GENDER SPECIFIC DISPARITIES IN CARDIOVASCULAR DISEASE AND TREATMENT OUTCOMES AMONG OLDER ADULTS IN A TERTIARY HEALTH INSTITUTION, EDO STATE

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OCTOBER, 2025

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IN PARTIAL FULFILMENT OF THE AWARD OF THE DEGREE OF BACHELOR OF NURSING SCIENCES, FACULTY OF NURSING SCIENCES, UNIVERSITY OF BENIN, BENIN CITY

OCTOBER, 2025

DECLARATION

This is to declare that this research project titled **GENDER SPECIFIC DISPARITIES IN CARDIOVASCULAR DISEASE AND TREATMENT OUTCOMES AMONG OLDER ADULTS IN A TERTIARY HEALTH INSTITUTION, EDO STATE** was carried out by **MOMOH MIRACLE SEMIRA** is solely the result of my work except where acknowledged as being derived from other person(s) or resources.

MATRICULATION NUMBER BMS2001182

In the (department/school): FACULTY OF NURSING SCIENCES, UNIVERSITY OF BENIN, BENIN CITY.

Signature: _____

Date _____

CERTIFICATION/APPROVAL

This is to certify that this research project titled **GENDER SPECIFIC DISPARITIES IN CARDIOVASCULAR DISEASE AND TREATMENT OUTCOMES AMONG OLDER ADULTS IN A TERTIARY HEALTH INSTITUTION, EDO STATE** "will be carried out by **MOMOH MIRACLE SEMIRA** with Matriculation number **BMS2001182** in the faculty of Nursing Science, under the supervision of Dr Mrs C.A Enuku

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PROF. C.E. OMOROGBE _____

(Head of Department Medical Surgical Nursing) SIGN & DATE

_____ _____

(External examiner) SIGN & DATE

DEDICATION

This work is dedicated to the Almighty Father, the One who kept me alive and made it possible for me to make it this far. His unending grace and mercy upon my life is immeasurable. I also dedicate this project to my late father, Mr Momoh.

ACKNOWKEDGEMENT

I would like to begin by giving all the glory to the Almighty God, the sovereign owner of my life. I am eternally grateful for His guidance, protection, and unfailing provision throughout my life and academic journey.

I am incredibly grateful to Dr Mrs Enuku, a distinguished scholar of impeccable standing. Her invaluable contributions, meticulous corrections, and expert guidance were instrumental in shaping this research study. I would also like to extend my appreciation to my HOD, Dr (Mrs.) R.E Esewe, Prof. F. U. Okafor, Prof (Mrs) J. A. Afemikhe, Prof. (Mrs) C.E Omoregbe, Mrs M. A. Iniomor, Sr. J. N. Chukwurah, Mrs C. C. Edo-Osagie, Dr T. A. Ehwarieme, Mrs. E. N. Oyana, Mrs. R. Lawal, Mrs Ikhuobase, Mrs F. Esebanme and Mr Aragua as well as all other lecturers and non- academic staff for their immense contribution, dedication and support.

I express my heartfelt and deepest gratitude to my Family, my late father , Mr Momoh, my mother, Mrs Momoh my rock-solid support system, who have been my pillar of strength throughout this journey. To my siblings and my extended family, the Galis may God continue to bless and enrich you abundantly.

My sincere gratitude also goes to my friends, Henry Chinedu, may God continue to bless you. Joshua Momodu, thank you for being my support system. I really appreciate you for all you do. To my squad- COGC (Damian, Ivie, Kelechi, Eniola, Gift, Hilary) thank you guys for the support throughout our journey, may God bless you all richly. Amen.

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ABSTRACT

This study investigated cardiovascular disease (CVD) presentations, risk factors, and treatment outcomes among 102 older adults receiving care at the University of Benin Teaching Hospital, Edo State. A descriptive cross-sectional design with structured questionnaires was used. The mean age of respondents was 66.5 years; 52.9% were female and 47.1% male. Hypertension (26.5%) and cardiac structure/function disorders (26.5%) were the most prevalent diagnoses. The most reported CVD presentations were chest pain (73.5%), rapid fatigue (83.3%), irregular heartbeat (100%), weakness/lightheadedness (83.4%), and shortness of breath during activities (79.4%). Awareness of risk factors was high, with over 90% acknowledging hypertension, obesity, diabetes, poor diet, physical inactivity, and stress as contributors to CVD. However, only 73.3% recognized gender differences in disease patterns. Perceptions of gender disparities in treatment were generally low, though 56.6% agreed that differences in care may affect survival, and 90.1% emphasized the need for gender equity in treatment. Chi-square analysis revealed no significant association between gender and CVD presentations (p=0.077) or treatment outcomes (p=0.194), but a significant relationship existed between gender and risk factor awareness (p=0.024). The findings highlight the importance of sustained health education and gender-sensitive strategies to improve CVD management in older adults.

