ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

DEPARTMENT OF EMERGENCY MEDICINE AND CRITICAL CARE

# ASSESSMENT OF CLINICAL PROFILE AND MAGNITUDE OF EARLY MORTALITY IN ADULT EMERGENCY DEPARTMENT OF TIKUR ANBESA SPECIALIZED HOSPITAL, ADDIS ABABA, ETHIOPIA FROM MARCH 1, 2018-MARCH 1, 2020.

BY:-HANNA DANIEL (BSC.)

A THESIS TO BE SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES, DEPARTMENT OF EMERGENCY MEDICINE AND CRITICAL CARE FOR THE PARTIAL FULFILLMENT OF THE REQUIREMENT FOR MASTERS DEGREE IN EMERGENCY MEDICINE & CRITICAL CARE NURSING.

JUNE 2020

ADDIS ABABA, ETHIOPIA.

ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

DEPARTMENT OF EMERGENCY MEDICINE

MASTER OF EMERGENCY MEDICINE AND CRITICAL CARE

RESEARCH PROPOSAL SUBMISSION FORM

| | |
|---|---|
| Name of investigator | Hanna Daniel (BSC) |
| Name of Advisor(s) | Sr. Achamyelesh Tadele ( MSC in EMCCN) |
| Name of co-Advisors | Dr. Sisay Teklu (Gynecologists physician) |
| The full title of the research project | Assessment of clinical profile and magnitude of early mortality in the adult emergency department of TASH, Addis Ababa city, Ethiopia. |
| Duration of project | From Oct –June 2020 |
| Study Area | Addis Ababa city, Ethiopia. |
| Source of fund | AAU |
| Total Cost of the project | 27,764 ETB |
| Address of investigator | Mobile phone:+251911840054<br>Email:danielhana72@yahoo.com |

**Approval by the board of examiners**

This thesis by **Hanna Daniel** is accepted in its present form by the board of examiners as a satisfying thesis requirement for the degree of master in emergency medicine and critical care.

External examiner:

_____ _____ _____

Name signature date

Internal examiner:

_____ _____ _____

Name signature date

Research advisors:

**Achamyelesh Tadele (MSc in EMCCN)**

_____ _____

Signature date

**Dr. Sisay Teklu (Gynecologists physician)**

_____ _____

Signature date

Department head:

_____ _____ _____

Name signature date

**Addis Ababa University, College of Health Sciences Department of Emergency and critical care medicine Advisor's Approval Sheet**

This is to certify that the thesis entitled "Assessment of clinical profile and magnitude of early ED mortality in Tikur Anbesa Specialized Hospital Addis Ababa; Ethiopia." is submitted in partial fulfillment of the MSc. with a specialization in "Emergency and Critical care nursing" to the Graduate Program of the College of Health Sciences of Addis Ababa University and has done by Hanna Daniel ID No: GSR9552/11 under my supervision. Therefore, I recommend that the student has fulfilled the requirements and hence hereby can submit the thesis to the Department.

_____ _____ _____

Name of Major Advisor Signature Date

_____ _____ _____

Name of Co advisor Signature Date

Declaration

I hereby declare that this MSc thesis is my original work and has not been presented for a degree in any other university and all sources of material used for this thesis have been duly acknowledged.

Name: _____

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This MSc thesis had been submitted for examination with my approval as a thesis advisor.

Name: _____

Signature: _____

Date: _____

## ACKNOWLEDGMENT

First and foremost, I would like to give thanks to the almighty GOD who helped me in all situations. starting from the beginning of my life and being with me during the journey of this Thesis development.

I would like to extend my thanks to my advisors, Dr. Sisay Teklu and Sr. Achamyelesh Tadele for their review, unreserved professional support, technical guidance and advice throughout the process of the thesis development.

I would also like to thank Addis Ababa University College of health science Department of Emergency Medicine and critical care and all the staff of the department for their technical and administrative support.

Finally, I extend my thanks to my family and colleagues for their support and encouragement.

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# ACRONYMS

**A&E:** Accident and Emergency

**AOR:** adjusted odd ratio

**C/C:** Chief complaint

**COD:** Cause of death

**COR:** crude odd ratio

**CVS**: Cardio-vascular system

**DM:** Diabetes mellitus

**DOA:** Dead on arrival

**ED:** Emergency department

**EMCCN:** Emergency Medicine and Critical Care Nursing

**EM:** Emergency medicine

**HC:** Health center

**HIV/AIDS:** Human immune-deficiency virus

**Hrs.'** Hours

**HTN**: Hypertension

**LIC:** Low-income country

**LMIC:** Low and middle-income country

**MOF:** Multi-organ failure

**MOH**: Ministry of health

**PI**: Primary investigator

**SPSS**: Statistical Package for Social Science

**rSET**: revised Swiss Emergency Triage Scale

**TASH**: Tikur Anbesa Specialized Hospital

**TEWS**: Triage early warning score

**UGIB**: Upper gastrointestinal bleeding

**Yrs**.: Years

# ABSTRACT

**Background:** The classification of ED mortality is important because it identifies a group of patients who can benefit from the treatment that are provided at the department. Early mortality is defined as death within 72 hrs.' of ED presentation (7) and 'very early' ED mortality is defined as death within 24 hours (8). This 'very early' mortality group represents the most urgently ill patients likely to benefit from ED care interventions to prevent mortality.

**Objective**: The purpose of this is study to assess clinical profile and magnitude of early emergency department mortality among patients presented to the adult emergency department of Tikur Anbesa Specialized Hospital from March 1,2018-March 1, 2020, Addis Ababa, Ethiopia.

**Methodology**: A cross-sectional study design was used to assess clinical profile and Magnitude of early mortality in the adult emergency department, Tikur Anbesa Specialized Hospital; Addis Ababa, Ethiopia, From March 1, 2018 to March 1, 2020. The data were collected by review of patients' medical record cards. Data was entered by Epi data 4.2.1 and analyzed by SPSS Version 23. Binary and multiple logistic regression analysis were used for the association. Statically significance was P-value<0.05 at CI 95%.

**Result**: Of analyzed 506 charts, overall early ED mortality rate was 1.68 %, with male to female ratio 1.1:1. From multiple logistic regression results, it was found that, patients who were triaged as Green were 4.2 times more likely to die after 24 hrs of admission.' than patients who triaged as red. (AOR= .235 95% CI .101, .546). Patients who presented with chief compliant of >1 week duration were 2.1 times more likely to die after 24 hrs of admission.' than who came with chief complaints of 4-24 hrs.' duration (AOR = .471, 95% CI: (.256, .866.). From co morbid diseases HIV patients were 2.7 times more likely to die after 24 hrs.' than Asthmatic patients.' (AOR = 2.720, 95% CI: (1.013, 7.300).

**Conclusion and recommendations:** even though important steps were done to boost the emergency care there are still gaps. It has been found triage acuity; comorbid disease and duration of symptoms of patients were associated with Early ED mortality. Therefore it is essential to improve the quality of care of ED, to reduce the magnitude of preventable ED mortalities.



**Keywords**: Early Mortality, Death, Emergency-Department

# CHAPTER ONE: INTRODUCTION

## 1.1 Background

Emergency Department is a unique location at which patients are guaranteed access to emergency care 24 hours a day, 7 days a week. It is the backbone of any hospital, for the general public; the ED is the "shop window" of the health service(1).

It is very important to accept and treat critically ill patients who presented with all kinds of different cases of medical and surgical emergencies (illness, injury, and mental health) in all age groups. The initial management of these patients is often challenging. For valuable lives to be saved, the infrastructure and man-power should be up to date. In consequence, it should be supported to provide the level of care that the public both expect and deserve (2,3).

In the Emergency, many factors are contributing to deaths in hospitals all over the world. The severity of the injury or illness can be the cause of death on its own. The care and management at the hospital also determine the fate of the patients' life or death, so do lack of, or inadequacy of medical installation and the staffs, thereof Inaccessibility of transportation due to topography of patients' residency and unsuitable (or unavailable) road network delays arrival of the patients to the hospital, lack of rapid transfers of the patient to other departments (for definitive treatment) which aggravate illnesses or injuries and could cause death also increases the ED burden. These and other factors like pre-hospital factors, adequate trained man-power have a direct relationship with the morbidity and the mortality pattern in ED (4,5). Mortality from traumatic injuries and medical illness among Ethiopian ED patients remains largely uncharacterized. Causes are believed to be multifactorial and include both a significant burden of trauma and diseases as well as limited access to quality resources including skilled health care providers(6).

The classification of ED mortality is important because it identifies a group of patients who can benefit from the treatments that are provided at the department. Early mortality is defined as death within 72 hrs.’ of ED presentation (7), and 'very early' ED mortality is defined as death within 24 hours. This 'very early' mortality group represents the most urgently ill patients likely to benefit from ED care interventions to prevent mortality (8).

In recent years, The Ministry of health taken important steps and has shown interest to boost the efficiency of acute emergency care. It is evident by the launching of training in Emergency Medicine (EM) at undergraduate and postgraduate levels and residency in EM. Emergency medical technicians (EMT) are also being trained in various health institutes (6).

In one of the objectives of the World Health Organization (WHO), the pattern of death statistics is important scientific information that should be available for constant evaluation of available health services as an integral part of the managerial process in health care delivery (9).

