



WOLKITE UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF INTERNAL MEDICINE

**SPECTRUM OF CARDIOVASCULAR DISEASE ADMISSIONS,
OUTCOME, AND ASSOCIATED FACTORS IN WOLKITE UNIVERSITY
COMPREHENSIVE SPECIALIZED HOSPITAL, CENTRAL ETHIOPIA:
RETROSPECTIVE STUDY**

Dr. Tarekegn Murezha

INTERNAL MEDICINE SPECIALITY THESIS

WOLKITE ETHIOPIA

FEBRUARY, 2026

Wolkite University
College of Medicine and Health Sciences
Department of Internal Medicine

**Spectrum of Cardiovascular Disease Admissions, Outcome, and Associated
Factors in Wolkite University Comprehensive Specialized Hospital, Central
Ethiopia: Retrospective Study**

Investigator: Dr. Tarekegn Murezha (MD, Internal Medicine Resident)

Advisors:

- 1. Mr. Ibrahim Muktar (Assistant Professor of GPH)**
- 2. Dr. Abeba Yeshitla (MD, Ass't Prof. Of Internal Medicine)**

**A Thesis to Be Submitted to Wolkite University, College of Medicine and
Health Sciences, Internal Medicine Department, In Partial Fulfillment of The
Requirements for The Specialty Certificate Program in Internal Medicine**

Wolkite Ethiopia

February, 2026

APPROVAL SHEET

We hereby certify that we have read and evaluated this Thesis titled "**Spectrum Of Cardiovascular Disease Admissions, Outcome, And Associated Factors In Wolkite University Comprehensive Specialized Hospital, Central Ethiopia: Retrospective Study**" prepared under our guidance by **Dr. Tarekegn Murezha**. We recommend that the Thesis shall be submitted as fulfilling the requirements for the award of **Certificate of Specialty in Internal Medicine**.

Ibrahim Muktar (Asst.Prof. of GPH)



06/02/2026

As members of the Board of Examiners of the Certificate of Specialty in Internal Medicine Thesis open defence examination, we have read and evaluated this thesis prepared by **Dr. Tarekegn Murezha**, and examined the candidate. We hereby certify that the thesis is accepted in fulfillment of the requirements for the award of the **Certificate of Specialty in Internal Medicine**.

Mr. Andamalk Dendir (MPH, Asst.Prof)



25/02/2026

1. Internal Examiner 1

Signature

Date

Dr. Hayatu Awol (MD, Asst.Prof)



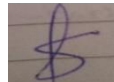
25/02/2026

2. Internal Examiner 2

Signature

Date

Dr. Meskele Bireda (MD, Asst.Prof)



25/02/2026

3. Internal Medicine Department Head

Signature

Date

4. Chairman SGC

Signature

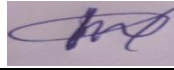
Date

DECLARATION

By my signature below, I declare and affirm that this thesis is my own work. I have followed all ethical principles in the preparation, data collection, data analysis, and completion of this thesis. All sources of information and ideas that are included in the thesis have been given recognition through citation. I further declare that this work has not been submitted to any other university or institution for the award of any degree or diploma.

Name: Dr. Tarekegn Murezha

Signature:



Date: 05/02/2026 G.C

ACKNOWLEDGMENTS

I would like to express my deepest gratitude to Wolkite University College of Health Sciences, Department of Internal Medicine, for allocating the budget and giving me the chance. I would also like to express my respect to my advisor, Mr. Ibrahim Muktar, and Dr. Abeba Yeshitla, for their invaluable comments throughout the development of the proposal and thesis, and for their interest and readiness to help me until the end of the study.

ACRONYMS

ACSH	Ayder Comprehensive Specialized Hospital
BP	Blood pressure
CVD	Cardiovascular disease
DVT	Deep venous treatment
GBD	Global burden of disease
HFpEF	Heart failure with preserved ejection fraction
HHD	Hypertensive heart disease
ICU	Intensive care unit
IHD	Ischemic heart disease
IE	Infective endocarditis
LMICs:	Low- and middle-income countries
NCD	Non-communicable disease
PE	Pulmonary embolism
HOHF	High-output heart failure
WKUCSH	Wolkite University Comprehensive Specialized Hospital

Contents

APPROVAL SHEET	iii
DECLARATION	iv
ACKNOWLEDGMENTS	v
ACRONYMS	vi
List of Tables	ix
List of Figures	ix
Abstract	x
1. INTRODUCTION	1
1.1 Background	1
1.2 Statement of the problem	2
1.3 Significance of the study	3
2. LITERATURE REVIEW	4
2.1 Conceptual framework	8
.....	8
3. OBJECTIVES OF THE STUDY	9
3.1 General objectives	9
3.2 Specific objectives.....	9
4. METHODS	10
4.1 Study setting and Period.....	10
4.2 Study Design	10
4.3 Study population	10
4.4 Sampling technique and procedure	11
4.5 Sample Size determination.....	11

4.6 Inclusion and Exclusion criteria.....	13
4.7 Study Variables	15
4.8 Operational definitions	15
4.9 Data collection procedure and tool.....	16
4.10 Data Quality Control	17
4.11 Data analysis	17
4.10. Ethical considerations	17
4.11 Dissemination Plan.....	17
5 RESULTS AND DISCUSSION	18
5.1 Results	18
5.1.1 Sociodemographic characteristics of the study population.....	18
5.1.2 Spectrum of cardiovascular diseases	20
5.1.3 Co-morbidities and cardiovascular disease risk factors.....	21
5.1.4 Treatment Outcomes and Causes of Death.....	21
5.1.5 Factors Associated with Treatment Outcomes	23
5.2 Discussion	26
5.2.1 Strengths of the Study.....	29
5.2.2 Limitations	29
6. CONCLUSIONS AND RECOMMENDATIONS	30
6. 1 Conclusions	30
6. 2 Recommendations	30
7. REFERENCE.....	31
8. ANNEX.....	34

List of Tables

Table 1; The sample size determination by using two population proportion formulas from significantly associated factors with outcomes of cardiovascular disease from a previous study (23).....	12
Table 2: Socio-Demographic characteristics among cardiovascular disease admissions at Wolkite University Comprehensive Specialized Hospital, Gurage Zone, Central Ethiopia, 2022 -2025..	19
Table 3: CVD co-morbidities and risk factors among cardiovascular disease admissions at Wolkite University Comprehensive Specialized Hospital, Gurage Zone, Central Ethiopia, 2022 -2025..	21
Table 4: Cause of death among cardiovascular disease admissions at Wolkite University Comprehensive Specialized Hospital, Gurage Zone, Central Ethiopia, 2022 -2025.....	22
Table 5: Factors associated with treatment outcomes among cardiovascular disease admissions at Wolkite University Comprehensive Specialized Hospital, Gurage Zone, Central Ethiopia, 2022 -2025.....	24

List of Figures

Figure 1: Conceptual Framework of the assessment of clinical spectrum, determinants, and in-hospital outcomes of cardiovascular disease admissions.....	8
Figure 2: Flow chart showing selection of study participants	14
Figure 3: Spectrum of cardiovascular disease at Wolkite University Comprehensive Specialized Hospital, Gurage Zone, Central Ethiopia, 2022 -2025	20
Figure 4: Outcome of admission among cardiovascular disease at Wolkite University Comprehensive Specialized Hospital, Gurage Zone, Central Ethiopia, 2022 -2025.....	23

Abstract

Background: Cardiovascular diseases are the leading cause of death globally, with approximately 80% of these deaths occurring in low- and middle-income countries, including Ethiopia. Despite this growing burden, there is a significant lack of localized data on the clinical profile, outcomes, and associated factors of cardiovascular disease admissions in many regions of the country, including the study area. This study seeks to fill that gap by providing crucial evidence from a tertiary care setting.

Objective: To assess the clinical spectrum, admission outcomes, and determinants among patients admitted with cardiovascular diseases at Wolkite University Comprehensive Specialized Hospital.