Keywords: Cardiovascular disease, older adults, risk factors, treatment outcomes, gender disparities.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Cardiovascular diseases (CVDs) are a major public health concern and the leading cause of death worldwide. They refer to disorders of the heart and blood vessels (WHO, 2021). Cerebrovascular disease affects the arteries in the brain, while coronary heart disease affects those in the heart. Peripheral arterial disease impacts the blood vessels in the arms and legs. Rheumatic heart disease, caused by untreated streptococcal infections, damages the heart's muscles and valves. Congenital heart disease refers to structural abnormalities of the heart present from birth. Deep vein thrombosis can lead to blood clots in the legs, which may travel to the heart or lungs, potentially causing a pulmonary embolism (Pająk et al., 2022).

According to the Global Burden of Disease Study (2019), CVDs account for over 32% of total deaths worldwide, with heart attacks and strokes responsible for 85% of these fatalities (Gaidai et al., 2023; Sun et al., 2023). Several risk factors contribute to CVDs, including smoking, obesity, diabetes, hypertension, and high cholesterol (Vaduganathan et al., 2022). Smoking promotes the formation of atherosclerotic plaques by causing fatty deposits in the arteries, leading to inflammation and an increased risk of blood clots (Levin et al., 2021). Obesity is linked to hypertension, insulin resistance, and dyslipidaemia, all of which can contribute to heart failure and atrial fibrillation (Bakhtiyar et al., 2022). Diabetes damages nerves and blood vessels due to high blood sugar levels and disrupts cholesterol balance by increasing low-density lipoproteins (LDL) while decreasing high-density lipoproteins (HDL), thereby raising the risk of strokes and myocardial infarctions (Sun et al., 2024). Hypertension puts excessive strain on the heart and blood vessels, leading to arterial stiffening and damage to vital organs such as the heart, kidneys, brain, and eyes (Yano et al., 2022). Additionally,

hyperlipidaemia, characterised by elevated triglycerides and cholesterol, contributes to endothelial damage, inflammation, and plaque accumulation, further increasing the risk of cardiovascular complications (Münzel et al., 2022).

CVDs present differently in each gender, significantly influencing disease progression. These differences stem from biological and hormonal variations, disease development, response to treatment, and overall outcomes (Regitz-Zagrosek & Gebhard, 2023). Globally, studies have highlighted variations in CVD presentation between men and women. Women are more likely to present with atypical symptoms such as fatigue, nausea, and shortness of breath, whereas men more commonly report classic chest pain. These differences often lead to delays in diagnosis and treatment for women, potentially resulting in poorer outcomes (Connelly et al., 2021).

Furthermore, traditional CVD risk factors—including hypertension, diabetes, dyslipidaemia, smoking, and obesity—vary in prevalence and impact between genders. For instance, diabetes confers a higher relative risk of coronary heart disease in women compared to men, while smoking poses a greater risk for myocardial infarction in younger women. Structural differences also play a role; women have smaller hearts and blood vessels, making them more prone to plaque accumulation. Hormonal variations, particularly in testosterone, progesterone, and oestrogen, further influence CVD risk. Premenopausal women benefit from oestrogen's protective effects, while postmenopausal women, who experience a decline in oestrogen levels, are at higher risk of cardiovascular events (Ndzie Noah et al., 2021).

Men and women also exhibit differences in plaque characteristics. Men tend to develop high-grade arterial obstructions due to severely calcified plaques, whereas women, despite having fewer calcified plaques, are more likely to experience plaque rupture, leading to various cardiovascular complications (Gerdts et al., 2022). Additionally, responses to treatment vary between genders. Studies have shown that ACE inhibitors and other therapeutic approaches

are more effective in women than in men (Tamargo et al., 2022). Women also benefit more from the combination of beta-blockers and diuretics (Betai et al., 2024).

Despite these differences, women are less likely to receive invasive CVD treatments, such as revascularisation and catheterisation, due to their higher complication rates. Factors such as smaller blood vessel size, increased bleeding risk, more advanced disease at diagnosis, and coexisting conditions like diabetes contribute to this disparity (Geraghty et al., 2021). Additionally, higher complication rates in women are associated with hypertension and cerebrovascular disease (Parikh et al., 2021). While CVDs affect both men and women, growing evidence suggests significant gender-specific disparities in their presentation, risk factors, and outcomes. These differences are influenced by biological, hormonal, social, and cultural factors, which impact disease manifestation, access to care, and treatment effectiveness (Yang et al., 2024).

