
# WALLAGA UNIVERSITY

## INSTITUTE OF HEALTH SCIENCE

## DEPARTMENT OF PUBLIC HEALTH

# TIME TO DEATH AND PREDICTORS OF MORTALITY AMONG ADULT PATIENTS ADMITTED TO ICU WITH CONGESTIVE HEART FAILURE AT PUBLIC HOSPITALS IN NEKEMTE TOWN, OROMIA, ETHIOPIA

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A RESEARCH PROPOSAL SUBMITTED TO WALLAGA UNIVERSITY, INSTITUTE OF HEALTH SCIENCE, DEPARTMENT OF PUBLIC HEALTH IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE MASTER OF PUBLIC HEALTH IN REPRODUCTIVE HEALTH.

December, 2023

NEKEMTE, ETHIOPIa

**WALLAGA UNIVERSITY SCHOOL OF GRADUATE STUDY INSTITUTE OF HEALTH SCIENCE DEPARTMENT OF PUBLIC HEALTH.**

# TIME TO DEATH AND PREDICTORS OF MORTALITY AMONG ADULT PATIENTS ADMITTED TO ICU WITH CONGESTIVE HEART FAILURE AT PUBLIC HOSPITALS IN NEKEMTE TOWN FROM 2018 TO 2023. OROMIA, ETHIOPIA.

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**A Research Proposal submitted to Wallaga University, Institute of Health Science, Department of Public Health in partial fulfillment of the requirements for the Masters of Public Health In Reproductive Health.**

**December, 2023.**

**Nekemte, Ethiopia**

**APPROVAL SHEET FOR SUBMITTING RESEARCH PROPOSAL**

**Title:** Time to death and predictors of mortality among adult patients admitted with Congestive heart failure to intensive care unit in Nekemte town public hospitals of Oromia, Ethiopia.

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## ACKNOWLEDGEMENT

I would like to thank Wallaga University, Institute of Health Science, and Department of Public Health staff for their efforts in facilitating the student research project time frame.

I would also like to extend my heartfelt gratitude to my advisors for their continuous encouragement and constructive comments for the development of this research proposal.

My gratitude also extends to the ICU staff at Nekemte Comprehensive Specialized Hospital and Wallaga University Referral Hospital for their kind assistance during my preliminary data collecting.

## ABBREVIATIONS AND ACRONYMS

**ACC/AHA** American College of Cardiology / American Heart Association

**ACE** Angiotensin converting enzyme

**ADHERE** Acute decompensated heart failure National Registry

**ADHF** Acute decompensated heart failure

**AF** Atrial fibrillation

**AHF** Acute heart failure

**CHF** Congestive heart disease

**CVD** Cardiovascular diseases

**EF** Ejection fraction

**ESC** European society of cardiology

**HF** Heart failure

**IHD** Ischemic heart disease

**NCSH** Nekemte Comprehensive Specialized Hospital

**NYHA** New York heart association

**RHD** Rheumatic heart disease

**WURH** Wallaga University Referral Hospital

**WHO** World Health Organization

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## SUMMARY

**Introduction**: Congestive heart failure (CHF) is a complex and life-threatening condition characterized by the heart's inability to pump blood effectively. It is a significant cause of morbidity and mortality, particularly among critically ill patients admitted to the intensive care unit (ICU). Congestive heart failure predictions were identified in earlier research without accounting for survival time. To the researcher's knowledge, this is the first study to assess time to death and Predictors of Mortality among Adult Patients Admitted to ICU with Congestive Heart Failure.

**Objective**: To determine time to death and Predictors of mortality among adult patients admitted to ICU with Congestive heart failure at Nekemte Comprehensive Specialized Hospital and Wallaga University Referral Hospital, Oromia, Ethiopia, from July 01 2018 to June 30 2023.

**Methods:** Hospital based retrospective cohort Study will be conducted by reviewing the registration and patient cards from July 01 2018 to June 30 2023 in selected public hospitals in Nekemte town, Ethiopia. Data extraction tool is adapted from previous study conducted at different area. The collected data will be coded and entered into Epidata version 4.6 and then the data exported to STATA version 14 for further analysis. Descriptive statistics will be used to describe the study population by variables in terms of frequencies, tables and graphs. Kaplan Meier survival curve and log rank test will be used to estimate the survival probability. Cox proportional hazards regression model will be used to determine Incidence and predictors among asphyxiated neonate. Hazard Ratios (HR) with 95% confidence intervals will be computed and statistical significance will be declared when it is significant at 5% level (p value < 0.05).

**Work Plan and Budget Required:** The study will cost 31795.5 ETB to complete this study.



**Keywords:** Congestive Heart Failure, Incidence, Predictors of mortality, Time to death.

# 1. INTRODUCTION

## 1.1. Background

Non-Communicable Diseases are the leading cause of death globally, accounting for 71% of 57 million deaths in 2016. Cardiovascular Diseases contribute significantly (44% of all non-communicable diseases)(1). Non-communicable diseases are the primary cause of premature mortality in lower and middle-income countries, accounting for 60% of all deaths(2). Cardiovascular Diseases deaths are predicted to rise by 4% in high-income countries (HICs) between 2020 and 2030, 19% until 2050, and 44% in low-income nations(3).

Congestive heart failure is a chronic condition where the heart's muscles become damaged, causing insufficient blood supply to basic organs, causing it to become a major public health concern(4). Based on the functional capacity, disease progression, and severity of failure, the New York Heart Association (NYHA) has categorized failure into four classes (Class I, II, III, and IV)(5). Coronary artery disease is the primary cause of congestive heart failure, influenced by factors such as high blood pressure, cholesterol, poor diet, sedentary lifestyle, diabetes, smoking, obesity, stress, and certain treatments(6).

Heart failure, a chronic disease affecting around 26 million people globally, has been a significant public health issue for centuries(7). Heart failure is a devastating, resource-intensive syndrome that results in premature mortality, disability, impaired functional capacity, reduced quality of life, and need for multiple pharmacotherapies(8). The mortality of patients with HF is three to four times higher in Africa than in Western countries(9). Sub-Saharan Africa is highly affected by high prevalence of heart disease (HF), causing significant disability, premature death, and economic productivity loss among young economically active individuals(10). It is a significant cause of morbidity and mortality, particularly among critically ill patients admitted to the intensive care unit (ICU). Congestive heart failure predictions were identified in earlier research without accounting for survival time. Hence, this study gives a more encompassing picture of the time to death and Predictors of mortality due to congestive heart failure.

## 1.2. Statement of the problem

Heart failure, the fastest-growing cardiovascular disease, affects 33 million people globally, affecting 26.4% of adults(11). Congestive heart failure is a leading cause of mortality among individuals with poor quality of life and shorter lifespans, expected to increase by 8 million by 2030(12). Global HF incidence data are very limited. Data from Europe and North America reflect an incidence of approximately 2-3 cases/1000 PY(13). Low and middle-income countries had more prevalent heart failure associated death than high-income countries(14). Sub-Saharan Africa, a low-income country, is experiencing an increase in risk factors for heart failure, which is a significant contributor to cardiovascular illness burden(15).

The incidence of congestive heart failure (CHF) is particularly high in the older population, and is primarily determined by age, gender, systolic blood pressure, coronary heart disease, and inflammation(16). The American Heart Association suggests that a rise in respiratory rate may indicate the onset of pulmonary edema, a common and potentially fatal symptom of congestive heart failure(17). Congestive heart failure is a contributing factor in 9% of all fatalities in Ethiopia(18). A study in Ethiopia from 1960 to 2011 found that CHF was responsible for 4-24% of morbidity, 8.9-9.8% of intensive care unit admissions, and 6.5-24% of death(19).