Methods: An institution-based retrospective cross-sectional study was conducted among 357 cardiac patients admitted to Wolkite University Comprehensive Specialized Hospital from September 1, 2022, to September 1, 2025. A systematic random sampling method was applied, and all eligible medical records were reviewed from this period. Data on types of cardiovascular diseases, clinical presentation, diagnostic results (including echocardiography), treatment, and in-hospital outcomes were collected using a pre-tested, structured data extraction checklist. Data were entered into Epi-Data version 4.6 and then exported to SPSS version 27 for statistical analysis. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize the burden and spectrum of cardiovascular disease. Bivariate analyses and multivariable logistic regression were used to identify factors associated with admission outcomes. A p-value of less than 0.05 at 95% CI was considered statistically significant.

Results: A total of 357 cardiovascular disease admissions were included in the analysis. The most common cardiovascular diagnoses were Stroke, heart failure, and ischemic heart disease. The overall in-hospital mortality rate was 10.9%. Among the independent factors, hemorrhagic stroke (AOR = 7.92, P = 0.004) and ICU admissions (AOR = 5.45, P = 0.020) are associated with unfavorable outcomes.

Conclusion: The study area has a high prevalence of cardiovascular diseases, which significantly increases morbidity and mortality. Overall, this study demonstrates an increasing burden of stroke and heart failure among patients admitted for cardiovascular disease in Gurage zone. The majority of cardiovascular diseases involve potentially modifiable risk factors that may have stopped or slowed the disease's progression. Among the independent variables hemorrhagic stroke and ICU admissions were associated with poor admission outcome.

Keywords: Spectrum, Factors, Cardiovascular Disease, Central Ethiopia

1. INTRODUCTION

1.1 Background

Cardiovascular diseases are a group of disorders affecting the heart and blood vessels. It includes a wide spectrum of clinical conditions, including ischemic heart disease, heart failure, hypertensive heart disease, cerebrovascular disease, rheumatic heart disease, cardiomyopathies, peripheral vascular disease, and thromboembolic diseases. These conditions may involve structural abnormalities, functional impairment, or vascular obstruction affecting systemic or pulmonary circulation(1).

CVDs are characterized by complex pathophysiological process such as atherosclerosis, myocardial ischemia, ventricular dysfunction, vascular remodeling, thrombosis, and inflammatory injury. Many cardiovascular conditions share common risk factors, including hypertension, diabetes mellitus, dyslipidemia, obesity, smoking, sedentary life style, and advancing age. Clinically, cardiovascular diseases may present acutely, such as acute coronary syndrome, stroke, or decompensated heart failure, or chronically with progressive symptoms including dyspnea, chest pain, palpitations, syncope, or peripheral edema.

Globally, cardiovascular diseases represent a major category of non-communicable diseases and account for a significant proportion of hospital admissions and healthcare utilization. In low- and middle-income countries, the clinical profile of cardiovascular disease often includes both traditional causes such as rheumatic heart disease and emerging atherosclerotic conditions such as ischemic heart disease and stroke, reflecting an ongoing epidemiological transition (2).

Understanding the clinical spectrum and characteristics of cardiovascular diseases within specific healthcare settings is essential for improving patient management, optimizing resource allocation, and guiding institutional clinical practice.

1.2 Statement of the problem

Cardiovascular diseases are among the leading causes of morbidity and mortality globally, with a growing burden in low and middle - income countries, including Ethiopia. It accounts for approximately 32% of global deaths, with more than three-quarters of CVD-related deaths occurring in low- and middle-income countries (LMICs) (1). According to the Global Burden of Disease 2023 study, the global prevalence of CVD was 612 million cases (3).

In sub-Saharan Africa, including Ethiopia, the burden of CVDs is steadily increasing. This trend is especially concerning given that health systems in the region still focused on infectious disease and maternal child health, often lack the infrastructure, trained personnel, and data necessary for effective non-communicable disease management (4). Available evidence indicates that the leading causes of CVD-related morbidity and mortality in Ethiopia include heart failure, rheumatic heart disease, ischemic heart disease, stroke, and hypertension (5). However, existing data are limited, and most studies are centered in major urban centers, leaving a significant gap in understanding the disease burden at regional and district hospital levels.

In Ethiopia, the age-standardized prevalence of CVD in 2017 was around 5,466 per 100,000 population (5). Despite this increasing trend, little is known about the trends, scope, and results of hospital admissions due to CVD in many regions of the nation, especially in emerging regional hospitals. WKUCSH, located in central Ethiopia, serves a large and diverse population, yet the spectrum and outcomes of CVD cases admitted to this facility have not been studied.

Planning successful prevention, management, and resource allocation strategies requires an understanding of the spectrum and features of cardiovascular admissions. However, focused initiatives and policy-making decisions are hampered by the lack of local evidence. Healthcare professionals and stakeholders have difficulties in tackling this expanding public health concern if they lack a comprehensive grasp of the types and consequences of cardiovascular illnesses treated at the hospital.

Therefore, this study is imperative to address this void in local evidence. By determining the clinical spectrum, determinants, and treatment outcomes of CVD admissions at WKUCSH, the findings will generate crucial data to guide clinical practice, direct institutional resource planning, and inform regional and national health policy, ultimately contributing to the reduction of the CVD burden in Ethiopia.

1.3 Significance of the study

Although the incidence of cardiovascular diseases (CVDs) in Ethiopia is rising, there is still a lack of thorough hospital-based data, especially from rural or recently opened healthcare facilities. There are currently no published data on the frequency, types, and clinical outcomes of cardiovascular admissions at Wolkite University Comprehensive Specialized Hospital, which serves a large catchment area in Central Ethiopia.

The results will give policymakers, regional health bureaus, and hospital administrators the crucial information they need to create efficient, evidence-based plans for the management, diagnosis, and prevention of cardiovascular diseases.

By assessing the spectrum and outcomes of CVD admissions, the study will assist Wolkite University Comprehensive Specialized Hospital physicians in better understanding regional disease patterns, which can enhance patient care and guide treatment recommendations.

By identifying modifiable risk factors and the common causes of death among patients with CVD, the study will help in directing regional public health initiatives like screening, education, and preventative campaigns. This study will promote a culture of data-driven inquiry within the hospital and related academic programs, and it will provide a basis for future longitudinal studies in the area.

2. LITERATURE REVIEW

Cardiovascular diseases (CVDs) comprise a group of disorders affecting the heart and blood vessels, including ischemic heart disease, cerebrovascular disease (stroke), hypertensive heart disease, heart failure, rheumatic heart disease, cardiomyopathies, and peripheral vascular diseases. These conditions are largely chronic, progressive, and influenced by modifiable and non-modifiable risk factors. They represent a major component of non-communicable diseases (NCDs), which have increasingly replaced communicable diseases as the dominant cause of morbidity and mortality worldwide (1,6).

CVDs result from complex interactions between genetic predisposition, environmental exposure, lifestyle factors, and health system performance. Major modifiable risk factors include hypertension, diabetes mellitus, dyslipidemia, obesity, physical inactivity, unhealthy diet, tobacco use, and harmful alcohol consumption. Non-modifiable factors include age, sex, and genetic susceptibility. The clustering of these risk factors significantly increases the likelihood of adverse cardiovascular outcomes (6).

Cardiovascular diseases are among the leading causes of morbidity and mortality globally, with a growing burden in low and middle - income countries, including Ethiopia (1,6). In recent years, Ethiopia has seen an epidemiologic shift from Infectious to non-communicable diseases (NCDs), with CVDs accounting for a large portion of hospital admissions and deaths (2).

Worldwide, ischemic heart disease and stroke are the leading causes of mortality, responsible for over 15 million deaths in 2019 (7). The Global Burden of Disease (GBD) study indicates that more than 75% of cardiovascular disease (CVD) deaths take place in low- and middle-income countries (LMICs). The major contributing factors are hypertension, diabetes, lack of physical activity, and smoking (6).

In LMICs, fragile health systems contribute to delayed diagnosis, inadequate treatment, and limited long-term follow-up. Essential medications such as antihypertensives, antiplatelets, statins,

and anticoagulants are often underutilized. Additionally, emergency cardiovascular services, including thrombolysis, cardiac catheterization, and neurosurgical interventions, remain inaccessible in many settings.

