluded from the dataset.

Rights: The hospital/card room has the right to get the medical chart of the patients at any time.

Contact address: If there are any questions or enquires any time about the study or the procedures, please contact: Dr. Melaku Mengist (principal investigator)

Phone number: +251928562462

Email address: melakumengist27@gmail.com

Declaration of informed voluntary consent

I hereby confirm that I have thoroughly reviewed the participant information sheet and fully understood the purpose of this research, the procedures involved, the potential risks and benefits, and the measures taken to ensure confidentiality. I acknowledge my right to access patient files at any time and have been provided with the appropriate contact details for any queries or clarifications.

I have been given the opportunity to ask questions regarding aspects that may have been unclear, and all concerns have been addressed satisfactorily. I also recognize that the Hospital reserves the authority to terminate this study should any misconduct or unethical practices be observed during the data collection process within its premises.

Accordingly, I voluntarily provide my consent, on behalf of TGSH management, to permit the conduct of this study within the Hospital. This consent is affirmed with my initials/signature below.

Name and Signature of the Hospital CEO: _____Date_____

Name and Signature of PI: _____Date_____

Annex II: Data extraction checklist

S/No	Questions	Response
Part I: Socio-demographic Information		
1	Age in years	_____
2	Sex	1. Male 2. Female
3	Place of residence	1. Rural 2. Urban
Part II: Clinical Presentation at admission		
4	Are there comorbidities	1.yes 2.no
5	If yes to Q4, which comorbid problems are there?	1. HPN 2. CKD 3. DM 4. CHF 5. HIV/AIDS 6. CLD 7. COPD 8. Asthma 9. Malignancy 10. CNS disorder 11 Others, (specify)
6	Duration of symptoms	1. <6 hrs 2. 6-12hrs 3. 12-24hrs 2. >24 hrs
7	Source of Referral	1. self-presented 2. from gov't health institution 4. from private hospital/clinic
8	Mode of arrival	1. Walking 2. Ambulance 3. Public transport 3. Private car
9	Vital Signs on ED Arrival	1. SBP: ____ mmHg 2. MAP____ 3. HR: ____ bpm 4. RR: ____/min 5. SpO2: _____ % 4. Temp: _____ °C

10	Are there signs of poor perfusion	1. Yes 2. No
11	If yes to Q11, is there Capillary refill >3sec?	1. Yes 2. No
12	If yes to Q11, is there Cold extremities?	1. Yes 3. No
13	If yes to Q11, is there Altered mental status?	1. Yes 2. No
14	Type of Shock diagnosed	1. Hypovolemic 2. Septic 3. Cardiogenic 4. Anaphylactic 5. Obstructive 6. Mixed 7. Undifferentiated
15	Initial investigation	1. WBC ____ 2. HGB ____ 3. Platelets: ____ 4. Creatinine: ____
Part III. Emergency Management		
16.	Volume and type of fluid given	_____Litter
17.	Volume of blood given	_____ml
18	Time to initiation	_____
19	Vasopressor given	Yes 2. No
20	If yes to Q22, identify the types of vasopressor given	1. Norepinephrine 2. Dopamine 3. Adrenaline
21	Time of arrival to initiation	_____
22	Has Antibiotics started?	1. Yes 2. No
23	If yes to Q25, time to initiation	_____
Part IV. Outcome Assessment		
24	ED Disposition	1. Discharged improved 2. Improved and admitted to Wa 3. Admitted to ICU 4. Improved and Transferred to health facility 5. Died