A study at Saint Paul Hospital Millennium Medical College revealed that congestive heart failure accounted for 2.5% of all deaths in all age groups(20). A retrospective study at Tikur Anbassa Teaching Hospital in Addis Ababa, Ethiopia, found that 26.5% of cardiovascular deaths were due to RHD, with 70% of patients dying from congestive heart failure(21).

The risk factors for congestive heart failure have increased due to a lack of understanding in risk factors and management, with previous studies focusing on survival time(22). Identifying factors affecting CHF patient survival is crucial for timely treatment and prolonging their survival(18). Congestive heart failure is a significant public health concern with economic consequences such as chronic illness, job loss, and poverty, exacerbated by inadequate management(23).

Ethiopia's studies on death rates and in-hospital factors have not adequately addressed congestive heart failure time to death and predictors, crucial for improving patient outcomes and saving lives(24). So far, various initiatives have been taken, especially expansion of the ICU, improved staffing and equipment, but the death rate from CHF in the ICU is still high(25).

Ethiopia faces potential risks due to its high prevalence of non-communicable diseases, causing 44% of deaths and 27% premature births before 70, if not addressed(26). SDG 3.4 aims to decrease premature mortality from non-communicable diseases by a third through prevention and treatment in countries(27). The Lancet Commission was established in 2015 to expedite progress in addressing extreme poverty, despite the slow pace of progress made thus far(2). The Ethiopia Non-Communicable Disease and Injuries Commission is tasked with evaluating the burden of NCDI, prioritizing health sector interventions, and estimating cost and fiscal space(28).

To the researcher's knowledge, this is the first study to assess time to death and Predictors of Mortality among Adult Patients Admitted to ICU with Congestive Heart Failure. Therefore, the study will be proposed with the aim of assessing the time to death and Predictors of Mortality among Adult Patients Admitted to ICU with Congestive Heart Failure among adult patients admitted at Nekemte Comprehensive Specialized Hospital and Wallaga University Referral Hospital, Western Ethiopia.

## 1.3. Significance of the study

This study will help in understanding hospitalized CHF patients and identifying the factors that result in poor outcomes. This study will help in describing characteristics, underlying factors, and treatment of CHF patients, who are hospitalized, with an emphasis on those who are at the highest risk, with the aim to identify and close gaps in understanding through the country, but especially in NCSH and WURH.

The assessment of the time to death among adult patients admitted to ICU with CHF and its predictors offers details about variables that affect the clinical outcomes and enables hospital administrators to plan initiatives to improve the treatment and care of CHF patients, which is the ultimate objective of the health care sector.

Moreover, information on the predictors with CHF patient will help physicians in making better decisions and priority setting about CHF and treatment for the patients. The community and patients at most will be benefited by the improvement of the service quality that will be undertaken by the hospital managers. This study will also help researchers as input data for other studies which will be conducted on the related subject matter in the future time.

# 2. LITERATURE REVIEW

## 2.1. Incidence of mortality among Adult patients admitted with Congestive Heart Failure.

The World Health Organization reported that cardiovascular illnesses accounted for 45% of non-communicable deaths in 2015, with 80% occurring in low- and middle-income nations(29). Projections show a rise in non-communicable disease deaths from 59% to 69% by 2030, and cardiovascular disease fatalities from 16.7 million to 23.3 million, with ischemic heart disease leading(30). A 2010 study revealed 37.7 million heart failure cases worldwide, with 68% caused by rheumatic heart disease, COPD, and IHD, with poorer nations more likely to experience HF(29). The Ugandan study Mbarara Heart Failure Registry (MAHFER) 2019 followed 217 individuals for six months, revealing a mortality incidence rate of 3.58 per 1,000 person-days, with 43% dying within six months. Most fatalities occurred in hospitals, with 18% occurring within 48 hours(31).

The mortality rate of HF was 16•5%, with Africa and India having the highest rates (34% and 23%), Southeast Asia having the middle rate (15%), and China, South America, and the Middle East having the lowest rates(32). The composite outcome of death or HF hospitalization at one year was highest in Sudan (59.7%) and lowest in Mozambique (21.1%) among patients(33).

A study in Southern Ethiopia found that ICU patients have a mortality rate of 46.8%, with congestive heart failure contributing to 34 (6.6%)(25). A study in Amhara Regional State, Northwest Ethiopia, found a 29.6% mortality rate among ICU patients, with congestive heart failure contributing to 4.4% of these cases(34).

A study in Addis Ababa revealed that 51% of deaths were non-communicable, with cardiovascular disease being the leading cause (24%)(35). CHF is a contributing factor in 9% of all fatalities in Ethiopia(36). A study in Ethiopia from 1960 to 2011 revealed that chronic hepatitis F (CHF) was responsible for 4-24% of morbidity, 8.9-9.8% of mortality, and 6.5-24% of intensive care unit admission(19). A retrospective study at Saint Paul Hospital Millennium Medical College in Addis Ababa found that 57% of cardiovascular admissions were discharged with improvement, while 10% were discharged with the same condition(20).

The Arbaminch status study revealed that 21.6% of patients died from CHF, with the remaining 78.4% censored(24). A study conducted at Debre Tabor Referral Hospital revealed that out of 271 CHF patients, 20.7% died(37). Surveillance data analysis reveals that congestive heart failure is the third leading cause of cardio-vascular death in Addis Abeba, following hypertension and stroke(38). The Tikur Anbessa specialized hospital found that myocardial infarction, stroke, and high blood pressure account for 75% of heart failure (CHF) deaths in Ethiopia(39).

A hospital-based retrospective cross-sectional study conducted at the Jimma University Medical Center (JUMC), south west Ethiopia, mortality rate among admitted heart failure patients is 21.29%, whereas a majority of them, i.e., 79.91%, were discharged improved(40).

## 2.2. Predictors of mortality among adult patients admitted with Congestive Heart Failure.

### 2.2.1. Socio-demographic related predictors

CHF incidence increased across age groups, from 10.6/1,000 person-years in 65-69 year olds to 42.5/1,000 person-years in 80-year-olds at the initial evaluation(16). From 1979 to 2000, HF incidence in Olmsted County, America was higher in males (378/100,000) and did not decrease over two decades, with lower survival rates in men(41). A study in MMSH, Kano, Nigeria, involving 268 HF patients, revealed a mortality rate of 69% for females and 31% for males(42).

The Cardiovascular Health Study and Multi-Ethnic Atherosclerosis Study reveal a higher lifetime risk for HFrEF in men (10.6% vs. 5.8%), while HFpEF risk remains similar for both sexes(43). A Brazilian study found that the non-survivor group had a significantly older mean age (70.4, 14.2) compared to the survivor group (66.5, 13.8), with a higher proportion of men(44).

A study at Debre Tabor Referral Hospital found that the mean age of CHF patients was 50 years, with a mean weight of 58.10 kg, and a mean LVEF of 51.29, with varying minimum and maximum values(37). A study at Arbaminch General Hospital found that 58.8% of congestive heart failure patients were rural(11).

A retrospective study in Debretabor, Ethiopia, found that out of 285 patients, 67 (23.5%) were male and 26 (9.1%) were female, with rural residents accounting for 66% of the cases(23). The study at Felege Hiwot Comprehensive Specialized Referral Hospital found that 84.99% of patients with congestive heart failure developed issues, with 43.6% being male and 69.4% living in urban areas(45).

### 2.2.2. Clinical related predictors

GBD predicts myocarditis and cardiomyopathy will cause 370,000 fatalities globally in 2020, largely due to variations in diagnostic and coding standards. Geographical geography significantly impacts death rates, with patients discharged after acute heart failure having 20% 1-year mortality rate worldwide, with higher rates in lower-income and middles-income-inequalities nations(13).