In high-income nations, cardiovascular disease (CVD) mortality has decreased due to enhanced prevention and treatment methods; however, low and middle-income countries (LMICs) are facing an increasing rate of incidence and unfavorable outcomes, primarily because of fragile health systems (8).

Rheumatic heart disease (RHD), largely eradicated in high-income countries due to improved living conditions and antibiotic use, continues to cause significant morbidity and mortality in LMICs (9). It disproportionately affects young individuals, leading to early disability and economic consequences for families and communities. The coexistence of infectious diseases and rising NCDs in LMICs creates a “double burden” that further strains healthcare systems.

Sub-Saharan Africa is undergoing an epidemiological transition, with non-communicable diseases expected to outnumber infectious diseases as the primary cause of mortality by 2030 (10). In SSA, cardiovascular diseases (CVDs) are the leading causes of NCD deaths, responsible for approximately 13% of all deaths and 37% of all NCD deaths (11).

Hypertension is the most prevalent cardiovascular risk factor in SSA, affecting approximately one-third of adults, yet control rates remain below 20% in many settings (12). Poor blood pressure control contributes significantly to hypertensive heart disease, stroke, heart failure, and chronic kidney disease (13).

Hospital-based studies highlight similar trends. In Ghana, almost one-third of admissions for cardiac cases were attributed to heart failure, primarily due to hypertension and rheumatic heart disease (14). In Nigeria, the primary reasons for cardiovascular disease admissions were stroke and heart failure (15). These observations align with data from hospitals in Ethiopia, indicating shared regional trends.

Ethiopia also faces an increasing burden of cardiovascular diseases. Evidence from global burden of Disease study showed that ischemic heart disease, stroke, and hypertensive disorders are the leading causes of mortality (5). Hospital-based study confirms the same pattern.

According to a study conducted at Saint Paul's Hospital Millennium Medical College in Addis Ababa, cardiovascular diseases were responsible for 30.3% of medical admissions. The most common causes of CVDs were rheumatic valvular heart disease, hypertensive heart disease, and congestive heart failure. The study also shows an in-hospital mortality rate of 23.8% among cardiovascular admissions, primarily due to complications such as infections, arrhythmias, and thromboembolic events (16).

According to a retrospective study conducted at Ayder Comprehensive Specialized Hospital in Northern Ethiopia, cardiovascular diseases accounted for 36.7% of medical admissions, and it accounted for 53.9% of all admissions linked to NCDs (17). Another prospective study from ACSH shows that stroke is the leading cause of CVD, and rheumatic heart disease is the most common cause of heart failure among hospital-admitted patients. Hypertension was the leading CVD risk factor (18). A study from the University of Gondar Teaching Hospital noted that hypertension (62.3%) and heart failure (23.9%) were the dominant cardiovascular diagnoses among outpatient attendees (19).

Another study conducted in a Central Ethiopian referral hospital found that acute heart failure accounted for 13.2% of all medical admissions, with heart failure with preserved ejection fraction (HFpEF) being the most common subtype (60.9%). Ischemic heart disease (IHD), HHD, and corpulmonale were common contributory etiologies. The study also found that evidence-based treatments including beta-blockers and angiotensin-converting enzyme inhibitors are frequently underutilized, and that the in-hospital death rate is 8.6% (20).

A long-term analysis of trends in Tikur Anbessa Specialized Hospital medical intensive care unit CVD - related admissions increased significantly over three decades, accounting for up to 42.6% of ICU admissions. These admissions also carried a high case fatality rate of 31.6% (21). These

findings suggest that in Ethiopia's tertiary hospitals, the prevalence and complexity of CVD presentations are increasing.

Several studies have identified factors associated with unfavorable outcomes among hospitalized cardiovascular patients. Advanced age, hypertension, diabetes mellitus, delayed presentation, ICU admission, and hemorrhagic stroke have been consistently associated with higher mortality (7,18,23).

Hemorrhagic stroke is associated with a worse prognosis compared to ischemic stroke due to increased intracranial pressure, risk of herniation, and limited access to neurosurgical intervention in resource-limited settings (7,13). ICU admission, while often necessary for critically ill patients, reflects disease severity and has been associated with increased in-hospital mortality (21).

Sex-based differences in cardiovascular outcomes have also been reported, although findings vary across studies. Differences in healthcare access, biological factors, and sociocultural determinants may contribute to these variations (12,17) .

Despite these observations from large teaching hospitals in Addis Ababa, Gondar, Mekele, and Central Ethiopia, there is a lack of region-specific data from Wolkite and the surrounding Gurage zone. This poses a challenge for evidence-based planning and the local health system's response. Data from Wolkite University Comprehensive Specialized Hospital is desperately needed in order to understand the determinants, spectrum, and treatment outcomes of cardiovascular admissions. This will enable the development of prevention and management plans.

2.1 Conceptual framework

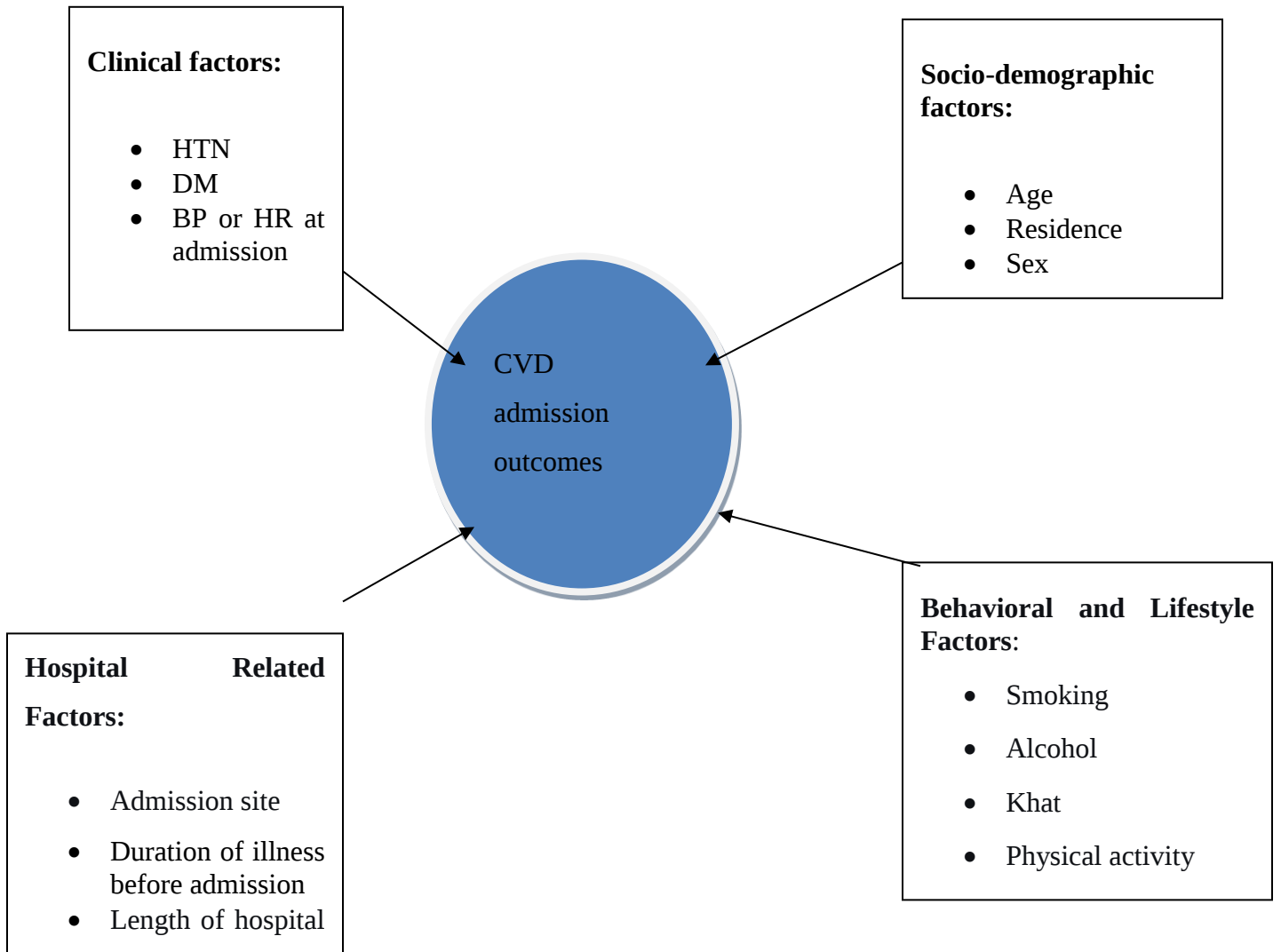


Figure 1: Conceptual Framework of the assessment of clinical spectrum, determinants, and in-hospital outcomes of cardiovascular disease admissions

