



Graduate Study Program

Valvular heart disease treatment outcomes and associated factors among adult patients admitted at selected hospitals of Addis Ababa, Ethiopia.

By

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A Research Paper Submitted to the Department of Medical Surgical nursing; Presented in Partial fulfillment of the Requirements for the MSc in cardiovascular Nursing; St. Paul's Hospital Millennium Medical College.

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Addis Ababa, Ethiopia

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Abstract

Background: Valvular heart disease presents significant burden on healthcare systems worldwide, often leading to hospital admission and affecting patient outcomes in treatments modalities, there remains a gap in understanding the factors influencing treatment outcomes among patients admitted to hospitals with valvular heart disease (VHD).

Objective: The primary objective of this research is to analyze treatment outcomes and identify factors influencing these outcomes among adult patients admitted to selected hospitals of AA, Ethiopia with valvular heart (VHD). The study aims to provide evidence regarding treatment outcomes and associated factors of Valvular heart diseases in Ethiopia context.

Methods: A retrospective cross sectional study was conducted on 423 adult valvular heart disease (VHD) patients admitted to selected hospitals in AA, Ethiopia, from January 2021_2023. All patient charts meeting's the inclusion criteria were included. Data were collected from these charts, cleaned, coded, and entered into Epi-info version 7.2, then exported to SPSS version 26 for further analysis. A binary logistic regression model with adjusted odds ratio (AOR) and a 95% Confidential Interval (CI) was used to identify candidates for multivariable logistics regression analysis then, variables with a p-value less than 0.25 selected and candidated for multivariate analysis.

Result: From the total patients 383(90.55%) had good treatment outcome while 40(9.5%) of them had poor treatment outcome. This study have identified 3 variables to be significantly associated with poor treatment outcome smoking (AOR 2.8; 95% CI [0.69-7.09] P-value 0.045), Presence of comorbidities (AOR 3.2; 95% CI [1.5-6.89] P-value 0.02) and alcohol drinking (AOR 3.68; 95% CI [0.19-4.78] P-value 0.025).

Conclusion: From the total patients 383(90.55%) had good treatment outcome while 40(9.5%) patients had poor treatment outcome. This has found presence of comorbidity, drinking alcohol and smoking cigarette to be significantly associated with poor treatment outcome of Valvular

heart disease(VHD). All the variables found to be significant are modifiable and can be corrected.

Key words: Valvular Heart Disease, Treatment outcomes, Association Factors, Hospitals.

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Acronyms

ACC/AHA- American Collage of Cardiology

ACEIs- Angiotensin Converting Enzyme Inhibitors

ARBS- Angiotensin 2 Receptor Blockers

AF- Atrial Fibrillation

AR- Aortic Regurgitation

AS- Aortic Stenosis

AVR – Aortic Valve Replaceemnet

BBs –Beta Blockers

CKD- Chronic Kidney Disease

CABG – Coronary Artery By Pass Grafting

DM –Diabetic Mellituse

DVR – Dual Valve Replacemnet

IE – Infective Endocardities

LOHS- Length of Hospital Stay

MVP- Miteral Valve Replacemnet

MS- Mital Stenosis

RHD- Rhumatic Heart Disease

RVHD – Rhumatic Valve Heart Disease

VHD- Valvular Heart Disease

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1. Introduction

1.1 Background

Heart valve disease, defined as valve dysfunction induced by abnormal structure or function of one or more valve that is pulmonic, mitral, tricuspid or aortic valve in the heart, and it is one of the common cardiovascular diseases worldwide. The clinical features include symptoms like dyspnea, chest pain, fatigue, syncope and heart failure signs. The common causes of Valvular heart disease (VHD) are congenital defects, rheumatic fever, infective endocarditis, degenerative changes and certain connective tissue disorders. The management strategies involve a combination of medical therapy, regular monitoring with echocardiography, and surgical or transcatheter interventions.(1).

Valvular heart disease in developing countries due to rheumatic valvular heart disease is the most common cardiovascular diseases worldwide and its morbidity and mortality can be prevented. Valvular heart disease (VHD) is relatively common in developed nations, with a prevalence of about 2% and increases significantly after the age of 65. (2).

While the management of Valvular heart disease (VHD) has evolved considerably over the years, with advancements in medical and surgical interventions, there remain a need for comprehensive understanding of treatment outcomes and associated factors among patients admitted to hospitals. Previous research has provided valuable insights into efficacy of various treatment modalities, in improving patient outcomes. However, there is a paucity of studies specifically focusing on treatment outcomes and associated factors among hospitalized patients with valvular heart disease (VHD).(5).

According to the center for disease control and prevention (CDC) in USA valvular heart disease affects 2.5% of the population and 13% of persons aged 80 years and older. (4). A systematic review and meta-analysis on outcomes of valvular heart surgery in Africa indicated that in south Africa, Ethiopia, Egypt, Mali, Nigeria and other countries reported a pooled overall mortality of 10.48% and a pooled 30 day mortality of 4.59%.(8).

In Africa there was a reported data using cardiography diagnostic criteria of the World heart federation estimated Valvular Heart Disease due to rheumatic heart disease were 14_31 per 1000 in Ethiopia(9,10). 7 per 1000 in Rwanda.(11).18 per 100 in Uganda and Tanzania. (12),20 per 1000 in South Africa, (10).

Surgical interventions, including valve repair and replacement procedures, play a crucial role in managing valvular heart disease and improving patient outcomes. While traditional open heart surgery has historically been standard approach, advancements in minimally invasive techniques have provided viable alternative with potential benefits such as reduced morbidity, shorter recover times, and improved cosmetic outcomes.(3).

However, the optimal management strategy for valvular heart disease remains a subject of ongoing research necessitating a comprehensive understanding of treatment outcomes associated factors. Factors such as patient demographics, preoperative clinical profiles, and comorbidities may influence surgical outcomes and long-term prognosis. Additionally, intraoperative complication, immediate postoperative outcomes, and long term survival rates are critical metrics for evaluating the effectiveness and safety of surgical interventions. Moreover, the impact of surgical treatment on patients quality of life and functional status underscores the importance of considering patient-centered outcomes in clinical decision –making. (13).