## 1. 2 Statement of the problem

Globally, the ED mortality has been reported 15-16 % of all the mortalities in a hospital. Studies show that in Low and middle-income countries (LMICs) ED mortality were many times higher than high-income countries also even higher in Sub Saharan Africa (especially central, east, and west) which is 5.1%. In the USA, data shows that mean mortality within the emergency departments is 0.04%; the result shown in the same study, Nigeria has an estimated ED mortality, which accounts for 10-15 %(9,10)

In recent years, a significant proportion of the burden of disease and patient mortality is aggravated in ED(11,12). Studies showed that the possible causes of ED mortalities are cardiovascular disease; traffic accidents, trauma, and cancer are the most important etiologies. Even if, the etiology differs in various geographical locations it has been reported that these causes cover 15-60% of all the mortalities in hospitals that occur in ED (13,14).

In high-income countries, decades of advances in clinical science and care delivery have dramatically improved patient outcomes for a range of acute conditions. Clinical interventions like standardized ED trauma protocols have been previously shown to decrease mortality in high and few middle-income countries. There are lacks of data in low-income countries from the field. This has made it difficult to convince policy-makers to make major new investments in emergency care(14).

Researchers found that measuring the state of emergency care to be challenging. They mention that the main reason for this challenge is the heterogeneity of the network of facilities and also incomplete documentation of medical records. This is true even for basic information such as patient identity and diagnosis. Because of these and other additional related challenges, studies of emergency care in LMICs have been limited.so it had not been well studied in low-income countries' (LIC) EDs. Despite the thought that increasing availability to emergency medical services will improve patient outcomes, little empirical evidence exists to directly support that claim. To date, a small number of retrospective chart review studies have been conducted in similarly resourced acute care settings in Africa (15). In Ethiopia, a prospective ED mortality study has been conducted and the result showed that the overall death among ED visits within 72 Hrs.' was 1.9% including ward admission. According to this study head-injury and sepsis were the most common causes of death among Patients and the burden of trauma is significant. However, there are very few studies done to identify and explore the causes of ED mortality

(7). Even though very few literature has been done in Ethiopia, there is a gap in showing the actual magnitude or burden of ED Mortality and factors associated with it(16).

## 1.3 Significance of the study

The emergency department (ED) is the face of any hospital. It provides details on the quality of patient care in the institution including on-time intervention, which can bring a big difference between life and death. However, there are very few studies done to identify the causes of ED mortality(1,17).

With the advent of EM as a new Ethiopian medical specialty, this data is crucial for understanding ED mortality. Their characteristics and burden to inform the development of targeted patient care interventions to reduce ED mortality and policymaking toward the development of acute care capacity in LIC health systems. Interventions to decrease mortality in emergency settings of LICs could dramatically increase life-years saved and productivity(18,19).

So this study will contribute to identify the demographic patterns of early ED mortality. In addition, it is used to identify the cause and clinical profile of early mortality in the emergency department. This study provides information about the influence and magnitude of early mortality in ED and also to identify factors related to ED mortality.

In general, this study will have a contribution to update the advance of clinical care protocols to decrease ED mortality, possibly of reversible conditions. It also gives data which will add value for the improvements of EM care.

# CHAPTER TWO: LITERATURE REVIEW

Globally in 2010, there were 52·8 million deaths. At the most aggregate level, communicable, maternal, neonatal, and nutritional causes were 24·9% of deaths worldwide the data, shows that mortality from non-communicable diseases and injuries continue to rise (the increase from 1990 to 2010 was 30% for non-communicable diseases and 24% for injuries). For the 34·5 million annual deaths due to non-communicable diseases, timely emergency care could address many of the time-sensitive causes(17).

A study done on Swiss university shows that from the total number of 105,501 patients who Visited ED 277 died with a mortality rate of 2.6 per 1000. The mean mortality age was 65.7 years with a 2:3 female to male ratio, 93.4% (n=253) were triaged as category 1 using the revised Swiss Emergency Triage Scale (rSET), who are requiring immediate medical attention these are also subdivided based on presenting compliant medical (74.1%), surgical (22.9%), or neurological field (3%), and 75% of patient were under CPR upon arrival(20).

A Case-control study done in Tehran, Iran, from 2009 to 2010 revealed that 2907 patients were evaluated. From the study cardiovascular diseases (39.2%), severe traumas (18.5%), and Cerebrovascular accidents (17.7%) were the most frequent etiology of patient mortality in ED. Multivariate regression analysis showed that presentation with cardiovascular complaints(OR=7.3; 95% CI: 3.5-16.1; $p<0.001$), a history of hypertension (OR=5.4; 95% CI: 1.2-12.3;$p<0.001$), severe trauma (OR=4.6; 95% CI: 2.0-13.2; $p<0.001$), age over 60 (OR=3.8; 95% CI:1.8-7.8; $p<0.01$) and a final diagnosis of renal disease (OR=3.4; 95% CI: 2.1-6.4; $p<0.001$) were factors that increased the odds of mortality in patients referring to the ED (6).

Three years of retrospective cohort study done in Saudi Arabia from 2012 to 2014 shows 3,786 Patients presenting with injuries 77.5% were male. A little less than one third (29.8%) of patients were aged 15–25 years and 25.7% were aged 26–45 years. The mean age of female patients (33.7 years) was significantly higher than that of male patients (28.4 years, $t=5.39$, $p<0.001$. The majority of traumatic injuries were from blunt trauma in the form of MVCs (52.0%) and falls (25.8%). Head (32.2%), chest (16.9%) and abdomen (8.9%). 70.3% Traumatic injuries in trauma patients in Saudi Arabia in men and 59.8% in women the rates

then fell as age increased further. Moderate and severe injuries had higher fatality rates than injuries of mild severity (RR=6.438 and 181.780, $p<0.001$, respectively) (21).

A study done on the rural area of Southwest Nigeria from January 2011 to December 2012; shows that a total number of 1769 patients attended in ED (2 years period). This consists of 943 males (53.3%) and 826 (46.7%) females with male to female ratio 1.1:1. There were a higher Accident and Emergency (A & E) attendance of males compared to females. Total deaths recorded within the period of study were 92 with a crude mortality rate of 5.2%, age ranged 18 to 87 years with a mean of 52.49 + 18.78 years. Male deaths 52 (56.5%), age ranged 18 to 87 years with a mean of 54.19 + 20.44 years. The female deaths were 40 (43.5%) age ranged 18 to 80 years with a mean of 50.28 + 16.37 years. The crude mortality rate for male and female were 5.5% and 4.8% respectively. Most deaths occurred below 65 years of age with an equal number of deaths occurring in the young and middle-aged, each recording 32 (34.8%) deaths totaling 64 (69.6%). Deaths from the non-communicable disease were the highest, number 68 (73.9%) compared to communicable diseases numbering 24 (26.1%). Stroke topped the list of the former with 16 (17.4%) deaths while sepsis topped the latter with 6 (6.5%) deaths (22).

Another study done on South-south of Nigeria shows Four thousand and eleven (4,011) patients Were seen in the E.D during the period; three hundred and 355 with a rate of 8.5% mortalities were recorded. Their ages ranged from 4-87 years, with an average of 34.5 years. The male to female ratio was 2.1:1. E.D mortality is representing 41.3% (trauma and non-trauma). One hundred and forty-seven (41.4%) persons died from trauma; road traffic accidents (RTAs) accounting for 118 (80.3%). Two hundred and eight (58.6%) persons died from non-trauma related causes, with chronic Cardiovascular disorders were the most frequent cause of death 52[25.0]. The majority of the mortalities were between 26-50 years of age range. 86.2% of the mortalities presented late, greater than 6 hours after the incidence. In-hospital 72 hours death rate of 8.6% was recorded (23).

A retrospective review of hospital records done on Accident and Emergency (A&E) department of Federal Medical Centre IdoEkiti State, Nigeria; 2 years from (2011-2012). The total number of patients attendance in A and E department for was 3,162, consisting of 1959 (62.0%) males and 1203 (38.0%) females with a male to female ratio 1:6:1. There was a higher A and E

attendance of males compared to females. Total death recorded over the period was 122 with a crude mortality rate of 3.9% age ranged 15-87 years with a mean of 52.04 + 18.7 years. Male deaths were 76 (62.0%) age ranged 15 to 87 years with a mean of 51.9 + 19.9 years. The female deaths were 46 (38%) age ranged 18 to 80 years with means of 52.3 + 16.7 years. The male to female death ratio was 1:7:1 and there was no statistically significant difference between the mean age for deaths in both genders (P-value = 0.92). The crude mortality rate for male and female were 3.9% and 3.8% respectively. The majority of deaths occurred below 65 years of age with an equal but higher number of deaths occurring in the young and middle age, each recorded 43 (35.2%) totaling 87 (70.4%). Medical causes of death with 92 (75.4%) were predominant when compared to surgical causes of death with 30 (24.6%). Stroke with 16 (13.1%) deaths and road traffic accident (RTA) equally 16 (13%) deaths were the highest clinical causes of deaths. Deaths from non-communicable diseases with 98 (80.3%) are far more than deaths from communicable diseases with 24 (19.7%)(24).