3. OBJECTIVES OF THE STUDY

3.1 General objectives

To assess the clinical spectrum, outcomes, and determinants of cardiovascular disease admissions at Wolkite University Comprehensive Specialized Hospital, Gurage Zone, Central Ethiopia, 2022 -2025

3.2 Specific objectives

To describe the clinical spectrum of cardiovascular disease among admitted patients at WKUCSH, 2022 -2025

To determine the outcomes of CVD patients in Wolkite University Comprehensive Specialized Hospital (WKUCSH), 2022 -2025

To identify factors associated with outcomes of cardiovascular disease at WKUCSH, 2022 -2025

4. METHODS

4.1 Study setting and Period

The study was conducted in Wolkite University Comprehensive Specialized Hospital, which is one of the tertiary governmental Teaching Hospitals in the Gurage zone, Central Ethiopia region. The hospital serves as a referral center for the surrounding districts, providing both inpatient and outpatient services, including cardiology care. From September 1, 2022, to August 31, 2025, 3260 medical patients were admitted to WKUCSH; among them, cardiovascular disease accounted for 920 admissions. The study was conducted in the medical department of the Hospital on selected cardiovascular admissions among the medical admissions to the medical ward in the past 3 years. The study was conducted from November 15 to December 15, 2025.

4.2 Study Design

An institution-based retrospective cross-sectional study was conducted to assess the spectrum, outcomes, and determinants of cardiovascular disease admission at Wolkite University Comprehensive Specialized Hospital, Gurage zone, Central Ethiopia.

4.3 Study population

Source Population: All adult patients (age 14 and above) admitted to the medical wards of WKUCSH during the three-year study period (Sept 1, 2022 – Aug 31, 2025).

Study Population: All adult patients admitted to the medical wards of WKUCSH with the diagnosis of a cardiovascular disease during the three-year study period (Sept 1, 2022 – Aug 31, 2025).

4.4 Sampling technique and procedure

A systematic random sampling technique was employed to select study participants. The total number of cardiac admissions during the three-year study period was 920; the calculated sample size is 405. The sampling interval was determined by dividing the total number of cardiac admissions by the sample size (i.e., ~ 2). Accordingly, every second patient was selected from the admission registry. The first participant was chosen randomly from the first two patients, and thereafter, every second patient was included in the study.

4.5 Sample Size determination

The single and double population proportion formula was applied. Sample size for the first and the second objectives to determine the outcomes of CVD patients and to describe the clinical spectrum of cardiovascular disease, a single population proportion formula, with the assumptions of $Z_{\alpha/2} = 1.96$, a 95% confidence level, a 5% margin of error, 25% and 40% proportion, respectively (16,22). After adding a 10% for missing data, the sample size was 308 and 405, respectively. The sample size for the objective to describe the clinical spectrum of cardiovascular disease was a single population proportion formula, with the assumptions of $Z_{\alpha/2} = 1.96$, a 95% confidence level, a 5% margin of error, and a 40% proportion (VHD).

$$n = \frac{Z^2 \frac{\alpha^2}{2} P(1-P)}{d^2} =$$
$$= \frac{(1.96)^2 0.4(1-0.4)}{(0.05)^2} = 405 \text{ (by adding 10\% missing data)}$$

Where:

n= the desired sample size

Z = standard normal variance at 95% confidence level (1.96)

p = proportion of Valvular heart disease from previous study

d = margin of error (0.05)

- ❖ For the remaining **objective**, the sample size was calculated by using two population proportion formula, taking different factors with assumptions of 5% precision and 95% confidence level. Sample size for objective three was calculated using **EPI Info version 7** as the following table.

Table 1; The sample size determination by using two population proportion formulas from significantly associated factors with outcomes of cardiovascular disease from a previous study (23).

Factors	Prevalence of unexposed group	Power	AOR	Considering 10% non-response	Final sample size
Hypertension	20%	80%	2.8	16.6	182
Diabetes mellitus	15%	80%	2.5	25	275
Smoking	18%	80%	2.6	20.4	224
Physical inactivity	17%	80%	2.3	28.2	310
Obesity	21%	80%	2.1	31.6	348

The sample size for this study was determined by **comparing all computations** and choosing the one with the **largest sample size**. As a result, **405** Patients with CVD admission was planned to recruit in the study.

4.6 Inclusion and Exclusion criteria

Inclusion criteria

- All patients aged 14 years and above, patients with a confirmed primary diagnosis of CVD upon admission or discharge.
- Patients with complete medical records (at least having discharge summary, Echocardiography, brain CT scan and doppler U/S of the leg depending on specific diagnosis)

Exclusion criteria

- Patients with insufficient data in their medical records (i.e., missing discharge summary, absence of ECHO, brain CT scan, and doppler U/S of the leg based on their specific diagnosis).
- Patients admitted for non-cardiovascular reasons who developed a CVD as a complication during their stay.
- Early death and patients left against medical advice, which occurred before the diagnosis settlement

Of a total planned sample size of 405, 357 cardiovascular disease admissions to WKUCSH that fulfilled the inclusion criteria were reviewed during the study period. The remaining 48 patients excluded due to different reason (see figure 2).