The treatment outcomes of valvular heart disease surgery have many complications. The study done in Amman cross sectional retrospective indicated that among 122 patients 1.6% (2) patients developed stroke post operative complication, bleeding 5 (4.1%).cardiac tamponade 4 (3.3%) , surgical site infection 1 (0.8%) patient , warfarin toxicity 4(3.3%) patients. Other study done in England by retrospective, observational cohort study indicate that incidences of in hospital bleeding complication and re operation among 7774 cardiac surgery patients was 6.7% and 0.3% respectively.(7).

The treatment modalities available for valvular heart disease (VHD) management encompass medical therapy minimally invasive surgical and advanced surgical interventions, each with its own implications for patient outcomes. By assessing survival rates, incidences of mortality, and the occurrence of long term complications, provide comprehensive insights into the effectiveness of these treatment approaches. (6).

Effective treatment is mandatory for valvular heart disease (VHD) patients to alleviate symptoms, improving quality of life and prevent complications. However treatment outcome of VHD patients can vary depending on various factors such as patient demographic, comorbidities and disease severity and the choice of intervention.(14).

1.2 Statement of the problem

Valvular Heart Disease (VHD) is when one or more of the heart valve do not open or close properly, and is a leading contributor to cardio vascular morbidity and mortality worldwide. (15). Rheumatic Heart Disease(RHD) is the major causes of Valvular Heart Disease(VHD) in developing countries but degenerative heart disease is the cause of Valvular Heart Disease(VHD) in developed countries .(16). Rheumatic Heart Disease (RHD) which affect 33.4 million people in the world is the main cause of Valvular Heart Disease(VHD) in third world countries. (17). The study of The Center for Disease Control (CDC) show that 61% of death from valvular heart disease (VHD) is due to aortic valve disease, 15% of death were caused by mitral valve disease and other valves death was 24% .(18). Based on research, survival rate of sever aortic stenosis with symptom 50% survival rate at 1 year. Sever aortic regurgitation 2.2% mortality rate per year. Sever mitral stenosis 72% survival at 1year sever mitral regurgitation 61% survival at 5 years. Sever tricuspid rigid regurgitation 64% survival at 1 year. (19).

In Ethiopia study done cross sectional at six referral hospital indicate that valvular heart disease (VHD)accounts 41.4% of cardio vascular disease (CVD). (20). Another study done on the observational at cardiac center Ethiopia on contemporary outcomes on aortic and mitral valve surgery for rheumatic heart disease indicate that operative mortality occurred in 5(21%) of patients, additionally 11 (5%) patents died at follow up, and 55(23%) patients had at least 1major adverse event valve related event.(21).

Other study done in AA, Ethiopia for revealing an immediate outcomes following valve surgery for rheumatic heart disease through a method of chart abstraction indicate that surgical procedure done triple valve surgery 26 (22.8%) patients, single valve surgery that is 11 aortic and 47 mitral valve of patents, redo mitral valve surgery 3 (2.6%) patients and left maze with mitral valve

surgery 2 (1.8%) patients. Of them had mitral valve surgery post operatively 5 (44.4%) patients died with the 30 days following the index surgery. (22).

The associated factors such as hypertension, hyperlipidemia, chronic kidney disease (CKD), Diabetic Mellituse (DM) has great influence on the treatment outcome of Valvular Heart Disease (VHD). In Ethiopia the Valvular Heart Disease (VHD) treatment outcomes and associated factors in patients admitted in hospital poses challenging due to limited access to specialized care, financial constraints, lack of awareness and educations, shortage of health care professionals, limited availability of medical devices and technologies, so the proposed solution of this research is to assess the treatment outcome and associated factors among patients admitted at St Paul Hospital Millennium Medical Collage, AA, Ethiopia and Cardiac Center Ethiopia, Saint Peter Hospital and Tikure Anbessa Medical Collage which is crucial for improving patient care, treatment outcomes strategies, and promoting better treatment outcomes of Valvular Heart Disease (VHD).

1.3 Significance of the Study

Due to an increasing of number of patient with Valvular heart disease, it is important to have an understanding the treatment outcomes and for assessing the effectiveness of current intervention and identifying areas for improvement. Additionally, exploring the associated factors enables to optimize patient care and potentially reducing morbidity and mortality rate.

The study of Valvular Heart Disease (VHD) holds significance for multiple stakeholders with in the health care system such as for policy makers, organizations involved in health care delivery, including hospitals and medical institutions benefit from research of Valvular Heart Disease (VHD), patients from advancement in treatment options and improving access to care. Health workers for evidence based management and educate patients about Valvular Heart Disease (VHD).

2. Literature Review

Valvular Heart Disease (VHD) represents a significant global health concern, with its epidemiological reflecting a complex interplay of demographic shifts, socioeconomic factors and advanced in medical center.

The study done on operative mortality in adult cardiac surgery by retrospective method reveal that from total 11,190 index cardiac operation that was performed during the study period operative mortality occurred in 246 (2.2%) of the patients. The distribution of operative mortalities included (87.3%) who expired within 30 days while an in patients, 7(6.9%) died within 30 days as an outpatient, 23 (11.2%) expired after 30 days. The most causes of operative mortality were cardiac problem 92(38.7%), renal failure 37(15.6%) and strokes 33(13.9%). Furthermore 242 (98.4%) of deaths attributable for index operations. Post operative complications occurred frequently in those with operative mortality with, with blood transfusions (80.1%), re operative (65%) and prolonged ventilation (62.2%) being most common. (23). The other study done through observational, cross sectional analysis using propensity matching about pleural effusions associated with adverse outcomes after cardiac surgery indicate that of 11,037 patients that underwent cardiac surgery during the study period, 6461(58.8%) had no pleural effusion, 3322(30.1%) had pleural effusion.(24).