A study in Doha, Qatar, involving 12,015 patients, found that death rates were highest in ischemic (27.5%), idiopathic (15.3%), hypertensive (17.5%), Chagas (40.1%), and valve CMPs (24.4%)(46). A study in Italy found that individuals with a history of coronary artery disease, high pulse pressure, heart rate, atrial fibrillation, left ventricular hypertrophy, diabetes, and low vital capacity predicted CHF mortality(47).

A Ghana study revealed common CHF factors among participants, including hypertension (46.5%), previous heart disease (40.7%), excessive alcohol use (38.6%), and family history of heart disease (29.3%), predominantly hypertension (68.3%)(48). From 1991 to 1998, a study in Singapore found that congestive heart failure accounted for 4.5% of hospital admissions and 2.5% of overall mortality in this age group(49).

A Nigerian study found that hypertension, a risk factor for heart failure, was prevalent in 64.3% of patients. Type 2 diabetes mellitus was prevalent in 41 (10.0%). Hypertensive heart failure was the most common cause, with valvular dysfunction and left ventricular dysfunction prevalent in the majority (71.2%)(19). A Nigerian study revealed hypertension as the most common cause of heart failure (43.7%), followed by peripartum cardiomyopathy (38.9%) and idiopathic dilated cardiomyopathy (6.3%)(42).

The study identified prognostic factors significantly related to in-hospital mortality in patients with Chronic Hepatitis F (CHF) including age, race, and various physiological parameters. Multivariate logistic regression analysis was performed to control for confounding effects(50).

A study at Saint Paul Hospital Millennium Medical College in Addis Ababa found that 60% of cardiovascular patients had advanced congestive heart failure, with various underlying causes and precipitating factors(20). A study at Arbaminch General Hospital in Southern Ethiopia found that out of 199 patients with congestive heart failure, 5.3% were New York Heart Association class I patients, and 56.3% had diabetes, chronic renal disease, chronic TB, and anemia(11).

A prospective study at an Ethiopian tertiary care facility found that 48.5% of patients with acute heart failure had chronic rheumatic heart disease as the primary underlying condition. 17.2% died while hospitalized, with smoking, diabetes, pulmonary hypertension, and adverse medication events being predictors(51).

According to a retrospective cross-sectional study carried out at Jimma University Medical College, 57.5% of the patients had never been diagnosed with heart failure. This information was gathered from their medical history and complications related factors. Almost sixty percent of the patients had never before been admitted to the hospital due to heart failure. At the time of admission, nearly half (53.2%) of the patients do not have comorbidities. Ninety-four patients (94%) experienced complications after admission, compared to one hundred forty (55.6%) who had no complications at all(52).

A study at Debre Markos Hospital found a 12.7% all-cause in-hospital death rate and a higher risk of mortality in patients with heart failure with lower ejection fraction, with independent predictors(53). A study at Tikur Anbesa specialized hospital found that CRVHD was the most common ECHO finding in 67 patients (52.3%), followed by DCMP in 14 patients (10.9%). Corpulmonale was found in 10 patients (7.8%) and IHD in 8 patients (6.3%). HHD was found in 4 patients (3.1%), and peripartal cardiomyopathy in 2 patients (1.6%). Most patients were diagnosed and managed for CHF secondary to CRVHD, cardiogenic shock, and corpulmonale(54).

A study at Arbaminch General Hospital in Southern Ethiopia Concerning comorbidities, 56.3% of heart failure patients had diabetes, 35.7% had chronic kidney disease, 37.2 percent were smokers, 43.7 percent had pneumonia, and 59.3% had tuberculosis(24).

The study revealed that the average serum hemoglobin concentration, sodium concentration, and left ventricular ejection fraction of 218 CHF patients treated at Felege Hiwot Comprehensive Specialized Referral Hospital were 13.19, 122.03, and 48.47 respectively(45).

An analysis of a retrospective cohort carried out in Japan Serum sodium levels in people with CHF are associated with an increased risk of short-, medium-, and long-term all-cause mortality; lower serum sodium levels (<137.5 mmol/L) and higher serum sodium levels (≥137.5 mmol/L)(55). A prospective observational study at Tikur Anbessa Specialized Hospital in Addis Ababa, Ethiopia, found that the median age of patients with acute heart failure was 34 years(51).

## 2.3. Conceptual Framework.

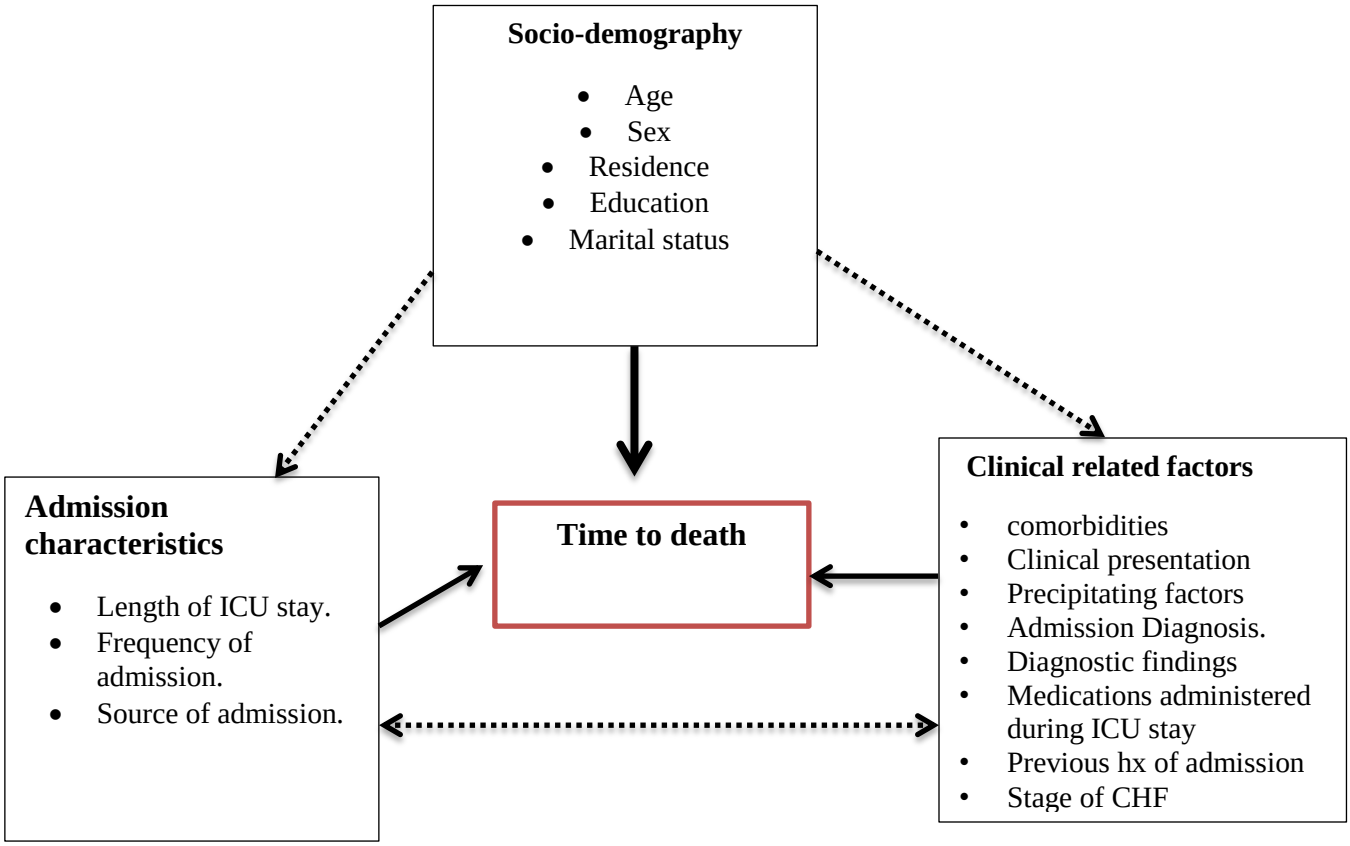


**Figure 1: Conceptual framework for assessing incidence and Predictors of CHF among adults admitted to ICU with CHF patients NCSH and WURH in 2023 (**(16)**,**(56)**,**(57)**,**(25)**,**(24)**,**(47)**,**(50)**).**

**Key**: Solid line indicates variables directly affect DV, **broken lines** indicate IV affect each other.

# 3. OBJECTIVES

## 3.1. General objective

- To assess the time to death and Predictors of mortality among adult patients admitted to ICU with Congestive heart failure at Nekemte Comprehensive Specialized Hospital and Wallaga University Referral Hospital, Oromia, Western Ethiopia, 2023.