In Nigeria, there is limited local data on gender disparities in CVD among older adults, particularly within hospital settings. Adults aged 65 years and above represent a key population in whom the cumulative effects of cardiovascular risk factors become more evident, leading to higher rates of CVD-related morbidity and mortality. Additionally, individuals in this age group often experience significant lifestyle and metabolic changes, making them an important demographic for studying gender differences in disease presentation, risk profiles, and treatment outcomes (Odelola et al., 2021). Therefore, this study aims to assess gender-specific disparities in CVD among adults aged 65 years and above in a tertiary health institution in Edo State, focusing on disease presentation, risk factors, clinical profiles, and treatment outcomes.

1.2 Statement of Problem

Despite significant advances in cardiovascular medicine, gender disparities in CVD continue to present challenges in diagnosis, management, and outcomes. Women often present with atypical symptoms, such as fatigue, nausea, and shortness of breath, which can lead to misdiagnosis and delayed treatment. These delays in seeking and receiving appropriate care contribute to poorer prognoses for women compared to men. Studies indicate that women are 50% more likely than men to be misdiagnosed after a heart attack, which increases their risk of mortality (Betai et al., 2024).

Furthermore, traditional CVD risk factors—such as diabetes, hypertension, and obesity—show gender-based disparities in their impact and management. For instance, diabetes is a stronger predictor of heart disease in women than in men, with diabetic women facing a 44% higher risk of cardiovascular mortality compared to their male counterparts. Despite this heightened risk, women are 20% less likely to receive cholesterol-lowering medications or adequate hypertension control (Dueñas-Criado et al., 2024). In contrast, men have a higher prevalence of hypertension and are more likely to engage in risk behaviors, such as excessive alcohol consumption and smoking, which significantly contribute to early cardiovascular complications (Zhao, 2021).

Men are also more likely to experience early-onset CVD, often presenting with more severe cardiovascular events, such as myocardial infarction and sudden cardiac arrest. Research shows that men aged 50-65 years have a 70% higher risk of developing coronary artery disease compared to women in the same age group. Despite this, men are more likely to receive aggressive treatments, such as percutaneous coronary intervention (PCI) and coronary artery bypass grafting (CABG), leading to better short-term outcomes. However, studies suggest that men often exhibit poorer long-term adherence to lifestyle modifications and

medication regimens, resulting in higher rates of recurrent cardiovascular events (Kumar et al., 2024).

Another significant concern is the variability in access to treatment and disparities in clinical outcomes. Studies consistently show that women are 34% less likely to undergo PCI and 24% less likely to receive CABG compared to men. This treatment gap contributes significantly to increased mortality rates, with post-heart attack mortality in women being 20% higher than in men (Regitz-Zagrosek & Gebhard, 2023).

Older adults experience a higher burden of cardiovascular disease due to aging-related changes such as arterial stiffness, reduced heart function, and multiple coexisting health conditions. Treatment disparities in this age group can be influenced by factors like delayed diagnosis, under-treatment, and differences in healthcare access. While older men are more likely to receive invasive procedures, they also face challenges with long-term adherence to medications and lifestyle modifications. Older women, on the other hand, may have different symptom presentations and are sometimes less likely to receive aggressive interventions. Additionally, financial constraints, limited mobility, and reduced social support in older age can impact timely healthcare access for both men and women, further complicating disease management.

In Nigeria, CVD represents a growing burden, compounded by socioeconomic inequalities, limited healthcare infrastructure, and disparities in disease awareness. Many Nigerians, particularly in rural areas, face financial and logistical challenges in accessing timely and quality cardiovascular care. Gender norms also influence health-seeking behaviours, with men often delaying medical consultations until severe symptoms arise, while women may struggle to access healthcare due to financial dependence or caregiving responsibilities (Ojo et al., 2024). Additionally, traditional beliefs and lower health literacy contribute to late-stage diagnoses, reducing the effectiveness of treatment interventions

1.3 Aim of the study

The aim of this study is to assess gender specific disparities in cardiovascular disease and treatment outcomes among older adults in a tertiary health institution, Edo state.

1.4 Objectives of the Study

The specific objectives of this study include to;

1. determine the common cardiovascular disease presentations among older adults by gender in a tertiary health institution, Edo state.
2. identify gender-specific differences in cardiovascular disease risk factors among older adults by gender in a tertiary health institution, Edo state.
3. determine the perceived gender disparities in treatment outcomes of cardiovascular disease among older adults by gender in a tertiary health institution, Edo state.