The study done in Israel on 5 years outcomes of patient with mitral valve surgery through a single prospective registry indicate that all 49 patients were treated with a balloon expandable device. The procedure was performed via transapical access in 17 cases (34.7%) and transfemoral veins or transatrial septal puncture in 32 cases (65.3%). (25). The study of European society of cardiology guidelines for percutaneous coronary intervention (PCI) favoring radial access over femoral access indicate that the rate of radial approach steadily increased from 13% to 49%, Femoral approach was more common in patients with ST elevation, myocardial infarction and cardiogenic shock and access site complication for radial 0.2% and femoral 0.8.(26).

An outcomes of patients with double valve surgery at university hospital Basel, Switzerland through Kaplan-Meier methods to analyze mortality during follow-up and Cox regression to

investigate potential predictors of mortality show that thirty days mortality was 6.3% in the Dual Valve Replacement (DVR) and 7% in the Aortic Valve Replacement (AVR) plus Mitral Valve Replacement (MVP) cohort. Overall mortality amounted to 17% for Dual Valve Replacement (DVR) and 23% for Aortic Valve Replacement (AVR) plus Mitral Valve Replacement (MVP). (27).

The study of transcatheter mitral valve repair result informed that among 19,088 patients mitral regurgitation success was shown in 88.9% of patients. The incidence of death was 2.7%, stroke was 1.2% and mitral valve re- intervention was 0.97%. (28). A study done in Sweden through cox- proportional hazards model about association between medical therapy after aortic valve replacement indicate that from total 9553 patients 1738(18.2%) patients died during follow up. Statins were prescribed for 49.1% of the patients in 6 month follow up, 51.4% for RAS inhibitor, 79.3% beta blockers. Ongoing treatment was associated with low mortality risk for statins but not for Beta blockers. (29). These studies reveal that there should be close follow up and appointment for better treatment outcome.

Treatment outcome of Valvular heart diseases (VHD) refers to the effectiveness of medical interventions or procedures in managing symptoms relief, improving in cardiac function reduction in hospitalization, and overall impact in the patient quality of life.

The study done on predictors of short term mortality after rheumatic heart valve surgery in Jordan through cohort study indicate that among 346 patients 21% of patients had diabetes, 44.6% had hypertension, 31.6% had coronary artery disease, and 22.5% Heart Failure (HF). Aortic Valve Replacement (AVR) was performed in 125(37%) patients, Mitral Valve Replacement (MVR) in 95(28%), combined Aortic Valve Replacement (AVR) and Mitral Valve Replacement (MVR) in 42(13%), Aortic Valve Replacement (AVR) plus Coronary Artery Bypass Grafting (CABG) in 32(10%). Operative mortality was 5.8%. The cause of death was multi system organ failure in 10 patients, sepsis in 6 patients stroke in 1 patient, and undocumented in 3 patients. Most patients were on standard medical therapy for best treatment outcomes of comorbidities: aspirin 33.3%, clopidogrel 16.2%, statins 25.2%, beta blockers 35.4%, ACE inhibitors 27.8%, and loop diuretics 48.5%. (30).

The contemporary trends in mitral valve surgery in east china from 3228 patients included 536(16.6%) who had mitral valve repair and 2702(83.4%) who had mitral valve replacement. Early mortalities for mitral valve were 0.2% and early mortality for aortic valve replacement was 0.9%. (31).

Contemporary presentation and Management of valvular heart disease (VHD) the Euro observational program valvular heart disease (VHD) 2 survey by international prospective multi-center, observational study reported that in Europe in 2017, the type of valvular disease are 40.3% AS , 33.32% AR ,46.6% MS ,and 37.1% of primary MR who are underwent valve intervention 37% of patients which different from others that involved all valve types. (32). The study done in Netherland by systematic safety analysis indicate that 745 patients underwent minimally invasive mitral valve surgery (507 repair 238 replacement). The repaired was successful in 95.8% over. Over 30 days mortality was 1.2% and stroke rate 0.03%, freedom from any 30 –day major complication was 87.2%. (33).

In sub Saharan Africa, Rwanda by collected data from chart by implemented a decentralised, integrated model the outcomes of 54 patents with rheumatic Heart Disease (RHD) the result reveal that valvular surgery consisted mostly a single valve (56%) and double valve (41%). Patients during 3 year followed 74% of them died; all deaths were patients who had underwent bioprosthetic valve replacement. (34). Anti coagulation was checked at 96%visits. There were no bleeding or thrombotic events requiring hospitalizations. (35).The variability in type of valve disease observed across different countries.

Few African countries has adequate facilities surgical expertise, they still lack key support staff and material resources. Training and mentorship program are being built, and the site participate in cardiovascular research yet a comprehensive, multidisciplinary approach including palliative care and rehabilitation is lacking ,and patient in remote areas are not being served. (36).The study done in south west region of Cameroon through retrospective echocardiographic reported that from 1,397 echocardiographic studies performed 96(6.9%) patients were left sided VHD. Degenerative valve disease, rheumatic heart disease, mitral valve prolapsed and infective endocarditis accounted for 46.9%, 43.8%, 8.3% and 1% of primary left sided VHD respectively. The most common valvular lesion was pure mitral regurgitation (25.5%) and pure aortic regurgitation (23.5%). The majority of the patients (71.9%) had severe lesions. (37).

The studies done in Addis Ababa Ethiopia show that the Rheumatic Heart Disease (RHD) treatment outcome has variations depend on socioeconomic status. Other study done on clinical echocardiographic characteristics and management practice in patients with Rheumatic valvular heart disease (RVHD) cross-sectional in Jima medical center explained that the highest valvular heart disease (VHD) treatment outcome was Miteral Regurgitation (MR) (87.2%), and Miteral Stenosis (MS) (85.1%) .(38).