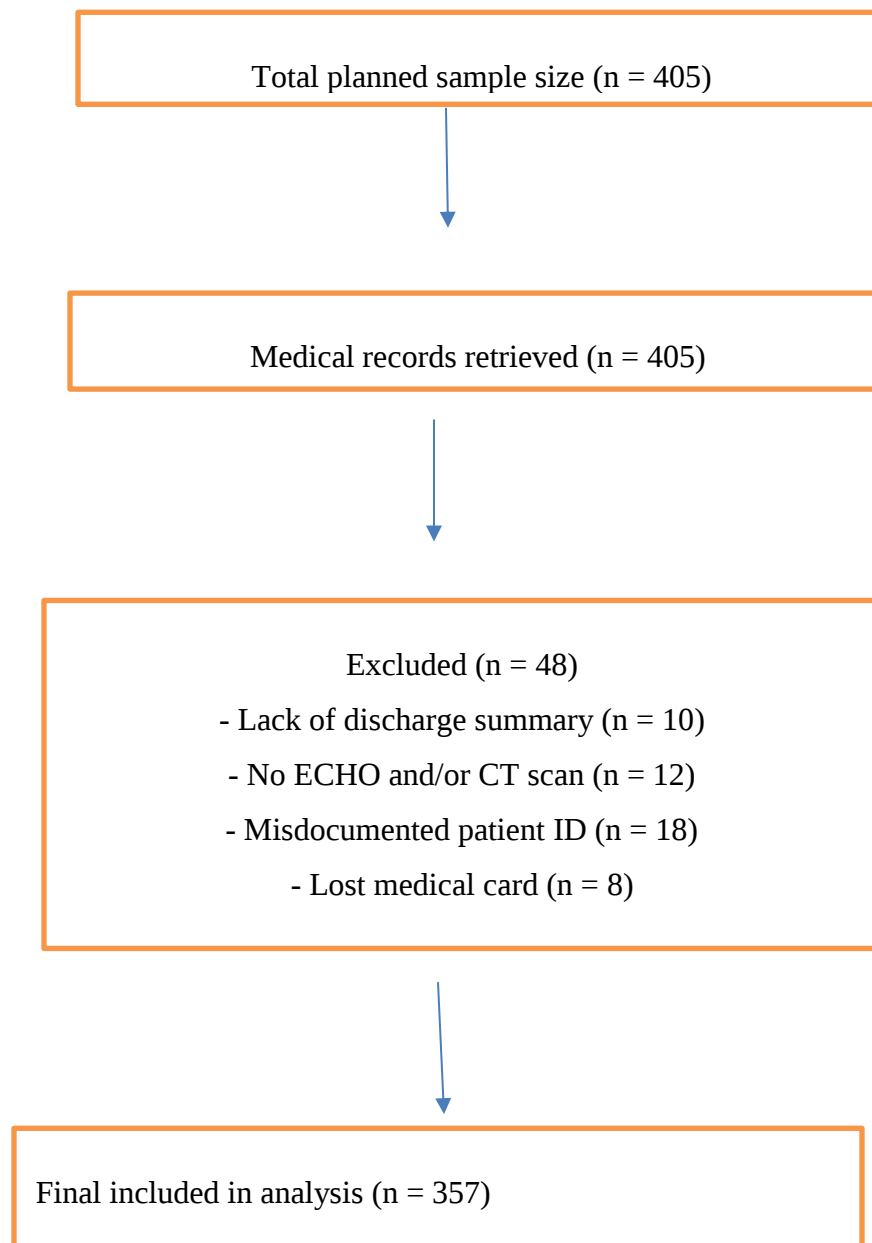


Figure 2: Flow chart showing selection of study participants

4.7 Study Variables

Dependent Variables

In-hospital Outcomes of Cardiovascular Disease Admission (Death or alive (discharged or referred))

Independent Variables

Socio-Demographic Factors: Age, Sex, Place of residence (Urban/Rural) Behavioral and Lifestyle Factors: Smoking status, Alcohol consumption, Khat chewing status, and level of physical activity

Clinical and Comorbidity Factors: History of Hypertension, Diabetes Mellitus, and Dyslipidemia

Hospital and Healthcare-Related Factors: Ward/Unit admitted to, Duration of symptoms before presentation, and Length of hospital stay.

Types of cardiovascular disease: IHD, HF, HHD, arrhythmia, and stroke

4.8 Operational definitions

Cardiovascular Disease (CVD) Admission: A hospital admission where the primary discharge diagnosis is a disorder of the heart and blood vessels. For this study, this includes:

Ischemic Heart Disease (IHD): Diagnosis of angina pectoris or acute coronary syndrome (including unstable angina, NSTEMI, STEMI).

Hypertensive Heart Disease (HHD): Cardiac conditions (e.g., heart failure, left ventricular hypertrophy) explicitly documented as a consequence of hypertension.

Heart Failure: A clinical diagnosis of HF based on standard frameworks (e.g., Framingham criteria) or clinician assessment, regardless of etiology.

Rheumatic Heart Disease (RHD): A history or echocardiographic evidence of chronic valvular lesions (e.g., mitral stenosis, mitral regurgitation) attributable to rheumatic fever.

Cerebrovascular Disease (Stroke): A rapidly developing clinical sign of focal or global cerebral disturbance, lasting more than 24 hours, with no apparent non-vascular cause, confirmed by imaging (CT/MRI) or clinical assessment.

Spectrum of CVD: The distribution and frequency of the specific primary CVD diagnoses (as listed above) among the study participants.

Outcome of CVD Admission: The patient's status at the termination of the hospital episode, categorized as: Death, alive (Discharged with improvement, referred)

In Hospital Mortality: Death from any cause during hospitalization.

4.9 Data collection procedure and tool

Patient records were identified from hospital admission registers, ward logbooks, and discharge summary registers. Medical records of study subjects were retrieved from the central medical records archive. Demographic and clinical data were collected from the medical records of study subjects using pretested checklist questionnaires. Relevant patient information was retrieved from the HMIS registry, and demographic information, admission details, spectrum of cardiovascular disease, outcomes, and determinants/risk factors related variables were extracted from the medical card.

In order to ensure the accuracy, completeness, and comparability of data, two medical doctors were trained to complete the data collection format. Data collection was made by the pretested structured checklists to document all the pertinent profiles of the study subjects.

4.10 Data Quality Control

To ensure the quality of data, training was provided for data collectors, and daily supervision was conducted. A pretest was conducted among 5% participants out of actual data collection setting. During the pretest, the internal consistency of the tool was assessed by computing Cronbach's alpha test. At the end of each data collection day, the collected data were reviewed and checked by the investigator for completeness and consistency.

4.11 Data analysis

The data were coded and entered in the Epi Data entry form, and then exported into SPSS version 27 for analysis. Descriptive statistics such as frequency, percentages, and means were used to present the variables. The analyzed data were described using tables, graphs, and figures accordingly. Binary and multiple logistic Regression analysis was used to analyze the association between variables where Applicable. A variable that meet p value<0.25 at bivariate regression analysis was included in multivariate analysis. A p-value <0.05 at 95% CI was taken as statistically significant. The Hosmer-Lomeshow test was used to check statistical model fitness. Multicollinearity was assessed using the variance inflation factor.

4.10. Ethical considerations

Ethical clearance to conduct this study was obtained from the research and ethical committee of the College of Medicine and Health Sciences, Wolkite University, and a permission letter to conduct the study was obtained from WKUCSH Internal Medicine Department. Confidentiality was fully maintained during data collection, further analysis, and dissemination of results.

4.11 Dissemination Plan

The findings of the study will be presented to Wolkite University College of Medicine and Health Science, and a formal report will be submitted to the WKUCSH department of internal medicine. The research output will also be published in local or international scientific journals.

5 RESULTS AND DISCUSSION

5.1 Results

5.1.1 Sociodemographic characteristics of the study population

Among a total of 3260 medical patients admitted to the medical ward, cardiovascular disease accounts for 920 (28%) admissions. In the year 2022/23, out of 910 total medical admissions, CVD admissions accounted for 242 (26.6%). In 2023/24, out of 1040 admissions, CVD accounts for 291(27.9%). In the 3rd year, out of 1320 medical admission 387 (29.3%) were CVD admissions. Of a total planned sample size of 405, 357 cardiovascular disease admissions to WKUCSH that fulfilled the inclusion criteria were reviewed during the study period. Of these, females were 189 (52.9%) and males 168 (47.1%).

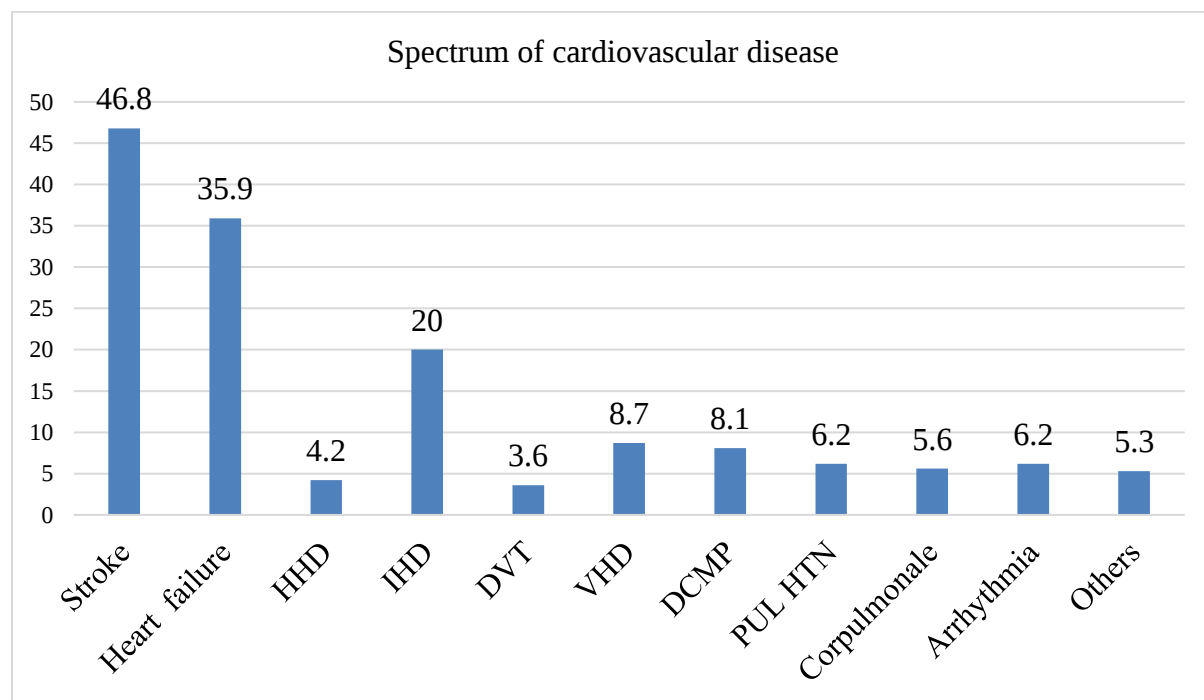
The mean age of the study participants was 59.27 ± 16.4 years, with ages ranging from 15 to 120 years. The largest proportion of patients, 145 (40.6%), were aged >60 years. Most of the patients, 307 (86%), were from rural areas, while 50 (14%) were from urban areas. Overall, cardiovascular disease admissions were more common among older age groups (Table2).