The study conducted in Lumbini Medical College Teaching Hospital from January 2014 to June 2017 Shows, in consecutive t hree and half year's mortality rates were 36.4%, 33.6 %, 28.2 %, and 1.8%. The highest number of deaths recorded was in above 60 years of age. The non-communicable cause for death 101 (91.8%) was found more than communicable causes 9 (8.2%). Stroke was found to be leading cause of death n = 16 (14.5%) followed by acute myocardial infarction n = 15 (13.6%), upper GI bleeding n = 14 (12. 7%) and pneumonia 14 (12.7 %) Stroke was the main cause of death in above 70-year age patients and comorbid conditions associated with stroke death were hypertension, diabetes mellitus, and valvular heart disease. Eight (7.3%) mortalities were recorded from the head injury, seven (6.4%) acute failure and six (5.5 %) sepsis. Fifty-two (47.3%) died within 6-12 hours of arrival(25).

A Three-year (2014 to 2016) a retrospective study was done in Tuanku Fauziah Hospital Showed that a total of 301 mortality cases were recorded in (emergency and trauma department) ETD from, 294 cases who were analyzed. Of these, majority, 59.5% (n=175) were death-in-department (DID) cases. The Majority of the brought-in-dead (BID) cases were among the elderly, aged more than 70 years old (n=34, 28.6%). The commonest organ system afflicted was the cardiovascular systems. There was a significant association between different age groups and the nature of the mortality cases in ETD (p=0.0026)(16).

Another retrospective review study done in Tanzania showed that from February 2010 to January 2012 The total number of patients who were seen 77,164 at the full capacity emergency department, including 44,758 (58.0 %) males and 32,406 (42.0 %) females with a male to female ratio of 1.4:1 while 568 deaths were recorded with the crude mortality rate of 0.74 %. The age range for deaths that occurred in the full capacity ED was 3 months to 92 years with the mean being 39.45 ± 4.5 years. The majority of deaths occurring in ED were in patients below the age of 40 years. The most common cause of death in the ED was a congestive cardiac failure and the least common was cancer. The total number of deaths recorded in this population was 6292 giving an overall mortality rate (ED plus inpatient) of 8.2 % (95 % CI 8.0–8.3 %) (26).

The study done on rural Uganda, from July 2010 to March 2012 shows that among 10,105 patients who visit ED, four were dead on arrival to the hospital (0.04%), 45 died in the ED (0.5%), there were 201 deaths. 22.8% of deaths occurred in the ED and 76.1% of deaths were in those admitted to the hospital. Overall mortality was 2.0% and the most common diagnoses recorded in deceased patients were malaria (29.9%), pneumonia (26.4%), malnutrition (10.4%), and trauma (10.0%). For patients with only a single diagnosis (n = 154), the top three causes of death were malaria (22.7%), trauma (12.3%), and pneumonia (11.7%) (12).

A retrospective review of death certificates in Nairobi during the period, January to June 2014. From the total 11,443 records, deaths resulting from injuries were 1,208 accounting for 10.6% of all recorded deaths. The majority of the deaths resulting from injuries occurred in persons aged 25 to 44 years (48.1%). Males accounted for 85% of all the injuries. The leading cause of injury was an assault by blunt force at 30.5%, followed by road traffic injuries at 25.9% and firearm injuries at 15%(27).

A prospective study was done in Ethiopia (October 2012 and May 2013) showed that from a total of 9956 patients presented to ED 220 patients died within 72 h of ED presentation. The times from ED presentation to patient dead on arrival 15 %(n=34), less than one hour 6 %, 1–6 h (21 %), 6–24 h (37 %), 24–72 h (20 %). The overall early ED mortality rate among patients alive on arrival to the ED was 1.9 %. The average age of death was 43.1 years, with a male to female ratio of 1.4:1. Head injury (21.5 %) and sepsis (18.8 %) were the most common causes

of death, followed by respiratory failure (15.1 %). The majority of patients were triaged as level 'orange' (48.6 %). Approximately 21.5 % of patients arrived by ambulance. Most (82.5 %) were visiting an ED for the first time in 30 days. Weekday's presentation to the ED is (67.9 %) during daytime hours (50.8 %). The mean age of trauma patients (40.35 years, SD 17.92 years) trended towards being lower than that of non-trauma patients (45.16 years, SD 18.09 years, $p = 0.09$). Overall, relative to medical patients, trauma patients were more likely to be male ($p < 0.01$), less likely to have had prior recent ED visits ($p < 0.01$), and were triaged as higher acuity ($p = 0.04$)(7).

# CHAPTER THREE: OBJECTIVES

## 3. 1 General objective

- To assess clinical profile and magnitude of early mortality in the adult emergency department of TASH, from March 1, 2018, to March 1, 2020, Addis Ababa, Ethiopia.

## 3. 2 Specific objectives

- To assess the magnitude of early mortality in adult ED.
- To identify common clinical causes of early ED mortality.
- To identify factors that could be related to early ED Mortality.

# CHAPTER FOUR: METHODOLOGY

## 4. 1 Study area

Addis Ababa is capital city of Ethiopia, a seat of African Union and Economic Commission for Africa and it is at the heartland of Ethiopia. It has a total area of 540 square Kilometers, which includes 10 sub-cities and 116 woredas (28). Tikur Anbesa Specialized Hospital is found in Addis Ababa and it is the largest tertiary referral hospital. It provides treatment and opens 24 hours per day for emergency services. The hospital is administered by Addis Ababa University also is the oldest teaching hospital in Ethiopia providing teaching for more than 300 medical students and 350 residents every year. Tikur Anbesa specialized Hospital offers diagnostic testing and treatment for approximately 370,000-400,000 patients per year. The hospital has 800 beds, with more than 130 specialists 50 nonteaching doctors. The emergency department of TASH has 9 consultants and 28 residents, and sees around 18,000 patient visits per year. On the average, 50 persons that encompass traumatized and/or critically ill patients are seen in the ED per day and many of them require emergency care or resuscitation(29,30).

## 4. 2 Study period

Medical record cards of patients who had visited TASH ED from March 1 2018 to 2020 were studied.

## 4. 3 Study design

A retrospective cross-sectional study design was conducted to assess clinical profile and magnitude of early ED mortality in TASH, A.A, Ethiopia, from March 1, 2018 to March 1, 2020.

## 4.4 Population

### 4.4.1 Source population

All patient medical record cards in ED, From March 1, 2018 to March 1, 2020, ED TASH.

### 4 .4 .2 Study population

Medical records of the patients, who was died within 72 hours ED arrival, from March 1, 2018 to March 1, 2020, ED, TASH.

## 4.5 Eligibility criteria

### 4.5.1 Inclusion criteria

Registration cards of mortality occurred within 72 hrs.' after arrived to ED were included during study period.

### 4.5.2 Exclusion criteria

- Medical record with registration of dead on arrival.
- In complete patient medical record.

## 4.6 Sample size determination

All Medical records of patients who died within 72 hours of Ed arrival from March 1, 2018, to March 1, 2020, ED TASH was included.

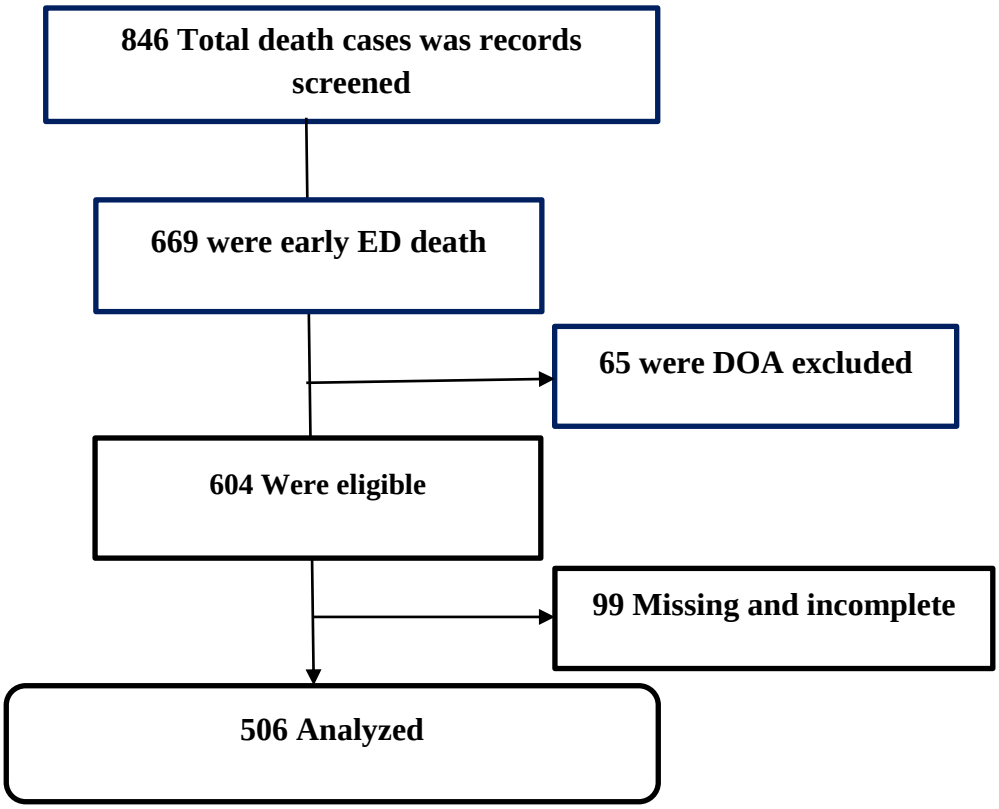


*Figure 1: Data processing of early ED TASH mortalities from March (1, 2018 -2020) Addis Ababa, Ethiopia.*

## 4.7 Study variables

### 4.7.1 Dependent variables

- Early ED mortality.