According to institutional based retrospective cross sectional study in cardiac center Ethiopia on Etiologies and patterns of valvular heart disease among cardiac patients at the cardiac center Ethiopia during February 2000 to April 2022 : indicate that the highest diagnosis result was multi valvular heart disease which accounted 49.5% ,the second case pulmonary stenosis which accounted 15% and the third case was mitral regurgitation accounted 14.3%.(39). The study reveal that this valvular heart disease exposure in Ethiopia highlight the need for integrated intervention aim at reducing health care inequalities and improving access timely diagnosis, treatment and preventive measures for all individual regardless of economic status.

2.1 Conceptual Framework for Valvular Heart Disease

Valvular heart disease poses significant challenges in patient management due to its diverse nature and variable treatment outcomes. This conceptual frame work aims to provide a structured approach to understanding and improving treatment strategies for individuals with valvular heart disease.

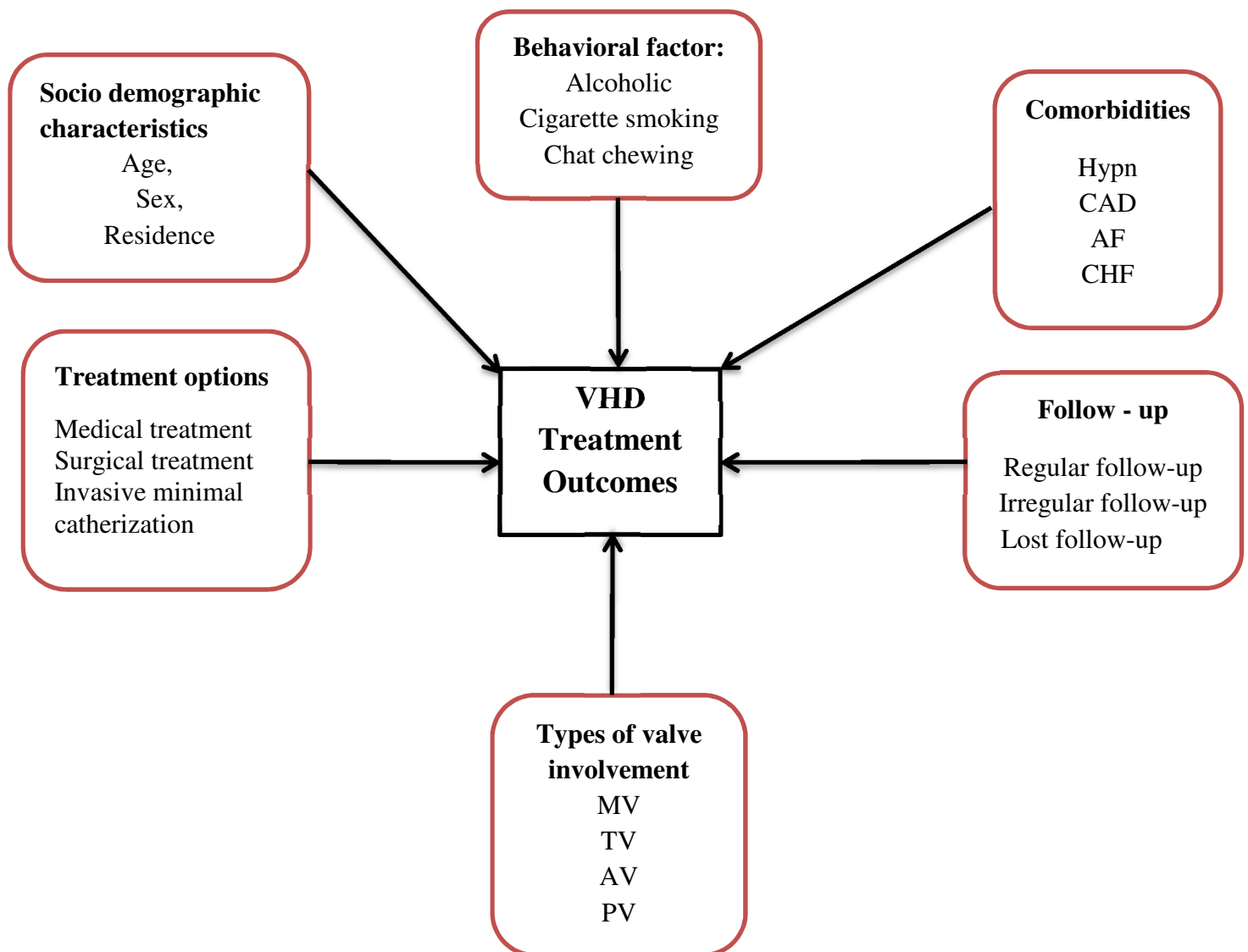


Figure 1 : Conceptual frame work forVHD treatment outcomes and associated factors among patients admitted at selected hospitals of Addis Ababa, Ethiopia 2024. (40).

3 Objective of the research

3.1 General Objectives

To identify Valvular heart disease treatment outcomes and associated factors among patients admitted at selected hospitals of Addis Ababa, Ethiopia2024.

3.2 Specific Objectives

- To asses the treatment outcome of valvular heart disease among patients admitted at selected hospital of Addis Ababa , Ethiopia 2024
- To identify factors associated with valvular heart disease treatment outcome among patients admitted to selected hospital of Addis Ababa , Ethiopia 2024

4. Methods and Materials

4.1. StudyArea and period

The study was carried out from March 2024 to July 2024 at the St. Paul Millennium Medical Collage Hospital, Cardiac Center of Ethiopia, Tikure Anbessa Medical Collage and Saint Peter Hospital which is the leading cardiac healthcare facility located in Addis Ababa, the capital city of Ethiopia. In addition to this, the hospitals provide a wide range of medical services to the local population, including specialty care for patients. The hospitals serve a diverse patient population, including individuals from various socioeconomic backgrounds. The hospitals are selected purposively because they are renowned public institutions that serve medical centers for cardiovascular disease (CVD) medical therapy minimally cardiac surgery, and open heart surgery. In addition to thus the hospitals are chosen due to their expertise, resources and diverse patient populations ensuring a comprehensive analysis of treatment effectiveness and patient experiences. The hospitals offer comprehensive cardiac services. These services are equipped with specialized medical teams and advance technologies. The availability of a full spectrum of

cardiac care, from invasive diagnostics to complex surgical interventions, ensure that patients receive the highest standard of care tailored to their specific conditions.