Table 2: Socio-Demographic characteristics among cardiovascular disease admissions at Wolkite University Comprehensive Specialized Hospital, Gurage Zone, Central Ethiopia, 2022 -2025

Variables	Categories	Frequency	Percent
Age group	<30	29	8.1
	30 – 45	48	13.4
	46 – 60	135	37.8
	>60	145	40.6
Sex	Female	189	52.9
	Male	168	47.1
Residency	Rural	307	86
	Urban	50	14

5.1.2 Spectrum of cardiovascular diseases

Among the cardiovascular disease admissions, stroke (both ischemic and hemorrhagic) was the most common diagnosis, accounting for 167 (46.8%) of CVD admissions. This was followed by heart failure (both HFrEF and HFpEF) 128(35.9%), and ischemic heart disease 74(20.7%). (Figure 2). Other conditions included DCMP 29(8.1%), Pulmonary hypertension 15(6.2%), DVT 11(4.6%), Degenerative valvular heart disease 11(4.6%), CRVHD 10(4.1%), and HHD 15(3.7%).



Others refer to PE, PCMP, HOHF, and infective endocarditis

Figure 3: Spectrum of cardiovascular disease at Wolkite University Comprehensive Specialized Hospital, Gurage Zone, Central Ethiopia, 2022 -2025

5.1.3 Co-morbidities and cardiovascular disease risk factors

Among patients with documented comorbidities and cardiovascular disease risk factors, hypertension was the most prevalent, present in 174(48.7%) of patients. Additionally, dyslipidemia 25(7%), diabetes mellitus 29(8.1%), and chronic respiratory diseases19(5.3%) were identified among the patients. (Table 3)

Table 3: CVD co-morbidities and risk factors among cardiovascular disease admissions at Wolkite University Comprehensive Specialized Hospital, Gurage Zone, Central Ethiopia, 2022 -2025

Co morbidity	Frequency	Percent
Hypertension	174	48.7%
Dyslipidemia	25	7%
Chronic respiratory disease	19	5.3%
Diabetes mellitus	29	8.1%
Cancer	5	1.4%

5.1.4 Treatment Outcomes and Causes of Death

Most patients improved and were discharged. 24(6.7% patients were referred to other centers. However, in hospital mortality occurred in 39(10.9%) patients. Among these, the leading causes of death were brain herniation 10(25.6%) and multi-organ failure 8(20.5%), followed by cardiogenic shock 15.4% and septic shock 12.8%. Other causes of death included cardiac arrest secondary to suspected massive PE, suspected ACS, unexplained cardiac arrest, respiratory failure secondary to refractory fluid overload, and cardiac arrest secondary to refractory hyperkalemia (Table 4). The majority (65.3%) of the patients stayed in the hospital for less than 5 days, with a mean of 5.6 (SD±4.5) days.

Table 4: Cause of death among cardiovascular disease admissions at Wolkite University Comprehensive Specialized Hospital, Gurage Zone, Central Ethiopia, 2022 -2025

Causes of death	Frequency	Percent
Brain herniation	10	25.6%
Cardiac arrest 2ndry to? massive PE	1	2.6%
Cardiac arrest 2ndry to?ACS	2	5.1%
Unexplained Cardiac arrest	4	10.3%
Massive PE	1	2.6%
MOF	8	20.5%
Cardiogenic shock	6	15.4%
Septic shock	5	12.8%
Respiratory failure 2ry to refractory fluid overload	1	2.6%
Sudden cardiac arrest 2ry to refractory hyperkalemia	1	2.6%

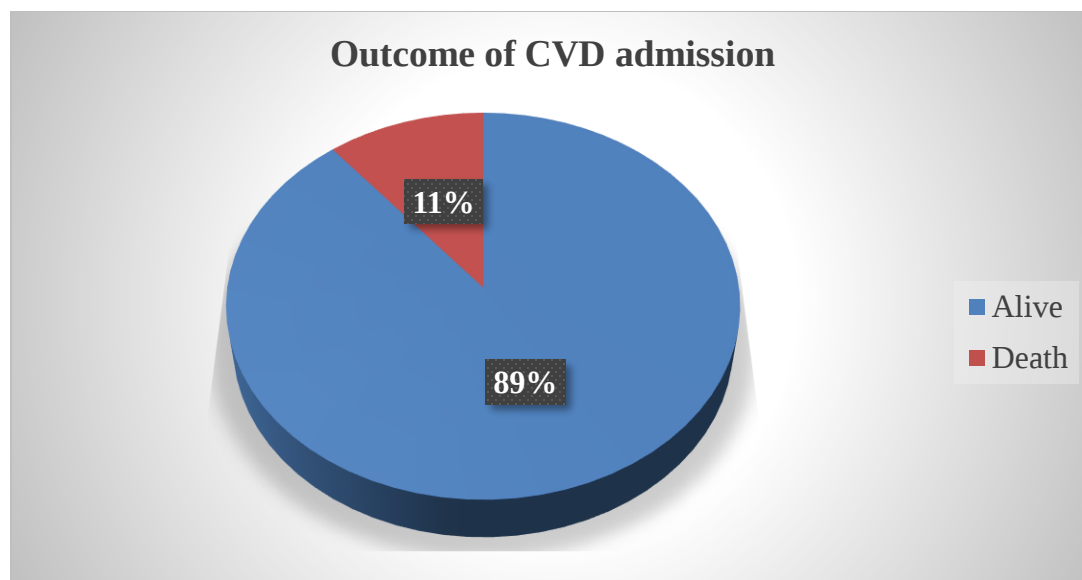


Figure 4: Outcome of admission among cardiovascular disease at Wolkite University Comprehensive Specialized Hospital, Gurage Zone, Central Ethiopia, 2022 -2025

5.1.5 Factors Associated with Treatment Outcomes

In bivariate regression analysis, age, sex, onset of symptom, Hemorrhagic stroke, ischemic stroke, HFpEF, HHD, hypertension, ICU admission, and length of hospital stay were associated at p value of 0.25 and included in multivariate analysis. Multivariable logistic regression revealed that hemorrhagic stroke and ICU admissions were significantly associated with unfavorable outcomes. Patients with hemorrhagic stroke had approximately eight times higher odds of poor outcomes compared to patients without hemorrhagic stroke (AOR =7.92 (95% CI, 1.52, 27.4), P = 0.004). Patients who were admitted to the ICU had five times higher odds of death compared to their counterparts (AOR =5.45 (95% CI 1.31, 22.7), P = 0.020).