### 4.7.2 Independent variables

- Age
- Sex
- Time of death
- Mode of transport to ED
- Triage category
- Source of referral
- Duration of c/c
- Presence of known chronic illnesses
- mechanism of injury in traumatic patients

## 4.8 Operational definitions

- **Early mortality**: death which was occurred after presentation to ED alive and dead Within 72 hours in ED.
- **Very early mortality**: death within 24 hrs.' of ED stay.
- **Presence of chronic illness**: diseases which persist more than 1 month and have confirmation from known health department by health professional with support of evidence.
- **Triage category**: Sorting of the patient according to the severity of illness or injury and for this study Triage early warning score (TEWS) was used.
- **Duration of chief complaint:** is a reported length of time of the illness by the patients after he/she noticed of their sign and symptoms.
- **Known cardiac patient:** Patients who were previously diagnosis for cardiac diseases by a qualified health professional from known health institution.

## 4. 9 Data collection procedure

The questionnaire was compiled by adapting questions from published literature and by considering the local situation (7,25,31). The questioners were prepared in the English language based on the study objective. The first part of the questionnaire focuses on patients' socio-demographic characteristics. The second part of the questionnaire focuses on clinical factors, mode of transportation to ED, and method of referral, and the third part consists of diagnostic factors like, duration symptom, medical diagnosis and etc. Two Data Collectors who have a BSc degree in nursing had collected the data. In addition, 2 supervisors, who have MSC in nursing, were involved. The questioner was transferred to a personal computer to save the backup.

## 4.10 Data quality assurance

Prior to data collection, orientation was given to supervisors and training was given for data collectors about data collection for one day. The actual data collection was done on the next day after the training. The questionnaires were filled by trained data collectors. A pretest was done in All Africa Leprosy and Rehabilitation center (ALERT) hospital, which was selected by a simple lottery method, by taking 5% of the study population. After the pretest, necessary corrections were made to the research questionnaire. The principal investigator collected questioners from supper visors and oversee the quality of data by reviewing the completeness of data on a daily basis. Besides this, the principal investigator had carefully entered and thoroughly cleaned the data before the analysis.

## 4.11 Data analysis

All questionnaires were checked for completeness manually. The data entry was done by epi data version 4.6.2 and analysis was done by using SPSS version 23 software. The generated data were compiled and presented by text, tables, graphs, mean, and proportions. Binary logistic regression was used to estimate the crude odds ratio of all independent variables on early ED mortality with p-value of <0.25. And Multiple logistic regression was also be used to estimate the adjusted odds ratio of early ED mortality to control confounders and predict the final predictor at 95% CI and 0.05 level of significance.

## 4.12 Ethical considerations

The ethical approval and clearance for this study were obtained from the Addis Ababa University College of Health Sciences, Institutional Review Board (IRB). A support letter was taken from the Emergency department to the study hospital for permission to conduct the study. The research purpose, its benefits and the procedures were explained for the Emergency Department head and staff member.

## 4.13 Dissemination of findings

The finding of the study will be presented to the Department of Emergency Medicine and Critical care/AAU/. Besides, it will be disseminated through presentations in different professional association meetings and annual conferences. The paper will also be submitted to national or international peer-reviewed scientific journals for possible publication.

# CHAPTER FIVE: RESULT

During 24 months period from March 1 2018 to March 1, 2020, a total of 30086 patients had visited ED. Male were 17,972 (59.74%) and female were 12,114 (40.26%) with male to female ratio 1.48:1. Totally 846 (2.8%) death was registered which include 65 dead on arrival and 604 deaths occurred within 72 hours after arrival alive to ED. During data collection time there were only 506 charts were found. So the analysis was taken based on these charts.

## 5.1 Socio-demographic character

According to analyzed 506 charts. Male were 266 (52.6%) and female were 240(47.4%), with male to female ratio of 1.1:1. The age range was from 13-95 with the mean age of 43.5±17.33 years. Male ranges from 13-95 yrs, with mean age 44 yrs. For the female age range of 15-82 years with the mean age 43 yrs.

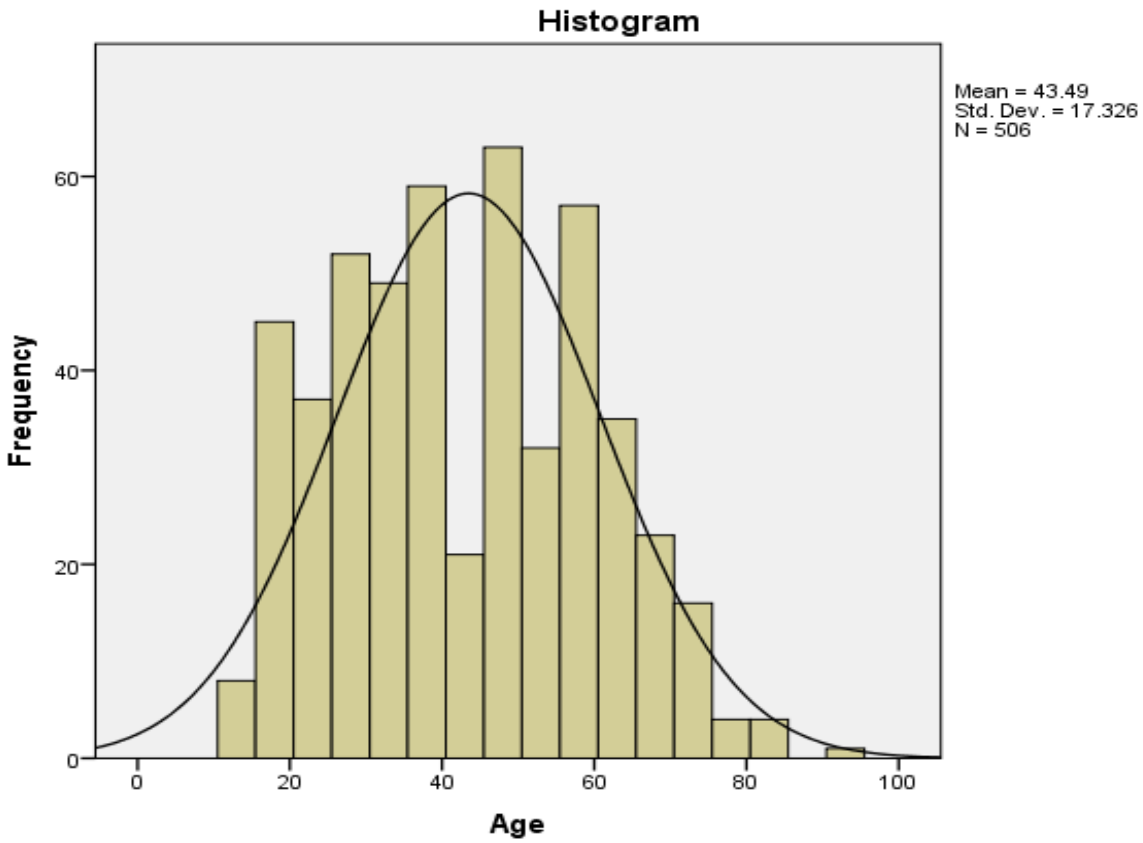


*Figure 2: Age distribution of early ED mortality of TASH from March 1(2018-2020), Addis Ababa; Ethiopia.*

Most of the patients 207(40.9 %) were from Addis Ababa, and Oromia 171(33.8%). Most patients come to the department with self-referrals which consists of 258(51%) followed by public hospital referrals 136 (26%) which include referrals from both A.A hospitals and regional hospitals.