4.2. Study design

An institution based retrospective cross sectional study was conducted at selected public hospitals Addis Ababa, Ethiopia from March, 2024 until the end of April 30, 2024.

4.3. Population

4.3.1. Source of Population

The source population was all heart disease patients chart admitted at selected hospitals Addis Ababa, Ethiopia since January 2021 - December 2023.

4.3.2. Study Population

The study population consisted of all Valvular heart disease patients chart admitted at selected hospitals Addis Ababa, Ethiopia since 2021 - 2023.

4.3.3 The sampling unit

The sampling unit for this research was an individual patients chart admitted at selected hospitals with valvular heart disease from January 2021 to December 2023

4.3.4 Inclusion and exclusion criteria

4.3.4.1 Inclusion criteria

All Valvular heart disease (VHD) patients admitted at selected hospitals in the last 2 years which have a confirmed diagnosis valvular heart disease (VHD) with echocardiography and clinical findings.

4.3.4.2 Exclusion criteria

Valvular heart disease charts which cannot provide complete information to a degree that compromises the integrity of the data.

Age less than 18 year old(adult age starting WHO)

4.4. Sampling Size Determination

The sample size is determined using a single population proportion formula ($n = Z^2 P (1-P)/d^2$) by taking by considering the treatment outcomes of valvular heart disease (VHD) from previously study 50% (0.5) and using the following assumptions 95% CI and 5% margin of error. Where: n = sample size, Z = Z value at 95% confidence level (standard 1.96) and d = tolerance of error 5% or (0.05) P is proportion of valvular heart disease (VHD) which is 0.5 from previous study of hospital in Jimma medical centre, Ethiopia.(38). Therefore, based on the formula, $n = 1.96^2 * 0.5 * (0.5) / (0.05)^2 = 384$. Since the source population is <10,000, a correction formula is used. By considering non response rate as 10% the total sample size required to conduct the research will be 423.

4.4.1. Sampling Techniques and Procedures

In this study, we used the purpose Sampling to select hospitals in AA, Ethiopia, that providing specialised care with in these hospitals, we employed stratified random Sampling to ensure representation across various demographic and clinical characteristics. Random samples were then drawn for each stratum to ensure proportional representations. Data on patient demographics, clinical characteristics and treatment outcomes were systematically collected following a standardized protocol to minimise bias and ensure robust, generalised result.

Table 1: sample size determination of valvular heart diseases patients who admitted at selected hospitals of Addis Ababa, Ethiopia 2021_2023.(n=423)

Factors	Outcomes		OR	Sample Size
	Exposed (%)	None exposed (%)		
Hypertension	42.9	23.1	2.5	196
Chronic Kidney disease	47.9	26.4	2.56	176
Diabetics	76.7	53.2	2.9	144

Table 1 Sample size calculations for associated factors of valvular heart disease

4.5 Study Variables

4.5.1 Dependent variable

Treatment outcomes of VHD: mortality, survival rate, long last complications.

4.5.2 Independent variables

Socio demographic factors

Age

Sex

Residence

Disease related factors

Rheumatic Fever

Ischeamic Heart Disease

Coronary artery disease

Types of valvular heart disDisease

Disease management related factors

Class of cardio vascular medications.

Surgical and invasive management.

Diagnostic procedure

Behavioural factors

Alcoholic

Cegaratte smoking

Chat chewing

4.6 Data collection and procedures

Data was collected using simple random sampling method. Sampling interval was calculated and data was taken from registration on that interval. Data was collected using data extraction checklist structured which was adapted from different literature review (39,40). The data extraction checklist was developed in English and was pretested for validity, then data extraction was carried out by trained BSC nurses and supervisors working at selected hospitals. The data included patient's socio demographic and also comorbidities, medications, surgical intervention type of valvular heart disease, diagnostic procedures and treatment outcomes.

4.7 Data Quality control and management

The quality of the data was assured through careful design and pretesting was conducted within the study area to ensure the relevance and accuracy of the data collected for the research with (5%) estimating sample size and proper training of the data collectors and supervisors. One day training was provided for the data collectors on how the data should be obtained and recorded. The training was provided on the topics; study objectives, the questionnaire, the use of survey instruments, techniques, and direction as to how to ensuring that all necessary information was present in the patient chart and checking for consistency across different section of the patient chart related to the structured questionnaire. The principal investigator and supervisors was made continuous follow-up and supervision throughout the data collection period. In addition, regular check-up for completeness and consistency of the data made on daily basis.

4.8 Data Analysis Plane and Procedures

Collected data was cleaned, coded and entered into Epi-info version 7.2 and exported to SPSS version 26 for further analysis. Descriptive statistics, including frequencies and percentages, calculated to summarize study variables. Initially, bivariate analysis was performed to identify candidates for multivariable binary logistic regression analysis. Then, variables with a p-value less than 0.25 selected and considered for multivariate analysis. Finally, variables that have a significant association with valvular heart disease identified based on adjusted odds ratio (AOR) with 95% confidence interval (CI) and P value less than 0.05. The fitness of the model checked using Hosmer and Lemeshow goodness of fit. The strength of association between independent and dependent variable was expressed using adjusted odds ratio with a 95% confidence interval. A variable with a P-value of less than 0.05 considered statistically significant. Then the data analysis plane and procedures conducted multicollinearity test to ensure the reliability of

statistically significant findings ($p < 0.05$) in this logistic regression, preserving the integrity of variables.