## 3.2. Specific objectives

- To assess incidence of mortality among adult patients admitted to ICU with Congestive heart failure at Nekemte Comprehensive Specialized Hospital and Wallaga University Referral Hospital, Oromia, Ethiopia, 2023.
- To estimate the median survival time of adult patients admitted to ICU with Congestive heart failure at Nekemte Comprehensive Specialized Hospital and Wallaga University Referral Hospital, Oromia, Ethiopia, 2023.
- To identify predictors of mortality among adult patients admitted to ICU with Congestive heart failure patients at Nekemte Comprehensive Specialized Hospital and Wallaga University Referral Hospital, West Oromia, Ethiopia, 2023.

# 4. METHODS AND MATERIALS

## 4.1. Study setting and period

The study will be conducted in two public hospitals found in Nekemte town, namely, Nekemte Comprehensive Specialized hospital and Wallaga University Referral Hospital. Nekemte town is found at the western part of Ethiopia at 333KM. Nekemte has a latitude and longitude of 9°5′N 36°33′E and an elevation of 2,088 meters. Total population of the town as 2016 population projection is 145,292 from which 73227 (50.4%) are males and 72065(49.6%) are females. There are different governmental organizations and institutions, one Comprehensive specialized hospital, one teaching and Referral Hospital, one Private primary Hospitals, two governmental Health centers, 1 Regional laboratory, 1 Blood bank, 7 Health Post, five higher clinics, 18 medium clinics, 25 lower clinics, 15 pharmacies, twenty-six drug stores which are serving the community.

Wallaga University Referral Hospital is established in 2016.GC. It serves a catchment population of 3.5 million people. It gives both outpatient and inpatient services in four major departments (Medical, Surgical, paediatrics, obstetric and gynaecological). In addition, it has been giving service in different field of sub-specialities like Orthopaedics, Dermatology, Psychiatric and Ophthalmology departments. The ICU service provision was started in 2016.G.C. Over the last five years, the total ICU admissions for NCSH and WURH were 1395 and 1231 respectively. Out of those 2626 patients admitted to ICU, 235 and 195 were admitted with CHF at NCSH and WURH respectively.

NCSH is one of the Comprehensive specialized hospitals in the Oromia region serving as a referral center for the western part of Ethiopia for about 11 million populations. The ICU service provision was started recently in March 2017 GC. This study will be conducted from January 8-February 8/2024 on patients admitted to ICU of both hospitals from July 01 2018 to June 30 2023.

## 4.2. Study design

Hospital based, Retrospective cohort study design will be carried out from July 01 2018 to June 30 2023.

## 4.3. Source population and study population

### 4.3.1. Source Population

All cases of CHF patients aged ≥18years of adult patients admitted ICU to Nekemte town public hospitals.

### 4.3.2. Study Population

All cases of CHF patients aged ≥18years of adult patients admitted ICU to Nekemte town public hospitals from July 01 2018 to June 30 2023.

### 4.3.3. Study Unit

Randomly selected eligible CHF patients aged ≥18 years of adult patients admitted ICU to Nekemte town public hospitals.

## 4.4. Eligibility criteria

### 4.4.1. Inclusion criteria

All cases of admitted CHF patient aged ≥18 years, treated at ICU in Nekemte town public hospitals, from July 01 2018 to June 30 2023.

### 4.4.2. Exclusion criteria

Those patients who don't have base line data (date of admission, date of discharge and discharge outcome) will be excluded from study.

## 4.5. Sample Size Determination and sampling procedure

### 4.5.1. Sample size determination

STATA version 14 was used to calculate number of event and sample size using ***"stpower logrank 0.5, hratio ( ) power (0.8) wdprob (0.15)"*** **command** by considering HR of different variables from previous studies. Hazard ratio was taken from retrospective follow-up study conducted at Arbaminch General Hospital, Southern Ethiopia(24) and by Considering, Log rank 0.5, Power 80% and withdrawal probability 15% for incomplete data. After sample size and number of event obtained from STATA, probability of event estimated based on number of events and sample size.

**Table 1: Sample Size determination for incidence and predictors of mortality among Adult admitted to ICU with Congestive Heart Failure in public hospitals in Nekemte Town, Western Ethiopia 2023.**

| Variables | HR | CI (95%) | Event | Sample size | Reference |
|---|---|---|---|---|---|
| Sex | 4.027 | | 22 | 36 | (24) |
| Residence | 0.49 | (0.23,1.03) | 68 | 202 | (24) |
| Smoking status | 2.459 | (1.1288-5.3570) | 46 | 80 | (24) |
| CHF stage (III or IV) | 0.54 | (0.47–0.62) | 88 | 256 | " |
| Serum Creatinine at admission | 0.59 | (0.44-0.81) | 120 | 334 | " |

Finally the largest calculated sample size (**334**) was selected as the final sample size for the study to get sufficient sample size.

### 4.5.2. Sampling procedure

There are two Public Hospitals in Nekemte town and both are selected to obtain adequate sample size. Among 430 adult patients admitted ICU by CHF in last five years (from July 2018 to June 2023) in selected hospitals, 334 adult CHF patients will be chosen by simple random sampling technique. The determined sample size will be proportionally allocated for selected hospitals.

The proportional allocation of sample size will be made for each selected health facility by using the following statistical formula:

$$ni = \frac{Ni * n}{N}$$

Where

ni = total sample size in selected hospital

Ni = total number of adult admitted by CHF in selected hospital

n = total sample size determined for study

N= Total Number of adult admitted by CHF in last five years in selected hospitals.