*Table 1* Socio-Demographic characteristics of early ED mortality from March 1-(2018 to 2020) TASH Addis Ababa; Ethiopia

| | | Length of stay in ED before death | | | | Sub Total | % |
|---|---|---|---|---|---|---|---|
| | | 0-24 hrs. | | >24hrs-48hrs | | | |
| Sex | Male | 152 | 30.4% | 72 | 14.2% | 267 | 52.8 |
| | Female | 121 | 23.9% | 80 | 15.8% | 239 | 47.2 |
| age in years | 13-25 | 72 | 14.23% | 20 | 3.95% | 106 | 20.9 |
| | 25-54 | 148 | 29.5% | 70 | 26.2% | 267 | 52.8 |
| | 54-64 | 43 | 8.5% | 30 | 5.9% | 84 | 16.6 |
| | ≥65 | 40 | 7.9% | 32 | 6.3% | 79 | 15.6 |
| Address | Addis Ababa | 106 | 20.9% | 66 | 13% | 207 | 40.9 |
| | Oromia | 84 | 16.6% | 56 | 11.1% | 171 | 33.8 |
| | Amhara | 40 | 7.9% | 18 | 3.56% | 61 | 12.1 |
| | Tigray | 6 | 1.2% | 0 | 0.0% | 11 | 2.1 |
| | SNNPRs | 27 | 5.3% | 3 | 0.59% | 36 | 7.1 |
| | Others | 10 | 0.395% | 9 | 0.99 % | 20 | 4 |
| Source of referral | Public Hospital | 69 | 13.6% | 45 | 8.9% | 136 | 26.9 |
| | Private Clinic | 6 | 1.2% | 3 | 0.59% | 13 | 2.6 |
| | Health Center | 7 | 1.3% | 2 | 0.395% | 12 | 2.4 |
| | Self | 155 | 30.6% | 76 | 15 % | 258 | 51 |
| | ROPD | 30 | 5.9% | 19 | 3.75% | 70 | 13.8 |
| | Others | 6 | 0.59% | 7 | 0.0% | 17 | 3.4 |

- On the address, Others includes Dire Dawa, Afar
- Source of referral police hospitals private hospital

## 5.2 Clinical factors

Of the total patients, 273 (54%) used taxi for transportation followed by ambulance 113(22.4%). Most 435(86%) of patients had no prior ED visits within 30 days. based on major classification 469(92.7%) were non-traumatic patients the remaining were traumatic. those include different types of intentional and unintentional accidents during the study period, Among early ED mortality 225(44.5%) patients were triaged as red, 182 (36%) were orange, 67(13.2%) were yellow and 32(6.3%) were green.

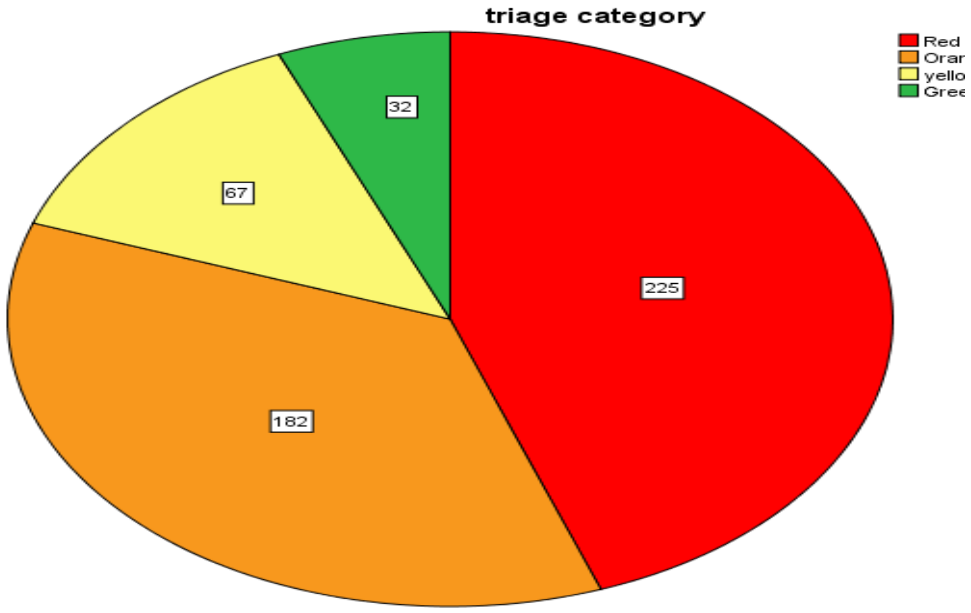


*Figure 3: Triage category of early ED mortality in TASH from March 1(2018-2020), Addis Ababa, Ethiopia.*

Among the study subjects, 264 (52.2%) had died during day time and 396 (78%) of patients died in red area and 4% of them were died in front and triage area . 'The following table demonstrates from time of arrival to 24 hours 273(54%), 25 hrs.' to 72 hrs.' 233(46%), see Table 2.

*Table 2 Clinical factors of early ED mortality from March 1(2018-2020) TASH, Addis Ababa; Ethiopia.*

| | | Length of stay in ED before death | | | | Sub Total | |
|---|---|---|---|---|---|---|---|
| | | 0-24 hrs.' % | | 24-72 hrs.'% | | N | % |
| Mode of transportation | Ambulance | 63 | 12.45 | 50 | 1 | 113 | 22.4 |
| | Taxi | 134 | 26.48 | 139 | 2.7 | 273 | 54 |
| | Public Transport | 8 | 1.58 | 4 | 0.8 | 12 | 2.4 |
| | private car | 34 | 6.7 | 19 | 3.7 | 53 | 10.5 |
| | Others | 34 | 6.7 | 25 | 4.9 | 59 | 11.7 |
| prior ED within 30 days | no ED Visits | 225 | 44.47 | 210 | 41.5 | 435 | 86 |
| | 1 | 43 | 8.5 | 21 | 4.15 | 64 | 12.6 |
| | 2 | 6 | 1.2 | 2 | 0.4 | 8 | 1.6 |
| major diagnosis | Traumatic | 19 | 3.75 | 18 | 3.6 | 37 | 7.5 |
| | non-traumatic | 254 | 50.2 | 215 | 42.5 | 469 | 92.7 |
| triage category | Red | 153 | 30.24 | 72 | 14.2 | 225 | 44.5 |
| | Orange | 78 | 15.4 | 104 | 20.6 | 182 | 36 |
| | Yellow | 29 | 5.7 | 38 | 7.5 | 67 | 13.2 |
| | Green | 13 | 2.6 | 19 | 3.8 | 32 | 6.3 |
| Time of death | Day | 145 | 28.66 | 119 | 23.5 | 264 | 52.1 |
| | Night | 128 | 25.3 | 114 | 22.5 | 242 | 47.8 |
| Location of death | Red | 227 | 44.9 | 169 | 33.3 | 396 | 78.3 |
| | Orange | 32 | 6.3 | 41 | 8.1 | 73 | 14.4 |
| | Yellow | 2 | 0.4 | 15 | 3 | 17 | 3.4 |
| | Others | 12 | 2.4 | 8 | 1.6 | 20 | 4 |
| any investigation | None | 55 | 10.9 | 24 | 4.7 | 79 | 15.6 |
| | Laboratory | 167 | 33 | 144 | 2.8 | 311 | 61.5 |
| | Imaging | 15 | 3 | 16 | 3.2 | 31 | 6.1 |
| | both2and3 | 36 | 7.1 | 49 | 9.7 | 85 | 16.8 |
| Immediate cause of death | Respiratory | 59 | 11.7 | 55 | 10.9 | 114 | 22.5 |
| | Cardiac | 42 | 8.3 | 38 | 7.5 | 80 | 15.8 |
| | MOF | 45 | 8.9 | 46 | 9 | 91 | 18 |
| | Cardiorespiratory arrest | 115 | 22.7 | 74 | 14.6 | 189 | 37 |

N.B: Others include 1. For the mode of transportation police car carried and walking

2. for location of death triage, front and waiting area

## 5.3 Diagnosis and related factors

Early ED deaths comprised of 7.3% of trauma cases and 92.7% were non-trauma cases Respiratory disease 152 (17.5%), septic shock 85 (11.6%) and cardio vascular diseases 84 (9.7%), were the most common non-trauma diagnosis for early ED mortalities. Cancer 176(37.5%), cardiac 70(14.9%) and hypertension 41(8.7%) were commonest co-morbid diseases among patients. Regarding to duration of illness(C/C) during presentation 48 hrs.'- 1 week accounts 134 (26.5%) followed by 4hrs-24 hrs. 128 (25.3%).