4.9 Ethical Considerations

Ethical approval was obtained from St. Paul Hospital Millennium Medical College Ethical Review Board. The Support letter was written to Saint Paul Hospital, Cardiac Center Ethiopia, Saint Peter Hospital and Tikure Anbessa Hospital. There must be ensuring personal health information that extracted from chart remain confidential and protected from unauthorized disclosure, respecting rights to privacy and confidentiality. Furthermore, the use of data for research purpose was ensuring that it is used only for intended study and that any potential risks or benefits are carefully weighed.

4.10 Dissemination of Results

Findings of this study submitted to St. Paul Hospital Millennium Medical College. It will be communicated to the selected study hospitals AA, Ethiopia. In addition, the results will be presented in seminars and workshops, and further efforts will be made to publish the findings in national or international peer-reviewed journals.

4.11 Operational Definition

Treatment outcomes: in this study the result obtained after the treatment of valvular heart disease (VHD) patients who are admitted at selected hospitals of AA, Ethiopia 2021-2023, might be survive or died.(44).

Good Treatment outcomes: In this study good treatment outcomes for patients with valvular heart disease is defined as the patients surviving after treatment. This includes patients who show clinical improvement, stabilisation of their conditions, or successful recovery from surgical or medical interventions related to valvular heart disease at selected study hospitals in AA, Ethiopia in specific study period.(43).

Poor treatment outcome: In these study poor treatment outcomes for patients with valvular heart disease is defined as the patients dying during or after treatment period. This encompasses

patients who succumb to valvular heart disease surgical or medical interventions resulting in mortality at selected hospitals of AA, Ethiopia in study periods. (43)

5. Result

5.1 Socio-demographic characteristics of patients

From the study participant majority of them were in the age category of less than 60. Which were 83.7. The mean age of the studied group was 46+ or 14.82 years. The large numbers of participants was urban 230(54.4%). Among valvular heart disease (VHD) patients 230(54.4%) were urbane while 193 (45.6%) were rural. The majority of the study group were female 268(63.4%) than male 155(36.6%).

Table 2: Socio demographic characteristics of valvular heart diseases patients who admitted at selected hospitals of Addis Ababa, Ethiopia 2021_2023.(n=423)

variables	categories	Frequency	percentage	Died	Survieved
Age	≥ 60	69	16.31	31 (7.3%)	38 (8.98%)
	< 60	354	83.7	9 (2.13)	345 (81.56%)
sex	M	155	36.6	15 (3.55%)	140 (33.10%)
	F	268	63.4	25 (5.9%)	183 (43.26%)
residence	Urban	230	54.4	11 (2.6%)	219 (51.77%)
	Rural	193	45.6	29 (6.86%)	164 (38.77%)

5.2 Behavioral and clinical factors

From substance abuse valvular heart disease (VHD) patients the highest number was Chat chewing 125(29.6%), Cigarette smoking 55(13%) was the second and alcohol drinking which was the third, 51(12%). Among the total patients who had family history of valvular heart disease (VHD) was 302(71.4%) and who had not family history of valvular heart disease (VHD) belonged to 121(28.6%). Diuretics was the most commonest medication used (17.8%). From the study participant most of them had no comorbidity and 42.3% of them had comorbidity. Catheterization invasive procedures were the most common procedures done (56.3%).

The treatment outcome for 423 patients admitted with valvular heart disease indicated that 125 (29.6%) chewed chat, with 32 (7.56%) died and 93 (21.99%) survived. Among 51 (12.1%) alcohol drinkers, 31 (7.33%) died and 20 (4.73%) survived, while of 55 (13.01%) cigarette smokers, 29 (6.86%) died and 26 (6.15%) survived. Of the 238 (56.3%) patients who underwent invasive catheterization procedures, 21(4.96%) died and 217 (51.3%) survived, for the 185 (43.74%) patients who had open heart surgery, 19 (4.49%) died and 166 (39.24%) survived. Lastly among 179 (42.3%) patients with comorbidities, 24 (5.67%) died and 145 (34.28%) survived

Table 3 : behavioral and clinical factors of valvular heart diseases patients who admitted at selected hospitals of Addis Ababa, Ethiopia 2021_2023.(n=423)

Variable	Category	Frequency	%	Died	Survived
Chat chewing	Yes	125	29.6	32 (7.56%)	93(21.99%)
	No	298	70.4	8(1.89%)	290(68.56%)
Alcohol drinking	Yes	51	12.1	31(7.33%)	20(4.73%)
	No	372	87.9	9(2.13%)	363(85.82%)
Cigarette smoking	Yes	55	13.0	29(6.86%)	26(6.15%)
	No	368	87.0	11(2.60%)	357(84.40%)
Most medication used	Diuretics	116	17.8	8(1.89%)	108(25.53%)
	Beta blocker	148	7.7	12(2.84%)	136(32.15%)
	Anti-coagulation	82	6.7	9(2.13%)	73(17.26%)
	Anti-platelet	77	4.1	11(2.60%)	66(15.60%)
Follow-up in 30 days	regular follow-up	219	51.8	10(2.36%)	209(49.41%)
	irregular follow-up	125	29.56	13(3.07%)	112(26.48%)
	lost follow-up	79	18.6	17(4.02%)	62(14.66%)
Type of surgery done	Catheterization invasive	238	56.3	21(4.96%)	217(51.3%)
	Open heart surgery	185	43.7	19(4.49%)	166(39.24%)
comorbidity present	Yes	179	42.3	24(5.67%)	145(34.28%)
	No	224	57.7	16(3.78%)	228(53.92%)

5.3 Clinical outcomes of patients with VHD at 30 days index of follow-up

From the total patients 383(90.55%) show improvement while 40(9.5%) patients died. The treatment outcomes are promising with the high rate of 90.5%. However the survival rate 90.55 % indicates that 9.5% patients died with this period. This suggests that there is still a Notable mortality rate that needs to be addressed.

5.4 Bivariate regression analysis for VHD patient admitted at selected hospital of AA, Ethiopia

Bivariate analysis was done to identify candidate variables for multivariate analysis. Variables with p-value of less than 0.25 were interred into multivariable analysis. Those variables were Age, Gender, Alcohol consumption, Smoking, Chat chewing, Family hx o valvular heart disease (f VHD), Comorbidities and Type of surgery done.