Table 5: Factors associated with treatment outcomes among cardiovascular disease admissions at Wolkite University Comprehensive Specialized Hospital, Gurage Zone, Central Ethiopia, 2022 -2025

Variables	Categories	Outcomes		COR	AOR	P – value
		Alive	Death			
Age	<30	25	4	1	1	
	30 – 45	41	7	1.06(0.28, 4.02)	1.47(0.31,7.12))	0.629
	46 – 60	129	6	0.29(0.08, 1.11)	0.17(0.04, 0.80)	0.075
	>60	123	22	1.12(0.35, 3.53)	1.37(0.33, 5.65)	0.659
Onset of symptoms	<1days	112	22	1	1	
	1 – 7 days	125	8	0.33(0.14, 0.76)	0.65(0.18, 2.37)	0.516
	7–14 days	52	7	0.68(0.28, 1.71)	2.05(0.41, 10.36)	0.383

	14-21days	17	1	0.30(0.04, 2.37)	0.66(0.04, 9.88)	0.765
	>21 days	12	1	0.42(0.05, 3.43)	0.96(0.07, 12.8)	0.976
ICU admission	No	303	34	1	1	
	Yes	15	5	2.97(1.02, 8.68)	5.45(1.31, 22.7)	0.020
Hemorrhagic Stroke	No	272	20	1	1	
	Yes	46	19	5.74(2.79, 11.3)	7.92(1.52, 27.4)	0.004
Ischemic stroke	NO	221	34	1	1	
	Yes	97	5	0.34(0.13, 0.88)	0.58(0.13, 2.54)	0.465
HHD	NO	305	37	1	1	
	Yes	13	2	1.27(0.28, 5.84)	4.33(0.66, 28.3)	0.127

Hypertension	No	168	15	1	1	
	Yes	150	24	1.79(0.91, 3.54)	1.37(0.50, 3.73)	0.541
HFpEF	No	258	38	1	1	
	Yes	60	1	0.11(0.02, 0.84)	0.11(0.01, 1.09)	0.600
Length of hospital stay	<5days	210	23	1	1	
	5 – 8 days	74	8	0.33(0.13, 0.86)	0.46(0.16, 1.36)	0.162
	9– 12 days	13	1	0.32(0.11, 0.99)	0.53(0.05, 5.25)	0.588
	>12 days	21	7	0.23(0.03, 2.10)	1.63(0.46, 5.77)	0.451

5.2 Discussion

This study assessed socio-demographic characteristics, spectrum of CVDs, comorbidities, length of hospital stays, treatment outcomes, and factors associated with outcomes among patients admitted with CVDs to Wolkite University Comprehensive Specialized Hospital. The results of the study showed a substantial burden of CVD, mainly affecting older adults and rural residents.

The most common cause of admissions was due to stroke and heart failure. Hypertension was the leading comorbidity. These findings are consistent with studies conducted in similar settings.

This study revealed that the majority of CVD admissions were from rural areas. It is consistent with several institution-based studies done in Ethiopia, like Ayder Comprehensive Specialized Hospital, which reported a higher proportion of rural residents among CVD admissions (17,18). This pattern may be explained by limited access to preventive and primary healthcare services, delayed health-seeking behaviors, and inadequate control of cardiovascular risk factors in rural populations (12,13). Females admitted with CVD were slightly higher in proportion than males. This finding is similar with study from the University of Gondar Teaching Hospital and Saint Paul's Hospital Millennium Medical College (16,19). These differences may reflect variations in healthcare utilizations, survival patterns, and effect of sociocultural factors.

The mean age of patients in this study was 58.6 years, with patients aged >60 years accounting for the highest proportions of admissions. This result is consistent with reports from Ethiopia and other LMICs, where CVDs disproportionately affect older adults (5,20). Compared with developed countries, the relatively younger age at presentation observed in Ethiopia and other African studies suggests an earlier onset of CVD, likely driven by inadequate primary prevention and poor control of modifiable risk factors (6,8).

The most common cardiovascular diagnosis in this study was stroke, with ischemic stroke accounting for 28.6% and hemorrhagic stroke for 18.2% of admissions. This result is similar to multiple Ethiopian studies reporting stroke as the leading cause of cardiovascular hospitalizations (16–18,23). The relatively higher proportions of hemorrhagic stroke compared to studies from high-income countries may reflect poor control of BP, limited access to antihypertensive therapy, and delayed hospital presentations, which are the common challenges observed in sub-Saharan Africa (12,13).

Heart failure constitutes a significant proportion of admissions, with both heart failure with reduced ejection fraction and heart failure with preserved ejection fraction. Similar findings have

been reported in institution-based studies from Ethiopia, where heart failure remains a major cause of morbidity and admission (16,20). IHD also accounted for a considerable proportion of admissions, suggesting an ongoing epidemiological transition and an increasing burden of atherosclerotic CVD in Ethiopia (5,7). Hypertensive heart disease, cardiomyopathy, and valvular heart diseases account for smaller but clinically significant proportions, showing both persistent traditional causes and emerging cardiovascular risk profiles.

The most common comorbidity among CVD-admitted patients was Hypertension. This result is similar to different studies done in Ethiopia (study conducted at Saint Paul's Hospital Millennium Medical College and Ayder Comprehensive Specialized Hospital) and sub-Saharan Africa that show Hypertension as the most prevalent cardiovascular risk factors (12,16,18). This result may be explained by a lack of screening, inadequate treatment, and poor BP control. Diabetes mellitus and dyslipidemia were less common than Hypertension; this may be due to underdiagnosis and limited routine screening in routine clinical practice (6,20).

The mean length of hospital stay was 5.6 ± 4.5 days. In this study, in-hospital mortality was slightly lower than the range reported (13.2 – 24%) from other Ethiopian institution-based studies of CVD admissions, like St. Paul's Hospital Millennium Medical College and Ayder Comprehensive Specialized Hospital (12,16). This may reflect differences in the magnitude of ICU admissions and referral patterns. The most common cause of death was brain herniation and multiorgan failure; this finding shows the impact of severe stroke and critical illness. This result is consistent with studies from other Ethiopian institution-based studies (16,21).

Among the independent variables, hemorrhagic stroke and ICU admissions were independently associated with the admission outcome. Hemorrhagic stroke was associated with nearly eight-fold increased odds of mortality. This result is similar to studies from ACSH and different parts of the world showing that hemorrhagic stroke is associated with higher mortality and worse prognosis compared with ischemic stroke; it's because of increased intracranial pressure, limited neurosurgical procedure, and delayed presentation (7,13,18).

ICU admission is also independently associated with increased mortality, reflecting the severity of illness among patients requiring ICU admission. Similar findings have been reported from different studies done in Ethiopia, showing high case fatality rates among critically ill CVD patients (19,22).

5.2.1 Strengths of the Study

This study provides the first documented hospital-based evidence on the spectrum and outcomes of cardiovascular disease admissions at WKUCSH. The study used systematic random sampling, which minimized selection bias. A relatively large sample size ($n = 357$) enhanced statistical power for identifying associated factors. The use of multivariable logistic regression enabled control for potential confounding variables. Data were collected over three years, improving the representativeness of admission patterns. Diagnosis were confirmed through imaging.

5.2.2 Limitations

The retrospective nature of the study limits the inclusion of other cardiovascular risk factors, such as smoking history, obesity, alcohol intake, and physical inactivity. Reliance on secondary medical record data may introduce information bias due to incomplete documentation, missing variables, or recording inaccuracies. As a single-center hospital-based study, the findings may not be generalizable to the broader community or national population. Furthermore, incomplete documentation is common in retrospective studies. The inclusion of heterogeneous cardiovascular diseases (CVD) in a single model. Despite these limitations, the study provides valuable baseline data for the institution and contributes important evidence to the regional CVD literature.

6. CONCLUSIONS AND RECOMMENDATIONS

6. 1 Conclusions

In conclusion, the study area has a high prevalence of cardiovascular diseases, which significantly increases morbidity and mortality. Overall, this study demonstrates an increasing burden of stroke and heart failure among patients admitted for CVD to WKUCSH. The majority of cardiovascular diseases involve potentially modifiable risk factors that may have stopped or slowed the disease's progression. Among the independent variables, hemorrhagic stroke and ICU admissions were independently associated with poor admission outcomes.