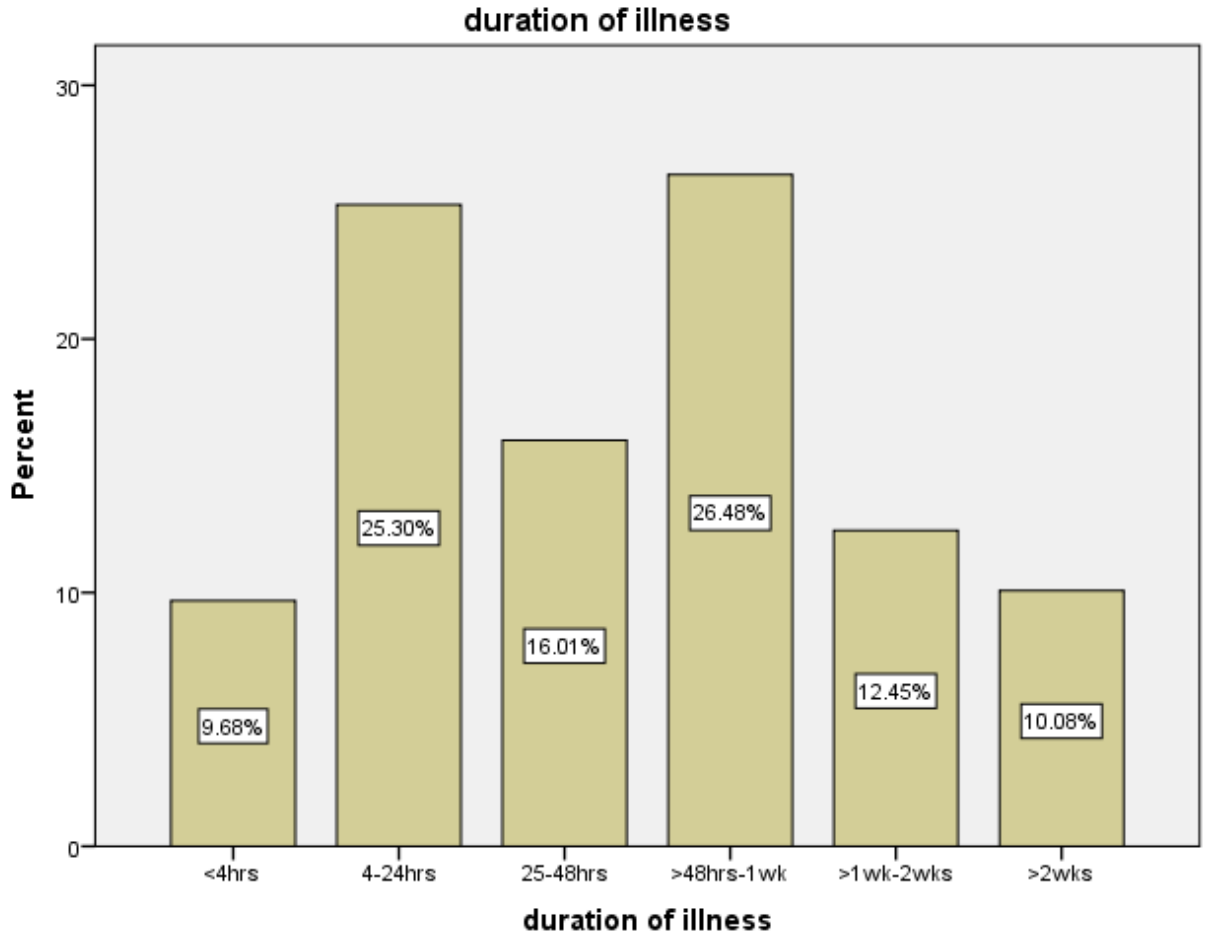


*Figure 4: Duration of illness of early ED mortality in TASH from March 1 (2018-2020) Addis Ababa, Ethiopia.*

For trauma patients road traffic accident 16 (43.2%) and fall down accidents 8 (27.6%) were common causes for mechanisms of injury. Head injury 19(51.3%) and SCI 10 (27%) were the main parts of the body involved during trauma. Most patients 427(84.4%) undergo investigations after arrived at ED. The immediate cause of deaths was recorded as cardio-respiratory arrest 189 (37.4%) and respiratory failure 114 (22.5%) followed by multi-organ failure 91 (18%). ‘The following table demonstrates from time of arrival to 24 hours 273(54%), 25hrs to 72 hrs 233(46%). See Table 3

*Table 3 Diagnostic and related factors of early ED mortalities, from March 1 2018-March 1, 2020, Addis Ababa, Ethiopia.*

| | | Length of stay in ED before death | | | | Subtotal | |
|---|---|---|---|---|---|---|---|
| | | 0-24hrs | | >24hrs | | | |
| | | N | % | N | % | N | % |
| duration of illness | <4hrs | 32 | 6.12 | 17 | 3.4 | 49 | 9.66 |
| | 4-24hrs | 89 | 17.6 | 39 | 7.7 | 128 | 25.3 |
| | 25-48hrs | 40 | 7.9 | 41 | 8.1 | 81 | 16.01 |
| | >48hrs-1wk | 60 | 11.8 | 74 | 14.6 | 134 | 26.48 |
| | >1wk | 52 | 10.2 | 62 | 12.3 | 114 | 22.52 |
| mechanism of injury | road traffic accident | 8 | 1.5 | 8 | 1.5 | 16 | 3.16 |
| | Assault | 1 | 0.2 | 4 | 0.8 | 5 | 0.99 |
| | Falls | 6 | 1.2 | 2 | 0.4 | 8 | 1.6 |
| | Gunshot | 0 | 0 | 1 | 0.2 | 1 | 0.2 |
| | Stab | 1 | 0.2 | 1 | 0.2 | 2 | 0.4 |
| | Suicide | 3 | 0.59 | 2 | 0.4 | 4 | 0.79 |
| | Burn | 0 | 0 | 1 | 0.2 | 1 | 0.2 |
| sites of injury | head injury | 8 | 1.5 | 11 | 2.1 | 19 | 3.8 |
| | Chest | 2 | 0.59 | 1 | 0.2 | 3 | 0.6 |
| | Spinal cord | 6 | 1.2 | 4 | 0.8 | 10 | 2 |
| | Polytrauma | 1 | 0.2 | 1 | 0.2 | 2 | 0.4 |
| | Others | 2 | 0.4 | 1 | 0.2 | 3 | 0.6 |
| chronic-morbids for trauma and non-trauma | known ca | 96 | 18.97 | 80 | 15.8 | 176 | 34.8 |
| | known cardiac pt. | 40 | 7.9 | 30 | 5.9 | 70 | 13.8 |
| | Hypertensive | 25 | 4.9 | 16 | 3.2 | 41 | 8.1 |
| | hematologic ca | 14 | 2.8 | 5 | 1 | 19 | 3.8 |
| | Diabetic Mellitus | 10 | 1.9 | 7 | 1.4 | 17 | 3.4 |
| | HIV/AIDS | 8 | 1.6 | 18 | 3.6 | 26 | 5.1 |
| | Asthma | 3 | 0.59 | | 1.4 | 10 | 2 |
| | Others | 17 | 3.4 | 37 | 7.4 | 54 | 10.7 |
| diagnosis for non-trauma | Respiratory disease | 91 | 10.5 | 61 | 10 | 152 | 17.5 |
| | cardiovascular ds | 50 | 5.8 | 34 | 3.9 | 84 | 9.7 |
| | renal disease | 27 | 3.1 | 42 | 4.8 | 69 | 7.9 |
| | neurologic disease | 42 | 4.8 | 38 | 7.5 | 80 | 9.2 |
| | liver disease | 11 | 1.27 | 15 | 1.73 | 26 | 3 |
| | DM and its complication | 2 | 0.23 | 6 | .67 | 8 | .9 |
| | sepsis | 46 | 5.3 | 39 | 4.5 | 85 | 9.8 |
| | septic shock | 50 | 5.8 | 35 | 4 | 85 | 9.8 |
| | other types of shock | 55 | 6.3 | 46 | 5.3 | 101 | 11.6 |
| | upper GI bleeding | 20 | 2.3 | 13 | 1.5 | 33 | 3.8 |
| | hematologic malignancy | 29 | 3.3 | 43 | 5 | 72 | 8.3 |
| | bleeding disorder | 9 | 1 | 13 | 1.5 | 22 | 2.5 |
| | Others | 21 | 2.4 | 29 | 3.6 | 50 | 6 |
| any investigation | None | 55 | 10.9 | 24 | 4.7 | 79 | 15.6 |
| | Laboratory | 167 | 33 | 144 | 28.5 | 311 | 61.5 |
| | Imaging | 15 | 3 | 16 | 3.2 | 31 | 6.1 |
| | both2and3 | 36 | 7.1 | 49 | 9.7 | 85 | 16.8 |
| immediate cause of death | Respiratory | 59 | 11.7 | 55 | 10.9 | 114 | 22.5 |
| | Cardiac | 42 | 8.3 | 38 | 7.5 | 80 | 15.8 |
| | MOF | 45 | 8.9 | 46 | 9 | 91 | 18 |
| | Cardiorespiratory arrest | 115 | 22.7 | 74 | 14.6 | 189 | 37.4 |
| | Others | 12 | 2.4 | 20 | 4 | 32 | 6.3 |

Others include a) For sites of injury extremities and abdominal injury
b) For chronic: comorbid disease CKD, CLD, epilepsy, seizure
c) for diagnosis: wound site infection, Abdominal diseases, gastritis
d) for causes of deaths: massive hemorrhage, unknown causes

## 5.4 Factors associated with early ED mortality

In the Bivariate logistic regression analysis, the factors found to be significantly associated with Early ED mortality, with P-value of <0.25 were: sex, address, source of referral, duration of C/C (illness), co-morbid diseases and triage category. From the variables associated with early ED mortality in the bivariate logistic regression with a p-value of <0.05; address, triage category, duration of C/C, and co-morbid disease, were statistically significant to predict early ED mortality in the multivariable logistic regression.

Patients who were triaged as Green were 4.2 times more likely to die after 24 hrs.' of admission.' than patients who triaged as Red. (AOR= .235 95% CI .101, .546). Patients who presented with chief compliant of >1 week duration were 2.1 times more likely to die after 24 hrs.' of admission. From co morbid diseases HIV patients were 2.7 times more likely to die after 24 hrs.' of admission than Asthmatic patients.Patients who came from A.A were 2.8 times more likely (AOR = 2.776, 95% CI: (1.357, 5.812) and Oromia 3.2 time more likely (AOR = 3.229, 95% CI: (1.581, 6.594) to die after 24 hrs of admission than from others regions of Ethiopia.