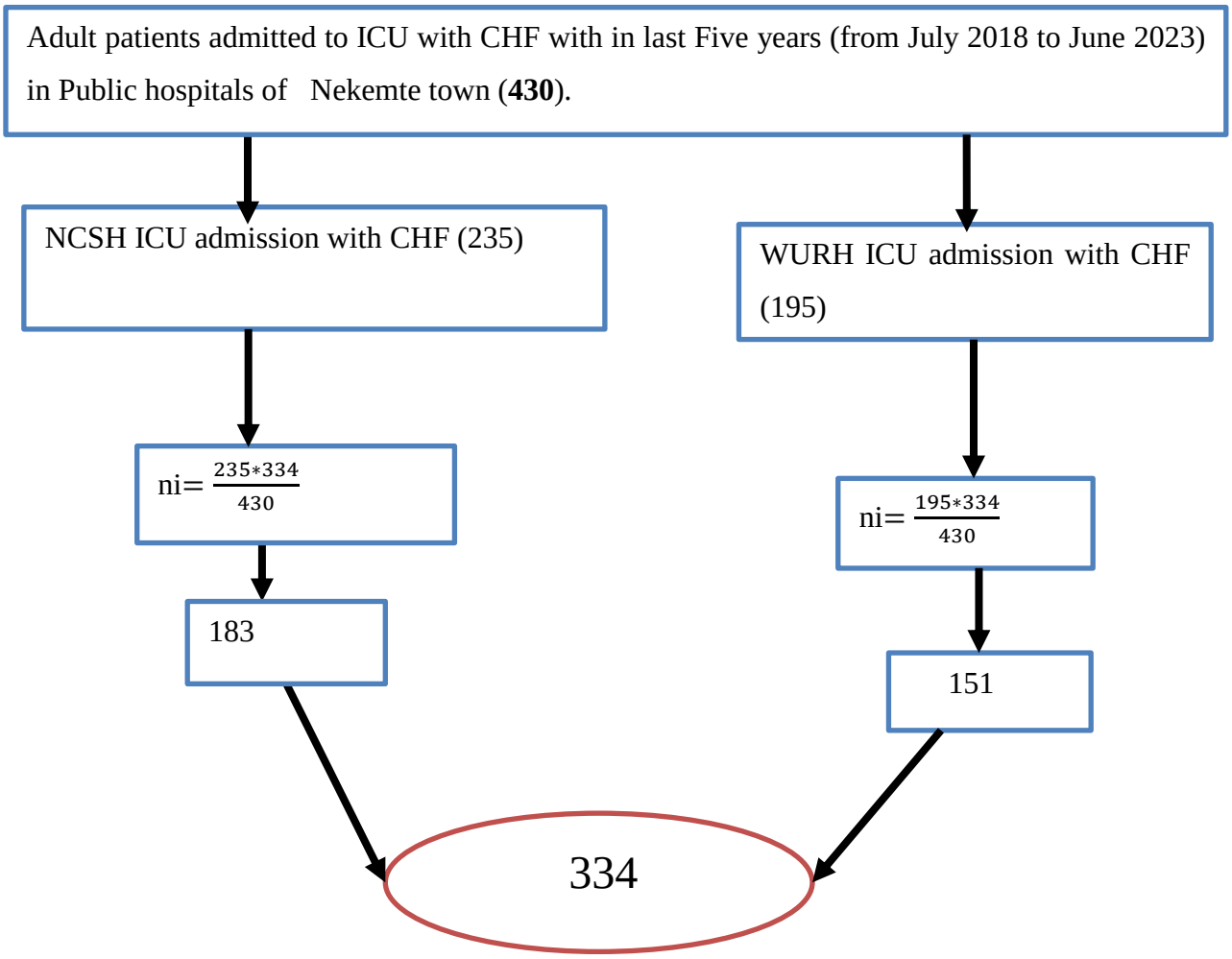


**Figure 2: Sampling procedures for selection of study unit to assess the incidence and predictors of mortality among adults' patients admitted to ICU with CHF in public hospitals of Nekemte town, Western Ethiopia, 2023.**

## 4.6. Data collection tool and procedure

Data extraction tool is adapted from previous study conducted at different area. It has four parts; first part is about Socio-demographic Characteristics, second part is about clinical profile of the patient and third part is about treatment Outcome. It will be pretested on nearby hospital to check its consistency and necessary amendments will be made. It will be collected from registries of patient intake forms and patients' cards would be retrieved from card room using medical record number. Regarding readmitted patients within the study period, I use the most recent information or outcomes. Two MSc Nurse and 2 BSc Nurses will be selected to collect the data from the two Hospitals.

## 4.7. Data quality assurance

The one-day training will be given to data collectors and supervisors on the objective of the study, contents of the checklist, confidentiality, and how to collect data. The pretest on 5% (16) of the sample (334 checklists) will be conducted at Ambo Referral Hospital. To identify the reliability and consistency of the data collection instruments and findings, data collectors and supervisors will discuss the checklist so that the tool will be modified for any inconsistencies and ambiguity before actual data collection. The completeness of data will be checked by the supervisors at the end of each data collection day.

## 4.8. Study variables

### 4.8.1. Dependent variable

- Time to death.

### 4.8.2. Independent variables

- ✓ **Socio-demographic characteristics A**ge (in year), Sex, residence, Marital status, Education.
- ✓ **Clinical related predictors:** Clinical presentation at admission, Lab parameters at admission, ECG and Echocardiography findings, Co-morbidity, Complications Previous diagnosis of CHF, Treatment given.
- ✓ **ECG findings**: rhythm disturbance, QTc prolongation
- ✓ **Echocardiography findings**: left ventricular ejection fraction in percent.
- ✓ **Admission characteristics**: length of stay, Frequency of admission, source of admission, date of admission and date of discharge, patient status at discharge.

## 4.9. Operational definition

- **Congestive Heart failure**: A clinical syndrome with a physician diagnoses of Congestive heart failure among adult patients who were admitted to ICU in Nekemte town public hospitals.
- **Co-morbidity**: it is the presence of one or more additional disorders (diseases) co-occurring with a primary disease or disorder(53).
- **Censored**: defined when participant lost before an event (death) occurs or death not observed within the study period.
- **Death**: referred to the patient that died while he/she is admitted to ICU in Nekemte town public hospitals.
- **Length of stay**: the number of days the patient stayed in hospital from admission until the development of event of interest in ICU in Nekemte town public hospitals.
- **Renal impairment**: a serum creatinine of >1.2 mg/d
- **Preserved EF**: expressed as a percentage of how much blood the left ventricle (LV) pumps out with each contraction (normal ⩾50%) other ways considered as reduction EF(53).
- **Time to event data**: Time from the start of the treatment to the death of CHF adult patients who were admitted to ICU in Nekemte town public hospitals from July 01 2018 to June 30 2023(24).

## 4.10. Data processing and analysis

Data will be checked for their completeness and consistence. Data will be entered into Epi Data version 4.6.0.6 and then exported to STATA version 14 for statistical analysis. Before analysis, data will be cleaned, edited by using simple frequencies and cross tabulation. Re-categorization of categorical variables and categorization of continuous variables will be done to be suitable for analysis. Finally, the outcome of each participant will be dichotomized into died or censored. Incidence rate will calculated for the entire study period, the number of death within the follow up will divided by the total person time at risk on follow up and reported per person day. Day will be used as time scale to calculate median time to death.

Kaplan Meier survival curve will be used for the estimation of survival probability and Log rank test will be used to test for statistical difference of survival probability among the groups. Schoenfeld residuals test for the individual covariates, log-log plot and global tests will be used to assess proportional hazard assumption. Backward stepwise procedures will be employed. The Log-likelihood (LL) value will considered to select the best fit model. Model adequacy will assessed for the variables remained in the multivariate model using Schoenfeld residuals test. Finally Cox Snell residual graph will be used to assess overall model adequacy of proportional hazard model. A Cox proportional hazards regression model will be used to identify factors associated with time to death. Independent variables with P-value $\leq 0.25$ in bi-variable Cox-regression will be candidate variables for multivariable Cox regression analysis. Adjusted Hazard Ratios (AHR) with 95% confidence intervals will computed and statistical significance will considered when it's significant at 5% level (p value $< 0.05$). Finally data will be presented by tables, figures and graph.

## 4.11. Ethical consideration

Ethical clearance will be obtained from the Research Ethical clearance committee of Wallaga University. The letter of cooperation will be written to Nekemte Specialized Hospital and Wallaga University Referral Hospital. Formal permission will be obtained from the Medical director and CEO of both hospitals and data will be extracted from the patient charts.

## 4.12. Dissemination plan

The finding of the study will be presented to Wallaga University, College of Medicine and health sciences, Department of Public health Science. Moreover, summary of the findings will be presented at review meetings or workshops at both hospitals and other regional levels. The study will be published in peer-reviewed int'l journal.