6. 2 Recommendations

In this study, the high burden of preventable conditions, especially complications related to hypertension, demonstrates the need for strengthened primary prevention strategies, improved blood pressure screening and control, early stroke detection, and enhanced acute and critical care services. Strengthening these interventions is essential to achieving reductions in cardiovascular morbidity and mortality in the study area.

All stakeholders must work together to reduce risk and optimize follow-up to delay or, if feasible, prevent the onset, progression, and consequences of CVD. Additionally, strategies should be developed to improve cardiac setups to provide better and more immediate care in the hospital, and increase public awareness of potential consequences, drug adherence, and cardiovascular risk reduction.

7. REFERENCE

1. World health organization, cardiovascular disease [Internet]. 2025 Available from: <https://www.who.int/news-room/fact-sheets/detail-cardiovascular-diseases>-(cvds).
2. Mensah, G. A., Roth, G. A. The Global Burden of Cardiovascular Diseases and Risk Factors: 2020 and Beyond. *Journal of the American College of Cardiology*,2015;66(20:2343–8.
3. American Heart Association. The Global Burden of Cardiovascular Diseases and Risks [Internet]. 2025 Available from: [https:// www.heart.org/en/-media/pha-files-2/science-news/2/2025-herat-and-stroke-stat-update/factsheets/2025-stats-update-fact-sheet-global-burden-of-disease](https://www.heart.org/en/-media/pha-files-2/science-news/2/2025-herat-and-stroke-stat-update/factsheets/2025-stats-update-fact-sheet-global-burden-of-disease).
4. Atun R., et. al. Health-system reform and universal health coverage in Latin America. *The Lancet*. 2013;385(9974):1230–47.
5. Ali S, Misganaw A, Worku A, Destaw Z, Negash L. The burden of cardiovascular diseases in Ethiopia from 1990 to 2017: evidence from the Global Burden of Disease Study. *Int Health*. 2021;13:318–26.
6. Gerish BJ, Sliwa K, Mayosi BM, Yusuf S. The epidemic of cardiovascular disease in the developing world: Global implications. *Eur Heart J*. 2010;31(6):642–8.
7. Roth GA, Mensah GA, Johnson CO. Global burden of cardiovascular diseases and risk factors, 1990–2019. *J Am CollCardiol*. 2020;76(25):2982–3021.
8. Keates AK, Mocumbi AO, Ntsekhe M, Sliwa K, Stewart S. Cardiovascular disease in Africa: epidemiological profile and challenges. *Nat Rev Cardiol*. 2017;14(5):273–93.

9. Watkins DA, Johnson CO, Colquhoun SM. Global, regional, and national burden of rheumatic heart disease, 1990–2015. *N Engl J Med*. 2017;377(8):713–22.
10. Mensah GA, Roth GA, Sampson UKA, Moran AE, Feigin VL, Forouzanfar MH. Mortality from cardiovascular diseases in sub-Saharan Africa, 1990–2013. *Cardiovasc J Afr*. 2015;26(2 Suppl 1).
11. Yuyun MF, Sliwa K, Kengne AP, Mocumbi AO, Bukhman G. Cardiovascular diseases in sub-Saharan Africa compared to high-income countries: an epidemiological perspective. *Glob Heart*. 2020;15:15.
12. Cappuccio FP, Miller M V. Cardiovascular disease and hypertension in sub-Saharan Africa: burden, risk and interventions. *Intern Emerg Med*. 2016;11(3):299–305.
13. Morana A, Forouzanfarb M, Sampsonc U. Epidemiology of cardiovascular diseases in Sub-Saharan Africa: the Global Burden of Disease 2010 Study. *ProgCardiovasc Dis*. 2013;56(3):234–9.
14. Amoah AGB, Kallen C. Aetiology of heart failure as seen from a national cardiac referral centre in Africa. *Cardiology*. 2000;93(1–2):11–8.
15. Nwafor CE, Alikor CA. Pattern of cardiovascular disease admissions in the medical wards of the University of Port Harcourt Teaching Hospital: a retrospective review. *Niger Health J*. 2016;16(2).
16. Tadesse A., et. al. Spectrum and outcomes of cardiovascular admissions at Saint Paul's Hospital, Ethiopia: A retrospective study. *Ethiopian Journal of Health Development*. 2021;
17. Gebre A., et. al. Non-communicable disease patterns at Ayder Referral Hospital: A retrospective review. *BMC Cardiovascular Disorders*. 2019;

18. Hailu A, Gidey K, MohamednigussEbrahim M, Berhane Y, Baraki TG. Clinical Profiles of Cardiovascular Diseases and Predictors of Outcome of Hospitalization in a Tertiary Teaching Hospital, Ethiopia: A Prospective Observational Study. *Research Reports in Clinical Cardiology*. 2023;31:69–83.
19. Addisu D. Hypertension and its management in Gondar University Hospital outpatient department. *Ethiop Med J*. 2017;
20. Yohannes M. Clinical profiles and outcomes of acute heart failure patients in Central Ethiopia: A retrospective study. *East African Health Research Journal*. 2024;
21. Desalegn T. Thirty-year trend of ICU admissions at TikurAnbessa Specialized Hospital, Ethiopia. *Ethiopian Journal of Critical Care Medicine*.
22. Yadeta D, Guteta S. Alemayehu B, et al Spectrum of cardiovascular diseases in six main referral hospitals of Ethiopia *Heart Asia* 2017. 9:10829.
23. Haddish HT, Hailu T, Berhane S, Hailu A, Luel A, Meles HG. Patterns and factors associated with cardiovascular disorders at Ayder Comprehensive Specialized Hospital, Tigray, northern Ethiopia. *East African Journal of Health Sciences* [Internet]. 2019 Jun 11 [cited 2026 Jan 29];1(2):148–58. Available from: <https://journal.mu.edu.et/index.php/eajhs/article/view/321>

8. ANNEX

Data collection and questioners

Titles: Assessment of on spectrum of cardiovascular disease admission, outcomes and associated factors in Wolkite University Comprehensive Specialized Hospital, Central Ethiopia. 2022 -2025

Section A: Socio-Demographic Information

1. Patient ID (code): .
2. Age (in years): .
3. Sex: 1. Male 2. Female
4. Occupation: 1. Farmer 2. Merchant 3. Government employee 4. House wife.
5. Student 6. Other (specify) .
5. Residence: 1. Urban 2. Rural

Section B: Behavioral and lifestyle factors

6. Smoking history: 1. Current smoker 2. Former smoker 3. Never
7. Alcohol use 1. Current use 2. Former drinker 3. Never
8. Chat chewing: 1. Yes 2. No
9. Dietary habit: 1. Healthy (low fat, fruits/vegetables) 2. Unhealthy 3. Unknown

Section C: Clinical Admission Data

10. Date of Admission.
11. Primary Reason for Admission.
12. ICU admission: 1. Yes 2. No
13. Types Of Cardiovascular Disease Diagnosed

CVD diagnosis	Yes(1)	No(2)
---------------	--------	-------

Hypertensive Heart Disease		
Ischemic Heart Disease		
Stroke		
Heart Failure		
Rheumatic Heart Disease		
Cardiomyopathy		
Peripheral Arterial Disease		
DVT/PE		
Pulmonary hypertension		

14. Co morbidities Present

Co morbidities	Yes(1)	No(2)
Hypertension		
Diabetes Mellitus		
Chronic Kidney Disease		
Chronic Respiratory Disease		

HIV AIDS		
Obesity		
Family Hx of CVD		
Dyslipidemia		

Section D; Investigation and Treatment

15. Investigation Done

1. ECG
2. Chest X-Ray
3. CT scan of brain
4. Troponin level
- Lipid profile (LDL)
- Echocardiography (Ejection fraction at admission).

16. Types Of Treatment

1. Medical
2. Surgical
3. Interventional(Catheterization)
4. Lifestyle Modification

17. Length of Hospital Stay (in days).

18. Time from symptom onset to hospital presentation

19. BP at admission PR_____.

Section D: Outcomes

20. Outcomes of Admission

1. Death
2. Alive (Discharged with improvement, Referred)

If death, cause of death_____.

Source from ESC guideline 2021