*Table 4* Binary and multiple logistic analysis of factors associated with early ED mortality from March 1(2018-2020) in Addis Ababa, Ethiopia.

| | | ED stay | | COR (95% CI) | | COR(95% CI) | |
|---|---|---|---|---|---|---|---|
| | | 0-24hr | >24hrs | Sig | (n, lower, upper) | Sig | (n, lower, upper) |
| age in years | 13-24 | 42 | 34 | .564 | .830(.441,1.562) | | |
| | 25-54 | 148 | 119 | .452 | .825(.499,1.363) | | |
| | 55-64 | 44 | 40 | .823 | .932.(504,1.724) | | |
| | **>64** | **40** | **39** | **.870** | | | |
| Sex | Male | 153 | 114 | .133 | .761(.489,1.185)* | .292 | .801(.530,1.20) |
| | Female | 121 | 118 | | | | |
| Address | A.A | 107 | 100 | .057 | 1.02(.992,3.372)* | .005 | 2.776(1.357,5.680)** |
| | Oromia | 84 | 87 | .029 | 2.017(1.076,3.784)* | .001 | 3.229(1.581,6.54)** |
| | Amhara | 40 | 21 | .956 | 1.022(.476,2.197) | .763 | 1.142(.482,2.703) |
| | SNNPR | 6 | 5 | .469 | 1.623(0438,6.011) | .098 | 3.786(.782,18.338) |
| | **Others** | **37** | **19** | **.000** | **1** | **.000** | |
| Triage category | Red | 154 | 71 | .003 | .315(.148,.674)* | .001 | .235(.101,.546)** |
| | Orange | 78 | 104 | .814 | .912(.425,1.959) | .506 | .752(.325,1.741) |
| | Yellow | 29 | 38 | .802 | .897(.381,2.108) | .259 | .576(.221,1.502) |
| | **Green** | **13** | **19** | **.000** | | | |
| Mode of transportation | Ambulance | 63 | 46 | .983 | 0993(.523,1.885) | | |
| | Taxi | 135 | 138 | .256 | 1.39(.788,2.454) | | |
| | Public Transport | 8 | 4 | .563 | .680(.184,2.512) | | |
| | private car | 34 | 19 | .481 | .760(.354,1.63) | | |
| | **Others** | **34** | **25** | **.189** | | | |
| source of referral | Private hospital | 3 | 9 | .183 | 4.5(.491,41.248)* | .134 | 6.820(.554,84.042) |
| | Public hospital | 69 | 67 | .686 | 1.457(.236,6.984) | .325 | 2.892(.349,23.982) |
| | private clinic | 6 | 7 | .601 | 1.750(.215,14.224) | .466 | 2.429(.223,26.408) |
| | health center | 7 | 5 | .949 | 1.071(.128,8.977) | .725 | 1.543(.138,17.208) |
| | Self | 156 | 102 | .983 | .981(.161,5.972) | .547 | 1.907(.233,15.616) |
| | ROPD | 30 | 40 | .463 | 2.0(.314,12.723) | .361 | 2.710(.319,23.025) |
| | **Others** | **3** | **2** | **.054** | | | |
| Ed visits | No ED visits | 226 | 209 | .215 | 2.774(.554,13.898)* | .450 | 2.555(.46,14.198) |
| | 1 | 42 | 21 | .637 | 1.500(.278,8.079) | .973 | 1.426(.237,8.58) |
| | **≥2** | **6** | **2** | | | | |
| Duration of illness | <4 | 32 | 17 | .022 | .446(.223,.892) | .325 | .664(.294,1.501) |
| | 4-24 | 90 | 38 | .000 | .354(.209,501)* | .015 | .471(.256,.866)** |
| | 25-48 | 40 | 41 | .604 | .860(.486,1.521) | .573 | 1.218(.613,2.422) |
| | >48-1wk | 60 | 74 | .895 | 1.34(626,1.708) | .513 | 1.210(.683,2.146) |
| | **>1wk** | **52** | **62** | | | | |
| Category | Trauma | 20 | 17 | .990 | 1.004(.513,1.966) | | |
| | **Non-trauma** | **254** | **215** | | | | |
| Co-morbid disease | Hypertension | 25 | 18 | .114 | .498(.209,1.183)* | .826 | 1.091(.504,2.361) |
| | Diabetics Mellitus | 10 | 7 | .361 | 1.731(.533,5.619) | | |
| | Cardiac Disease | 40 | 28 | .163 | .607(.301,1.223)***** | .655 | .835(.265,2.629) |
| | Cancer | 96 | 80 | .645 | .890(.542,1.461) | | |
| | Hematologic malignancy | 14 | 5 | .073 | .295(.078,1.121)***** | .757 | .835(.265,2.629) |
| | HIV | 8 | 18 | .080 | 2.911(.879,9.632)***** | .047 | 2.72(1.013,7.300)** |
| | Asthma | 3 | 7 | .304 | 2.092(.512,8.545) | | |
| Time of death | Day time | 145 | 119 | .715 | 1.067(.752,1.515) | | |
| | **Nighttime** | **129** | **113** | | **1** | | |

**COR=*P<0.25; AOR**P<0.05**

# CHAPTER SIX: DISCUSSION

As outlined in the objective of this study, it has been intended to identify and characterize clinical profiles that could cause early mortalities and to assess the magnitude of early mortalities in adult ED TASH.

The total number of patients' visited in the ED TASH over a period of two years were 30086 made up of males 17987 (59.74 %) and female 12114 (40.26%) with a male to female ratio of 1.48:1. with Early ED mortality rate of 1.68%.

A similar study done on the rural area of Southwest Nigeria Shows that a total number of 1769 patients attended ED in 2 years, with a crude mortality rate of 5.2%. In South-south of Nigeria, 4,011 patients were seen in the E.D, and death rate was 8.6% within 72 hrs. In Federal IdoEkiti, State, Nigeria; ED visit 3,162, (62.0% males and 38.0%) with a crude mortality rate of 3.9%. In rural Uganda, 10,105 patients 22.8% of deaths occurred in the ED, in Kinshasa University Hospital Congo: a total of 427 patients seen overall mortality was 12.3% (9,23,32). Compared to these studies, TASH ED has high patient flow, low early ED mortality, and proportional male to female death ratio. These could be explained by the fact that TASH's is tertiary referral hospital that accepts and treat patient from all over part of Ethiopia. But it has lower ED visits and high mortality rate when compared to a retrospective study done in Tanzania, which was 77,164, for male 58.0 % and female 42.0 % crude mortality rate of 0.74 %.this could be due to the opening of a full-capacity ED in a tertiary-level hospital in Tanzania which results in significant decrease in hospital mortality. Even though crude death rate was lower compared with some developing countries it still remains higher when compared to developed countries (9). Even if new attention is given to ED of TASH This may call for the need for improvements of care in ED of TASH.

From current result early ED mortality of TASH, consisted Males 266 (52.6%) and female 240 (47.4%). and the male to female ratio was 1.1:1. The total age range was 13-95 with the mean age of 43.5 ±17.33 years. For male 13-95 years with a mean age of 44 yrs. and for female 15-82 years with the mean age of 43 yrs. the age range varies compared to other literatures. This could be due to the age preference of adult scale was different from place to place this can be viewed by the following studies. The age range of rural areas of Southwest Nigeria was 18 to 87 years.

For Male 18 to 87 years with a mean of 54.19 + 20.44 years. The female ranged 18 to 80 years with a mean age of 50.28 + 16.37 years, Edo Ekiti state, Nigeria the age range of death were 15-87 years with a mean of 52.04 + 18.7 years. Male deaths were 76 age range 15 to 87 years with a mean of 51.9 + 19.9 years (24); The a study done in Swiss shows that the mean age was 65.7 years when compared to above literature it is the mean age of TASH was lower this could be explained by more younger population found in Ethiopia and due to differences in cut points used to consider patients as pediatrics and adults in different set ups.

There were different factors that affected early ED mortality, among them mode of transportation to ED had significant effect. According this study most of the patients used taxi for transportation 54% and ambulance utilization was 22.4%. This result was comparable with previous prospective study conducted in Ethiopia which showed that taxi utilization 61.8% and ambulance utilization was 21.9% (7) .This implies a culture of ambulance utilization is still low in our country which may affect the outcome of patients in ED.

Other important factors that affect early ED mortality were triaging score. This study shows among all study subjects 44.3% were triaged as red followed by orange 35.9%. This result is incomparable with study done on Swiss University, which showed 94.3% were triaged as category 1 (rSET), i.e., requiring immediate medical attention (20). This may be due to variation on triaging scale and difference in development of health system between these countries including the triaging practice of heath professionals. on the other hand it is comparable with previous prospective study done in Ethiopia which showed red accounts 39.3% (7), which showed from total number of Early ED visits red accounts less than half of ED death. This could imply less accurate triaging acuity was implemented. This may be due to high turnover of emergency staff and low experience of the triaging system. Other reasons could be high patient flow on ED of TASH.

In previous studies it was revealed that presence of chronic co-morbid disease was found to be a key factor for early ED mortality (6,7,19). Current study was in line with this study, which implied co morbid disease had burden for early ED death when related to single diagnosis. In this study most of the patients were comorbid disease with Cancer 37.5%, cardiac 14.9% and hypertension 8.7%

Previous studies showed cardio vascular disease the most common diagnosis for early ED death. This was Shown by A Case-control study done in Tehran, South-south of Nigeria, Tuanku Fauziah and Tanzania. (22,27),which contradict with the result of this study which showed, in TASH respiratory disease was the most common diagnosis, which account for 32.4% early ED death, followed by septic shock 18.12% and cardiovascular diseases 17.9%. This result also varies when compared with the study done in rural area of Southwest Nigeria, In (A&E) department of Federal Medical Centre Ido Ekiti State, Nigeria, and Lumbini Medical College Teaching Hospital, Stroke was found to be leading cause with 17.4%, 13.1%, and 14.5% respectively(7).This difference could be attributed to the fact that most (37.5%) of patients who has visited the ED had advanced cancer as comorbid disease which may affect respiratory system and also due to different types of respiratory infections.