## 4.13. WORK PLAN

Table 2: Work plan for assessment of incidence and its Predictors mortality among adult patients admitted to ICU with CHF at Nekemte town public hospitals, 2023.

| S/N | Research activities | Time in Month | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2023 | | | | | 2024 | | | | |
| | | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
| 1 | Title selection | | | | | | | | | | |
| 2 | Proposal development & discuss with advisers and receive comments | | | | | | | | | | |
| 3 | Final submission for proposal defense | | | | | | | | | | |
| 4 | Proposal defense | | | | | | | | | | |
| 5 | Final proposal submission to the department | | | | | | | | | | |
| 6 | Ethical clearance | | | | | | | | | | |
| 7 | Data collection | | | | | | | | | | |
| 8 | Data entry and analysis, and report writing | | | | | | | | | | |
| 9 | First draft to advisors | | | | | | | | | | |
| 10 | Receive advisors' comments on 1st draft. | | | | | | | | | | |
| 11 | Second draft to advisors | | | | | | | | | | |
| 12 | Receive advisors' comments on second draft | | | | | | | | | | |
| 13 | Thesis submission for Mock defense | | | | | | | | | | |
| 14 | Mock defense | | | | | | | | | | |
| 15 | Final thesis submission for final defense | | | | | | | | | | |
| 16 | Final thesis defense | | | | | | | | | | |

## 4.14. BUDGET REQUIRED

**Table 3: Budget required for conducting research to determine incidence and its predictors among adult admitted patients to ICU with CHF at public hospitals at Nekemte town in 2023.**

| S/N | Budget category | Unit | Unit cost | Quantity | Total Cost |
|---|---|---|---|---|---|
| I | **PERSONNEL** | | | | |
| 1 | Supervisors | Personnel | 150 | 150x2x15 | 4,500 |
| 2 | Data collectors | Questionnaire | 50 birr. | 50x334 | 16,700 |
| 3 | Training | Personnel | 150 | 150X6 X 1days | 900 |
| | **Subtotal** | | | | **22,100** |
| II | **MATERIALS** | | | | |
| 4 | Duplication paper | Pack | 800 | 3 x5 x334 | 5010 |
| 5 | Bindings | Each | 80 | 80x4 | 320.00 |
| 6 | Pencils | Each | 15 | 15x5 | 75.00 |
| 7 | Transport cost and per-diem | Days | 350 | 350x4 | 1400 |
| | **SUB TOTAL** | | | | **6805** |
| **8** | **TOTAL** | | | | **28905** |
| 9 | **CONTINGENCY** | | | 10% | **2890.5** |
| | **GRAND TOTAL** | | | | **31795.5** |

## 5. Reference


1. Kwan GF, Bukhman AK, Miller AC, Ngoga G, Mucumbitsi J, Bavuma C, et al. A simplified echocardiographic strategy for heart failure diagnosis and management within an integrated noncommunicable disease clinic at district hospital level for sub-saharan africa. JACC Hear Fail. 2013;1(3):230–6.
2. Memirie ST, Dagnaw WW, Habtemariam MK, Bekele A, Yadeta D, Bekele A, et al. Addressing the Impact of Noncommunicable Diseases and Injuries (NCDIs) in Ethiopia: Findings and Recommendations from the Ethiopia NCDI Commission. Ethiop J Health Sci. 2022;32(1):161–80.
3. Sleeman KE, de Brito M, Etkind S, Nkhoma K, Guo P, Higginson IJ, et al. The escalating global burden of serious health-related suffering: projections to 2060 by world regions, age groups, and health conditions. Lancet Glob Heal [Internet]. 2019;7(7):e883–92. Available from: http://dx.doi.org/10.1016/S2214-109X(19)30172-X
4. Events C. The Incidence of Congestive Heart Failure in Type 2 Diabetes An update. 2004;27(8).
5. Bredy C, Ministeri M, Kempny A, Alonso-Gonzalez R, Swan L, Uebing A, et al. New York Heart Association (NYHA) classification in adults with congenital heart disease: Relation to objective measures of exercise and outcome. Eur Hear J - Qual Care Clin Outcomes. 2018;4(1):51–8.
6. Congestive AM, Failure H, Sheets F, Medicine Y. Congestive Heart Failure ( CHF ) What makes Yale Medicine ’ s approach to treating congestive heart failure unique ? :8–9.
7. WHO. Non-communicable diseases Progress Monitor 2022 [Internet]. World Health. 2022. 233 p. Available from: https://www.who.int/publications/i/item/9789240047761
8. Martinez-Amezcua P, Haque W, Khera R, Kanaya AM, Sattar N, Lam CSP, et al. The Upcoming Epidemic of Heart Failure in South Asia. Circ Hear Fail. 2020;13(10):E007218.
9. Dokainish H, Teo K, Zhu J, Roy A, AlHabib KF, ElSayed A, et al. Global mortality variations in patients with heart failure: results from the International Congestive Heart Failure (INTER-CHF) prospective cohort study. Lancet Glob Heal. 2017;5(7):e665–72.
10. Gallagher J, McDonald K, Ledwidge M, Watson CJ. Heart Failure in Sub-Saharan Africa.

Card Fail Rev. 2018;4(1):1.

11. Anjullo BB, Kumaso SK, Erango MA. Joint modeling of longitudinal change in pulse rate and survival time of heart failure patients treated at Arbaminch General Hospital, Southern Ethiopia. PLoS One [Internet]. 2023;18(3 March):1–14. Available from: http://dx.doi.org/10.1371/journal.pone.0282637
12. Seid MA. Health-related quality of life and extent of self-care practice among heart failure patients in Ethiopia. Health Qual Life Outcomes. 2020;18(1):1–7.
13. Yan T, Zhu S, Yin X, Xie C, Xue J, Zhu M, et al. Burden, Trends, and Inequalities of Heart Failure Globally, 1990 to 2019: A Secondary Analysis Based on the Global Burden of Disease 2019 Study. J Am Heart Assoc. 2023;12(6).
14. Kitzman DW, Brubaker P, Morgan T, Haykowsky M, Hundley G, Kraus WE, et al. Effect of caloric restriction or aerobic exercise training on peak oxygen consumption and quality of life in obese older patients with heart failure with preserved ejection fraction: A randomized clinical trial. JAMA - J Am Med Assoc. 2016;315(1):36–46.
15. Tefera Y, Abebe T, Abegaz T, Ab M. The Changing Trend of Cardiovascular Disease And Its Clinical Characteristics In Ethiopia:Hospital-Based Observational Study. Value Heal. 2017;20(9):A602.
16. Gottdiener JS, Arnold AM, Aurigemma GP, Polak JF, Tracy RP, Kitzman DW, et al. Predictors of congestive heart failure in the elderly: The cardiovascular health study. J Am Coll Cardiol [Internet]. 2000;35(6):1628–37. Available from: http://dx.doi.org/10.1016/S0735-1097(00)00582-9
17. Baltimore RS, Gewitz M, Baddour LM, Beerman LB, Jackson MA, Lockhart PB, et al. Infective endocarditis in childhood: 2015 update: A scientific statement from the American Heart Association. Circulation. 2015;132(15):1487–515.
18. Tefera Belachew JB. Predictors of Adherence to Self-care Behaviour among Patients with Chronic Heart Failure Attending Jimma University Specialized Hospital Chronic Follow up Clinic, South West Ethiopia. J Cardiovasc Dis Diagnosis. 2014;02(06).
19. Ogah OS. Title A study of the contemporary profile, clinical outcomes and economic burden of acute heart failure in Abeokuta, Nigeria.
20. Id MDM, Benti H. Assessment of magnitude and spectrum of cardiovascular disease

admissions and outcomes in Saint Paul Hospital Millennium Medical College , Addis Ababa : A retrospective study. 2022;(70):1–14. Available from: http://dx.doi.org/10.1371/journal.pone.0267527