5.5 Multivariate regression analysis for VHD patient admitted at selected hospital of AA, Ethiopia, 2024

Multivariable analysis was done to variables associated with valvular heart disease (VDH) treatment outcome. Before the analysis was done model fitness was checked with p-value of 0.97. multicolliniarity was checked and all independent variable had Variance Inflation Factors (VIF)of less than 5 suggesting no multicolliniarity concern In this study smoking cigarette has shown significant association (AOR 2.8; 95% CI [0.69-7.09] P-value 0.045) which means those patients who smoke cigarette are 2.8 times more likely to have poor treatment outcome compared to those who do not smoke cigarette. Presence of comorbidity have also show significant association with treatment outcome (AOR 3.2; 95%CI [1.5-6.89] P-value 0.02), patients who has comorbidity at admission were 3.2 times more likely to have poor treatment outcome compared to those who do not have comorbidity. Alcohol consumption also has shown significant association with poor treatment for valvular heart disease (VHD). (AOR 3.68; 95% CI [0.19-4.78] P-value 0.025), patients who consumed alcohol were 3.6 times more likely to have poor treatment outcome compared to those who did not consume alcohol.

Table 4: multivariate regression analysis for VHD patient admitted at selected hospital of AA, Ethiopia 2021-2023.(n=423)

Categories	Treatment outcome	COR (95% CI)	AOR (95% CI)	P-value
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		Died	Survived			
Age	≥ 60	31	38	1	1	0.88
	< 60	9	345	0.032(0.01-.95)	2.1(1.07-8.1)	
Gender	Male	15	140	1	1	0.54
	Female	25	183	1.3(0.89-4.76)	2.45(1.1-8.02)	
Residence	Urban	11	219	1	1	0.78
	Rural	29	164	3.5(1.04-6.22)	0.79(0.18-8.3)	
Alcohol consumption	Yes	31	20	0.02(0.013-1.09)	3.68(0.19-4.78)	0.025*
	No	9	363	1	1	
Smoking	Yes	29	26	0.03(0.01-0.95)	2.8(0.69-7.09)	0.045*
	No	11	357	1	1	
Chat	Yes	32	93	0.08(0.04-2.05)	2.6(1.05-7.3)	0.537
	No	8	290	1	1	
Family hx of VHD	Yes	25	277	1.6(1.3-7.1)	0.81(0.12-5.5)	0.67
	No	15	106	1	1	
Comorbidities	no	24	145	1	1	0.02*
	yes	16	228	0.99(0.17-8.2)	3.2(1.5-6.89)	
Type of surgery done	Catheterization invasive	21	217	1	1	0.56
	Open heart surgery	19	166	1.2(0.97-4.6)	0.56(0.21-4.7)	

6. Discussion

In this study the prevalence of poor treatment outcome were 9.5%. From the study participant who underwent surgical procedure for VHD 9.5% of them had poor outcome and 90.5% of them had good outcome. This finding goes in line with other study done on operative mortality in adult cardiac surgery by retrospective method which found the mortality rate to be 2.2%(24). Another study on trans catheter mitral valve repair result informed that among 19,088 patients revealed that the mortality rate among the study participant were as low as 2.7%, this is lower than the finding on this study(29). Another study done on Management, clinical outcomes, and

its predictors among heart failure patients admitted to tertiary care hospitals in Ethiopia also found that poor treatment outcome to be 10.2% which is close to a finding in this study(44). Another study done on Immediate outcome following valve surgery for rheumatic heart disease: the first local experience from Ethiopia found post-operative death within 30 days to be 4.4% which is lower than the finding in this study (45).

In this study alcohol consumption has shown significant association with poor treatment outcome. Patients who consumed alcohol were 3.6 times more likely to have poor treatment outcome compared to those who do not consume alcohol. A study done on Management, clinical outcomes, and its predictors among heart failure patients admitted to tertiary care hospitals in Ethiopia it was also found that alcohol consumption is significantly associated with poor treatment outcome of heart failure treatment. This finding goes in line with finding in this study. (44)

Presence of comorbidity has shown significant association with poor treatment outcome of valvular heart disease. In which patients who had comorbidity were 3 times more likely to have poor treatment outcome compared to those who do not have comorbidity at admission. This finding goes in line with studies done in Incidence, clinical outcomes and associated factors among valvular heart disease patients admitted to medical ward of Jimma Medical Center which found that patients who have comorbidity were more likely to have poor treatment outcome compared to those who do not have comorbidity.(40)

In this study cigarette smoking has shown significant association to treatment outcome of Valvular heart disease(VHD). Patients who smoked cigarette were 2.8 times more likely to have poor treatment outcome compared to patients who didn't smoke according to a study done on Treatment outcome and its predictors among patients of acute heart failure at a tertiary care hospital in Ethiopia: a prospective observational study it was found that smoking were significantly associated with poor treatment outcome, this finding goes in line with the finding in this study (43).

7. Limitation and strength

7.1 Limitations

- The chart data used in the study may not contain complete or accurate information, potentially affecting the validity of the findings.
- The retrospective cross-sectional design of the study, which relies on existing chart data, may have limitations such as missing data, incomplete records, and potential inaccuracies in the recorded information.
- The study is confined to the specific area and subjects under investigation due to practical constraints such as geographic location, resource availability, and the accessibility of the target population.

7.2 Strengths

- The study incorporates a wide range of variables to determine their association with treatment outcomes for valvular heart disease (VHD), providing a comprehensive analysis of potential influences.
- It employs standardized and validated questionnaires from other studies, which have been adapted and adopted for this research, ensuring the reliability and validity of the data collection tools.
- A pretest was conducted before the actual administration of the prepared tools to the subjects, allowing for refinement and ensuring the effectiveness of the research.