Besides the result of this study contradict the same setting study done on Ethiopia years back, which shows that Head injury 21.5 % and sepsis 18.8 % were the most common causes of death followed by respiratory failure 15.1 % (7). This difference could be due to the establishment of new trauma center in Addis Ababa, so trauma patients are treated there. Despite of the differences Respiratory disease and sepsis remains significant problem for TASH.

Studies shows, non-communicable diseases were most dominant cause of early ED mortality. In Southwest Nigeria, (A&E) department of Federal Medical Centre Ido Ekiti State, Nigeria, and Lumbini Medical College Teaching Hospital deaths from the non-communicable disease accounts for, 73.9%.80.3% and 91.8% respectively. These agree to the result of current study which showed non-communicable disease accounts for 90 % of the deaths. It is the implication of non-communicable disease remains major burden for ED mortalities in Sub Saharan countries.

For trauma cases studies showed Road traffic accident is major problem among developing countries, In South-south of Nigeria ( 80.3%), In Kenya (41.7%) and Federal Medical Centre Ido Ekiti (13%) (5,27). (33).This finding agrees to the result of this study which shows, for trauma cases the most common cause of mechanism of injury was RTA 43.2% followed by fall down accidents 27.6%., this revealed that that RTA's impact is a major burden for developing countries.

Another factor for early ED death was the site of injury, from previous studies; it was found that head injury was found to be most fatal site of injury. It agrees with the finding of this study which showed TASH Head injury 51.3% and SCI 27% were parts of the body mostly involved among trauma patients. This was comparable with studies done on Lumbini Medical College Teaching Hospital 7.3% and in Saudi Arabia 32.2%(9). This implies RTA was continued to be a series problem of developing countries and not yet resolved.

The result of this study from multiple logistic regression revealed there was strongly association between red category and early ED mortality.Patients who were triaged as Green were 4.2 times more likely to die after 24 hrs of admission.' than patients who triaged as Red. (AOR= .235 95% CI .101, .546). Patients who presented with chief compliant of >1 week duration were 2.1 times more likely to die after 24 hrs of admission.' than who came with chief complaints of 4-24 hrs.' duration (AOR = .471, 95% CI: (.256, .866.). From co morbid diseases HIV patients were 2.7 times more likely to die after 24 hrs.' than Asthmatic patients

Patients who came from A.A were 2.8 times more likely (AOR = 2.776, 95% CI: (1.357, 5.812) and Oromia 3.2 time more likely (AOR = 3.229, 95% CI: (1.581, 6.594) to die after 24 hrs of admission than from others regions of Ethiopia. This could be explained by, as the distance increases, the time for patients to reach to TASH also delays that leads to early ED mortality.

# CHAPTER SEVEN: CONCLUSIONS

In the ED, respiratory disease and sepsis were the most common diagnosis for early death. Related to this, patients with co morbid illness like cancer and cardiac diseases are most commonly associated with early ED mortality. This implies TASH is facing big challenges due to non-communicable disease.

Other important factor for this study was trauma cases, Even if now a day trauma related deaths were reduced in TASH ED, RTA was the most common problem for trauma patients.

Patient's characteristics like low Ambulance utilization and lack of early treatment seeking behaviors were found to be among reasons for complication of cases and leading to early ED mortality in TASH.

Accurate sorting of patients are an important factor for identifying and treating the patients accordingly, but in TASH most of early ED mortalities were not triaged as red, so patients were misplaced for treatment. This showed that there is still a gap in the triaging system.

Even though, TASH implemented different actions to improve quality of care in the ED system, still it is essential to advance the quality of care, to reduce the magnitude of preventable ED mortalities.

# CHAPTER EIGHT: STRENGTH AND LIMITATION OF THE STUDY

## 8.1 Strength of the study

It was 2 years period study and all study subjects were used this makes it representative of early ED mortality.

## 8.2 Limitation of the study

A retrospective study design was conducted due to time constraints. All data were collected from medical record of charts. Since secondary data were used, it was difficult to get clear and consistent clinical data of study subjects, as all information might be not recorded on cards.

Other limitation was the charts were missing from store, for different purpose i.e. for other study or for legal reasons. In some cases from the available charts some data were incomplete recording of documentation.

The other limitation of this study was, it was difficult to compare the results of current study with others literature due to the difference in cut point of early ED death.

## 8.3. Recommendation

### 8.3.1 AAU and TASH

Based on the findings of this study periodic, on-job and pre-service training should be given regarding on Triaging scale. This training should be provided to all types of health caregivers especially nurses.

Regular supportive supervision by experts is also needed to motivate, refresh to all nurses, and to properly provide effective triaging and compressive care.

### 8.3.2 FMOH and communication media

Strengthen ambulance utilization by increasing its availability which includes increasing governmental as well as private ambulance numbers. Monitor quality of ambulance standards. Which include giving timely supportive and continuous measures such as monitoring and evaluation.

Health education must be given to the community by using different communication media to increase Ambulance utilization.

Increasing community awareness about non communicable disease and its preventive measures by using different media that could be accessible to all community is crucial.

### 8.3.3 Transport Minister

There should be strong low enforcement regarding on traffic controlling system to reduce RTA related accidents.

### 8.3.4 Recommendation for further Research

There are gaps identified so further research must be conducted to strengthen findings.it would be valuable if further studies are conducted in prospective manner and also in different hospitals.

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# ANNEX I. ENGLISH VERSION INFORMATION SHEET

**Title**: Assessment of clinical profile and magnitude of early mortality in the adult emergency department of TASH Addis Ababa, Ethiopia.

**Principal investigator**: Hanna Daniel Yosha

**Name of the institution**: Department of Emergency Medicine, College of Health Sciences, Addis Ababa University

**Payment**: there will be payment per charts for card officers but there will be no payment for the family members of studied charts.

**Contact** for additional information
If you need more clarification about this study, you can call or contact the researcher;
Hanna Daniel Mobile: 0911840054
**Email**: danielhana72@yahoo.com

# ANNEX II SEMI STRUCTURED QUESTIONNAIRE

**QUESTIONNAIRE** **MRN_____**

**I. Socio demographic characteristics**

**1. Age in year's** _____sex_____

**2. Address:**

a) Addis Ababa
b) Oromia
c) SNNPR
d) Amhara
e) Tigray
f) Somalia
g) Afar
h) Gambela
i) Other (specify)_____

**II. Baseline Information**

**1. Date of Admission to ED ------/------/-----**

**2. Method of referral**

a) Private hospital
b) Public hospital
c) Private Clinic
d) Health center
e) Self-referral

**3. Mode of transportation**

a) Ambulance
b) Taxi
c) Public transport
d) Others (specify) ----------

**4. Prior ED visits in past 30 days**

a) No ED visits
b) b)1
c) ≥2

**5. Duration of symptoms**

a) <4 hours
b) 4-24 hours
c) 24-48 hours
d) > 48 hours to 1 week
e) > 1 week

**6. Triage category**

a) Red
b) Orange
c) Yellow
d) Green
e) Black

**7. Time of death**

a) Day time
b) Night time

**8. Length of stay in ED before death**

a) On arrival
b) 0-24hrs
c) 24-48hrs
d) 48-72hrs
e) >72hrs

**9. Major diagnosis category**

a) Traumatic -----if go to question number 11
b) non-traumatic

**10. Presence of any chronic disease**

a) Hypertension
b) Diabetic mellitus
c) Known cardiac patient
d) Known cancer patient
e) Others (specify)_____

**11. Mechanism of injury (for trauma)**

a) RTA
b) Assault
c) Gunshot
d) Stab
e) Falls
f) Suicide
g) Others specify_____

**12. Sites of injury**

a) Head injury
b) Chest injury
c) Neck injury
d) Spinal cord injury
e) Upper extremities injury
f) Lower extremities injury
g) Others (specify) _____

**13. Diagnosis of medical causes**

a) Cardiovascular
b) Renal disease
c) Liver disease
d) Infection/sepsis
e) DM and complication
f) Oncologic
g) Other (specify) _____

**14. Any investigation? If performed**

a) no investigation
b) lab investigation
c) imaging
d) both lab and imaging

**15. Immediate causes of death**

a) Respiratory arrest/failure

b) Cardiac arrest

c) MOF

d) Others (specify) _____

**16. Location of death**

a) Red zone

b) Orange zone

c) Yellow and green zone

## ANNEX III ASSURANCE OF PRINCIPAL INVESTIGATOR

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and for the provision of required progress reports as Per terms and conditions of the Research Publications Office in effect at the time of grant is forwarded as the result of this application.

Name of the student: Hanna Daniel

Date _____ Signature _____

Approval of the Advisors

Name of Advisor 1: Achamyelesh Tadele (MSc in EMCCN)

Signature _____ Date _____

Name of the advisor 2: Dr. Sisay Teklu

Signature _____ Date_____