21. Hunt SA, Abraham WT, Chin MH, Feldman AM, Francis GS, Ganiats TG, et al. ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult. Circulation. 2005;112(12):154–235.
22. Husain MI, Chaudhry IB, Husain MO, Abrol E, Junejo S, Saghir T, et al. Depression and congestive heart failure: A large prospective cohort study from Pakistan. J Psychosom Res [Internet]. 2019;120:46–52. Available from: https://www.sciencedirect.com/science/article/pii/S0022399918309917
23. Moyehodie YA, Muluneh MW, Belay AT, Fenta SM. Time to Death and Its Determinant Factors Among Patients With Chronic Heart Failure in Northwest Ethiopia: A Retrospective Study at Selected Referral Hospitals. Front Cardiovasc Med. 2022;9(May):1–9.
24. Kumaso SK, Erango MA, Anjullo BB. Survival Rate Analysis of Heart Failure Patients at Arbaminch General Hospital, Southern Ethiopia, 2022. Am J Med Sci Innov. 2023;2(1):4–12.
25. Abate SM, Assen S, Yinges M, Basu B. Survival and predictors of mortality among patients admitted to the intensive care units in southern Ethiopia: A multi-center cohort study. Ann Med Surg [Internet]. 2021;65(April):102318. Available from: https://doi.org/10.1016/j.amsu.2021.102318
26. Shiferaw F, Letebo M, Misganaw A, Feleke Y, Gelibo T, Getachew T, et al. Non-communicable Diseases in Ethiopia: Disease burden, gaps in health care delivery and strategic directions. Ethiop J Heal Dev. 2018;32(3).
27. The-Sustainable-Development-Goals-Report-2023.pdf.
28. Solomon TM, Memirie ST, Dagnaw WW, Kifle M, Bekele A, Yadeta D, et al. Addressing the Impact of Noncommunicable Diseases and Injuries ( NCDIs ) in Ethiopia : Findings and Recommendations from the Ethiopia NCDI Commission. 2022;
29. No Title.
30. Mathers CD, Loncar D. Projections of Global Mortality and Burden of Disease from 2002

to 2030. 2015;3(11).

31. Abeya FC, Amanee B, Lumori E, Akello SJ, Brian H, Buda AJ, et al. HHS Public Access. 2019;113–7.
32. Dokainish H, Teo K, Zhu J, Roy A, Alhabib KF, Elsayed A, et al. Articles Global mortality variations in patients with heart failure : results from the International Congestive Heart Failure ( INTER-CHF ) prospective cohort study. 2017;665–72.
33. Karaye KM, Dokainish H, Elsayed A, Mondo C, Damasceno A, Sliwa K, et al. Clinical Profiles and Outcomes of Heart Failure in Five African Countries : Results from INTER-CHF Study. 2021;16(1):1–13.
34. Demass TB, Guadie AG, Mengistu TB, Belay ZA, Melese AA, Berneh AA, et al. The magnitude of mortality and its predictors among adult patients admitted to the Intensive care unit in Amhara Regional State, Northwest Ethiopia. Sci Rep [Internet]. 2023;13(1):1–7. Available from: https://doi.org/10.1038/s41598-023-39190-7
35. Misganaw A, Melaku YA, Tessema GA, Deribew A, Deribe K, Abera SF, et al. National disability-adjusted life years (DALYs) for 257 diseases and injuries in Ethiopia, 1990-2015: Findings from the global burden of disease study 2015. Popul Health Metr. 2017;15(1):1–16.
36. Getachew A, Assefa T, Negash W. Self-care behavior and associated factors among patients with heart failure in public hospitals of Southeast Ethiopia. J Int Med Res. 2022;50(8).
37. Belay AT, Belay DB, Gebremichael SG, Agegn SB. Congestive Heart Failure Patients' Pulse Rate Progression and Time to Death at Debre Tabor Referral Hospital, Ethiopia. Adv Public Heal. 2021;2021.
38. Misganaw Dr. A, Mariam DH, Ali A, Araya T. Epidemiology of major non-communicable diseases in Ethiopia: A systematic review. J Heal Popul Nutr. 2014;32(1):1–13.
39. Amare H, Hamza L, Asefa H. Malnutrition and associated factors among heart failure patients on follow up at Jimma university specialized hospital, Ethiopia. BMC Cardiovasc Disord [Internet]. 2015;15(1):1–6. Available from: http://dx.doi.org/10.1186/s12872-015-0111-4

40. Meshesha MD, Kabthymer RH, Abafogi MM. Mortality and Its Associated Factors among Hospitalized Heart Failure Patients : The Case of South West Ethiopia. 2021;2021.
41. Enjuanes C, Moliner P, Ruiz S. Real world heart failure epidemiology and outcome : A population-based analysis of 88 , 195 patients. 2017;1–13.
42. Hadiza S, Abdullahi U, Yau JA. Heart Failure Admissions in Medical Wards ofa Nigerian Tertiary Hospital. IOSR J Dent Med Sci e-ISSN [Internet]. 2017;16(10):63–6. Available from: www.iosrjournals.org
43. Rapsomaniki E, Timmis A, George J, Pujades-Rodriguez M, Shah AD, Denaxas S, et al. Blood pressure and incidence of twelve cardiovascular diseases: Lifetime risks, healthy life-years lost, and age-specific associations in 1·25 million people. Lancet. 2014;383(9932):1899–911.
44. Poffo MR, Assis AV de, Fracasso M, Londero Filho OM, Alves SM de M, Bald AP, et al. Profile of Patients Hospitalized for Heart Failure in Tertiary Care Hospital. Int J Cardiovasc Sci. 2017;30(3):189–98.
45. Hussen NM, Workie DL, Biresaw HB. Survival time to complications of congestive heart failure patients at Felege Hiwot comprehensive specialized referral hospital, Bahir Dar, Ethiopia. PLoS One [Internet]. 2022;17(10 October):1–14. Available from: http://dx.doi.org/10.1371/journal.pone.0276440
46. Mansur ADP, Del Carlo CH, Ramos Neto JA, Abreu AB, Scipioni AR, Pereira-Barreto AC. Mortality and predictors of death in women and men with congestive heart failure of different types of cardiomyopathies. Eur Heart J. 2022;43(Supplement_2):2022.
47. Mazza A, Tikhonoff V, Casiglia E, Pessina AC. Predictors of congestive heart failure mortality in elderly people from the general population. Int Heart J. 2005;46(3):419–31.
48. Agyekum F, Folson AA, Asare BYA, Doku A, Kpodonu J, Okine R, et al. Contemporary aetiology of acute heart failure in a teaching hospital in Ghana. BMC Cardiovasc Disord [Internet]. 2023;23(1):1–8. Available from: https://doi.org/10.1186/s12872-023-03103-3
49. Ng TP, Niti M. Trends and ethnic differences in hospital admissions and mortality for congestive heart failure in the elderly in Singapore, 1991 to 1998. Heart. 2003;89(8):865–70.
50. Han D, Xu F, Zhang L, Yang R, Zheng S, Huang T, et al. Early prediction of in-hospital

mortality in patients with congestive heart failure in intensive care unit: a retrospective observational cohort study. BMJ Open. 2022;12(7):1–11.