8. Conclusion and recommendation

8.1 Conclusion

From the total patients 383(90.55%) had good treatment outcome while 40(9.5%) patients had poor treatment outcome. This has found presence of comorbidity, drinking alcohol and smoking cigarette to be significantly associated with poor treatment outcome of Valvular heartdisease(VHD). All the variables found to be significant are modifiable and can be corrected.

8.2 Recommendations

- Implement targeted health education and screening programs, particularly to facilitate early detection and intervention.

- Increase the availability and training for percutaneous transluminal mitral commissurotomy and other critical surgical procedures to ensure timely and effective treatment for valvular heart disease (VHD) patients.
- Strengthen the management of common comorbidities through integrated care pathways that involve both responsible government and non government organisation
- Develop and implement standardized medication protocols to optimize the use of combination drug therapies.
- Comprehensive studies are needed to develop targeted interventions, strategies and to inform clinical guidelines for managing valvular heart (VHD) who have a history of alcohol use and Cegaratte smoking.
- Establish robust follow-up systems to monitor patients' progress post-treatment, providing timely interventions to reduce complications and mortality rates.

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9. Assurance of principal Investigator

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

Name of the student: _____

Signature: _____

Date: _____

Approval of the primary Advisor

Name of the primary advisor: _____

Signature: _____

Date: _____

Approval the co advisor

Name of the primary advisor: _____

Signature: _____

Date: _____

Approval of primary examiner

Name of the primary examiner

Signature: _____

Date: _____

Approval of secondary examiner

Name of the secondary examiner

Signature: _____

Date: _____

10. Annexes:

Questionnaires: The following questionnaires in retrospective cross sectional studies focused on valvular heart disease treatment outcomes among hospitalized patients serve as valuable tools for data collections. These instruments enable researcher together information directly from patient charts, providing insights into treatment efficiency, associated factors, and patient experiences during hospitalization.

S/No	I. Socio demographic questions	Categories
101	Code number of chart	
102	Sex	A. Male B. Female
103	Residence	A. Urbane B. Rural
104	Age(in year)	A. Greater than or equal to 60 B. Less than 60
	II. Associated Factors	
105	The patient history of exposure to risks	A. Smoking A yes B no B. Industrial chemicals A yes B no C. Alcoholic. A yes B no D. Chat chewing A. Yes B no
106	Notable family history of VHD	A. Yes B. No
107	Was the most Comorbidity?	A. Yes B. No
108	How long diagnosis with VHD?	A. Less than 1 years B. 1_3 years C. 3_7 years

		D. 7_ 10 years. E. greater than 10 years
109	List the underlying cause of VHD	A. RHD B. Inflammatory Conditions C. IHD D. Congenital heart disease: E. Degenerative heart disease F. Trauma G. Marfine syndrome H. Drug I. Cardiomyopathy
110	The type of valvular disease diagnosed	A. Aortic stenosis B. Aortic regurgitation C. Mitral Valve stenosis D. .Miteral regurgitation E. Trusgupid valve regurgitation F. Pulmonary valve stenosis G. Pulmonary valve regurgitation H. Triscupid valve stenosis
111	Initially diagnosed VHD is with	A. Physical examination. B. Echocardiography C. Cardiac Catheterization D. Angiography
	III. Treatment outcome	
112	What was the complication or adverse event at	A. CHF. B. Stroke.

	admission time?	C. Hypertention D. thrombosis E. AF. F. Sepsis. G. Pulmonaryhypertension. H. Hyperlipidemia I. CkD J. DM
113	The most common Medication prescribed	A. Digoxin B. Diuretics C. Beta blockers D. ACE inhibitors E. Anti-coagulation F. Anti-platelet G. Statins H. Metoprolol
114	What was the reason for discharge?	A. self-discharge B. Referral C. physician decision
115	The patient condition at the time of follow-up with 30 days following the index	A. Improved B. Died
116	For how long the patientsstay at hospital?	A. less than 1week B. 1_2week. C. 2_3week D. Greater than 3 week
117	The patient medication taking after discharge for VHD	A. Digoxin B. Diuretics C. Beta-blockers

		D. AC inhibitors E. Anticoagulant F. antiplatelet G. Statins H. Metoprolol
118	The follow up and monitoring medical OPD	A. Regular follow-up B. Irregular follow-up C. lost to follow up
119	Any dietary plane with salt or having salty dietary restrictions valvular lesion	A. Yes B. No
120	What specific valvular lesions addressed through surgical interventions?	A. Mitral regurgitation B. mitral stenosis C. aortic regurgitation D. Aortic stenosis E. Tricuspid regurgitation F. Tricuspid stenosis G. pulmonary regurgitation H. pulmonary stenosis
121	Types of surgical procedures done?	A. Cauterization invasive procedure B. open heart surgery
122	Was there the intra operative complication?	A. yes B. no If yes, explain it.
123	What were the complications post operative?	A. Bleeding B. infection C. arrhythmia D. stroke

		E. death F. No complication
	Ecographic parameter and severity classification	
124	left ventricular inter diameter and end diastolic	A. Normal B. B mildly increase C. Moderately increased
125	Left ventricular systolic dimension (Lvsd)	A. Normal B. mild reducing. C. Moderately reducing D severely reduced
126	Left ventricular posterior wall end diastolic and systolic (Lvpwd)	A. Normal B. mildly increase C. Moderately increased D. Severely increase
127	Left ventricular ejection fraction (EF)	A. Mild B. mild dysfunction C. moderate dysfunction D. Severe dysfunction
128	Tricuspid annular plane systolic exertion (TAPSE)	A. Normal B. decrease
129	Fractional shortening	A. Normal. B. B mildly reducing C. Moderately reduced

		D. Severely reduced
130	Aortic root diameter.	A. normal B. Mild dilated. C. moderately dilated D. Severely dilated
131	Left atrial diameter	A. Normal B. mild enlarged C. C moderate enlarged D. D severe enlarged
132	main pulmonary diameter.	A. Normal B. mildly enlarged C. Moderately enlarged D. severe enlarged