51. Tirfe M, Nedi T, Mekonnen D, Berha AB. Treatment outcome and its predictors among patients of acute heart failure at a tertiary care hospital in Ethiopia: A prospective observational study. BMC Cardiovasc Disord. 2020;20(1):1–10.
52. Among AF, Hospitalized P, Heart W, At F. INSTITUTE OF HEALTH , FACULTY OF MEDICINE ,.
53. Kebe B, Getachew M, Molla Y, Bahiru B, Dessie B. Management, survival, and predictors of mortality among hospitalized heart failure patients at Debre Markos comprehensive specialized hospital, Northwest Ethiopia: Prospective cohort study. SAGE Open Med. 2021;9.
54. PATTERN OF CONGESTIVE HEART FAILURE AT ADULT EMERGENCY. 2014;1–23.
55. Peng S, Peng J, Yang L, Ke W. Relationship between serum sodium levels and all-cause mortality in congestive heart failure patients: A retrospective cohort study based on the Mimic-III database. Front Cardiovasc Med. 2023;9.
56. Tefera GM, Feyisa BB, Umeta GT, Kebede TM. Predictors of prolonged length of hospital stay and in-hospital mortality among adult patients admitted at the surgical ward of Jimma University medical center, Ethiopia: Prospective observational study. J Pharm Policy Pract. 2020;13(1):1–11.
57. Sosin MD, Davis RC, Lip GYH, Baldasseroni S, Maggioni A Pietro. Mortality in congestive heart failure complicated by atrial fibrillation [3] (multiple letters). Eur Heart J. 2004;25(1):97–8.

# 6. Appendix

**Information sheet form**

**Annex I: - Information Sheet**

**Title of the study:** Time to death and predictors of mortality among adult patients admitted with Congestive heart failure to intensive care unit in Nekemte town public hospitals of Oromia, Ethiopia from July 01 2018 to June 30 2023.

**Name of Investigator**: Alebachew Regasa Bekuma (BSc.)

**Name of the Organization**: Wallaga University

This information sheet is prepared for data collection from ICU of Nekemte town public Hospitals located in Oromia regional state. The aim of the form is to make clarity on purpose of research and data collection procedures to the above concerned offices and get permission to conduct data collection.

**Purpose of the Research Project**: To assess the Time to death and predictors of mortality among adult patients admitted with Congestive heart failure to intensive care unit in Nekemte town public hospitals of Oromia, Ethiopia.

**Procedure**: In order to conduct the study and achieve the above objective, necessary information will be obtained from medical charts of adult patients admitted with CHF to ICU.

**Risk and/or Discomfort:** Since the information needed will be obtained from the medical charts, it will not cause any harm to the participant. Any identification of the participant including the name will not be recorded on the questionnaire. And all information obtained from the charts will be kept secretly. Moreover, the information will only be used for the purpose of the study.

**Benefit:** The study will not have direct benefit for the participants. But identifying the predictors will help program planers to plan accordingly and improve prevention and treatment adult patients' mortality and morbidity with congestive heart failure.

**If you have any question please contact the principal investigator(s):**

Contact **information**: Alebachew Regasa, phone+2519365482,
gmail:abdiregasa250@gmail.com

**Data collection date** _____/_____/_____

**Name of data collector _____signature_____**

**Name of supervisor _____signature_____**

| S/No. | Questions | Response | Skip | Code |
|---|---|---|---|---|
| Medical record number_____ Code _____ | | | | |
| **PART-I Socio- demographic characteristics** | | | | |
| 101 | Name of Hospital | 1. NCSH 2. WURH | | |
| 102 | Gender | 1. Male 2. Female | | |
| 103 | Age | _____ years | | |
| 104 | Residence | 1. Urban 2. Rural | | |
| 105 | Marital status | 1. Married 2. Single 3. Divorced 4. Widowed | | |
| 106 | Educational status | 1. No formal education<br>2. Primary school<br>3. Secondary school<br>4. Higher education | | |
| 107 | Date of admission | Date ____ month ____ year _____ | | |
| **Part II : Clinical Characteristics at Admission** | | | | |
| 201 | Symptoms at presentation (>1 answer allowed) | 1. Dyspnea<br>2. Orthopnea<br>3. PND<br>4. Fatigue<br>5. Chest pain<br>6. Body swelling<br>7. Altered mental status<br>8. Cough<br>9. Other(specify) | | |
| 202 | Duration of symptoms prior to admission | _____(days) | | |
| 203 | Signs of congestion at presentation (>1 answer allowed) | 1. None<br>2. SOB | | |

| | | | | |
|---|---|---|---|---|
| | | 3. Peripheral edema<br>4. Ascites<br>5. Hepatomegaly<br>6. Persistent cough | | |
| 204 | Stages of HF | 1. I 2. II<br>3. III 4. IV | | |
| 205 | Precipitating factors at admission | 1. ACS<br>2. Arrhythmia<br>3. Pneumonia (present, absent)<br>4. Anemia<br>5. Infective Endocarditic(SBE)<br>6. HTN<br>7. UTI<br>8. Not identified | | |
| | **Laboratory values** | | | |
| 206 | Hemoglobin level(g/dl) | _____ | | |
| 207 | WBC count(per µl) | _____ | | |
| 208 | Serum creatinine (mg/dl) | _____ | | |
| 209 | Serum BUN(mg/dl) | _____ | | |
| 210 | Serum sodium level(meq/l) | _____ | | |
| 211 | Serum potassium(meq/l) | _____ | | |
| **ECG Finding** | | | | |
| 301 | ECG present? | 1. Yes 2. No | | |
| 302 | What type of rhythm disturbance? | 1) Normal<br>2) Acute coronary syndrome<br>3) Atrial fibrillation<br>4) Bradycardia<br>5) Sinus tachycardia<br>6) Ventricular<br>7) Fibrillation | | |

| | | | | |
|---|---|---|---|---|
| | | 8) Ventricular tachycardia | | |
| | **Echocardiography finding** | | | |
| 303 | **Echo finding** | 1. Rheumatic heart disease<br>2. Hypertensive heart disease/ left ventricular Hypertrophy<br>3. Ischemic heart disease<br>4. Pericardial effusion<br>5. Cor pulmonale<br>6. Left ventricular ejection fraction ____ (%)<br>7. Not done | | |
| | **Previous History of Heart Failure** | | | |
| 304 | Previous diagnosis of HF? | 1. Yes 2. No | If 2 skip to Q701 | |
| 305 | Time since diagnosis of HF | _____ years | | |
| 306 | Any history of Hospitalization for Heart Failure | 1. None<br>2. One Hospitalization<br>3. >1 Hospitalizations<br>4. No Mention of Hospitalizations | | |
| | **Co-morbidity and Complications** | | | |
| 307 | Comorbidities identified | 1. None 2. Hypertension 3. DM 4. COPD 5. CKD 6. Thyrotoxicosis 7. Stroke/TIA 8. TB 9. others (specify) | | |
| 308 | Complications diagnosed at admission time | 1. None 2. VTE 3. Pneumonia 4. Stroke/TIA 5. AKI 6. Other, specify | | |
| 309 | Complications which developed after admission | 1. None 2. AKI 3. Pneumonia 4. VTE 5. Stroke/TIA 6. Other, specify | | |

| | | | | |
|---|---|---|---|---|
| | **Medication administered** | | | |
| 310 | Medication | 1. Diuretics<br>2. ACE/ARBs.<br>3. Beta-Blockers<br>4. Aldosterone Antagonists<br>5. Ventilatory support<br>6. Digoxin<br>7. Other(specify)_____ | | |
| | **Part III: Treatment Outcome of the patients** | | | |
| 401 | Patient status at discharge | 1. Improved 2. Death 3. Referred<br>4. Default 5. Self-discharge | | |
| 402 | Date of discharge (time of event occur) | _____ DD/MM/Y | | |
| 403 | Frequency of admission. | 1. New admission 2. Re-admission | | |