1.5 Research questions

1. What are the common cardiovascular disease presentations among older adults by gender in a tertiary health institution, Edo state.
2. What are the gender-specific differences in cardiovascular disease risk factors among older adults by gender in a tertiary health institution, Edo state.
3. What are the perceived gender disparities in treatment outcomes of cardiovascular disease among older adults in a tertiary health institution, Edo state.

1.6 Hypothesis

There is no significant relationship between gender and cardiovascular disease presentation, risk factors, and treatment outcomes among older adults in a tertiary health institution in Edo State.

1.7 Significance of the Study

To the Patients

Understanding gender-related differences in cardiovascular disease will empower patients with knowledge about their health risks, symptoms, and treatment options. By highlighting disparities in disease presentation and outcomes, this study will encourage early detection and timely medical intervention. Additionally, personalized treatment approaches tailored to male and female patients can improve adherence to treatment plans and enhance overall health outcomes.

To Nursing Practice

The study's findings will enhance nursing practice by equipping nurses with evidence-based knowledge on how gender influences cardiovascular disease. With this understanding, nurses can develop gender-sensitive care strategies that improve patient assessment, diagnosis, and treatment. By recognizing specific risk factors and symptoms in male and female patients, nurses can implement more targeted preventive measures and provide holistic, patient-centered care.

To Nursing Research

By addressing gender-specific disparities in cardiovascular disease, this study contributes valuable insights to the field of nursing research. It provides a foundation for future studies to explore additional factors influencing treatment disparities and patient outcomes. The findings may also highlight gaps in current research, encouraging further investigations aimed at improving gender-sensitive cardiovascular care strategies and overall healthcare equity.

To Nursing Education

Integrating this study's findings into nursing education can enrich the curriculum by increasing awareness of gender disparities in cardiovascular disease. It will equip nursing

students with the knowledge and skills necessary to recognize and address gender-related differences in patient care. This educational enhancement prepares future nurses to provide more effective, individualized care to diverse patient populations.

To Nursing Administration

For nursing administrators, this study provides critical insights that can guide hospital policies and protocols related to cardiovascular disease management. By understanding gender-based disparities, administrators can advocate for improved resource allocation, staff training, and patient education programs that address these differences. These improvements can lead to more equitable healthcare delivery, ensuring that both male and female patients receive appropriate care based on their unique health needs.

To Society

At the societal level, the findings from this study can contribute to public health initiatives aimed at reducing gender disparities in cardiovascular disease. Increased awareness can lead to better health-seeking behaviors, improved preventive measures, and community-based interventions that address cardiovascular risk factors among both men and women. Moreover, healthcare systems can use the study's insights to develop policies that promote equitable access to cardiovascular care, ultimately leading to a healthier population.

1.8 Scope/ Delimitation of the Study

This study focuses on gender specific disparities in cardiovascular disease and treatment outcomes among older adults in a tertiary health institution, Edo state.

This study is delimited to gender specific disparities in cardiovascular disease, presentation, risk factors and treatment outcomes among older adults in a tertiary health institution and will be carried out in the University of Benin Teaching Hospital (UBTH), Benin city, Edo state.

1.9 Operational Definition of Terms

Gender-Specific Disparities: In this study, this refers to the differences in cardiovascular disease presentation, risk factors, and treatment outcomes between male and female patients aged 65 years and above in a tertiary health institution in Edo State.

Cardiovascular Disease (CVD): In this study, this refers to medical conditions affecting the heart and blood vessels, including hypertension, coronary artery disease, heart failure, and other related disorders among adults aged 60 years and above.

Presentation: In this study, this refers to the symptoms, clinical signs, and complaints with which male and female patients present when seeking medical attention for cardiovascular disease.

Risk Factors: In this study, this refers to predisposing conditions or lifestyle behaviors such as hypertension, diabetes, smoking, obesity, and high cholesterol that increase the likelihood of developing cardiovascular disease among adults aged 60 years and above.

Treatment Outcome: In this study, this refers to the effectiveness of medical and nursing interventions in managing cardiovascular disease, measured by factors such as survival rates, recovery time, complications, and improvements in quality of life among male and female patients.

Older adults: In this study, this refers to individuals within the age range of 60 years and above who are diagnosed with cardiovascular disease and are receiving care in a tertiary health institution in Edo State.

CHAPER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter focuses on the review of related literature under the headings; conceptual review, theoretical review and empirical review. These are organized in order of the most important to least important to the variable of interest. Necessary literature would be gotten from published and unpublished works, articles, journals and textbooks in this study.

2.1 Conceptual review

2.1.1 Concept of cardiovascular disease

Cardiovascular disease (CVD) is widely defined in scholarly literature as a group of disorders affecting both the heart and blood vessels, encompassing coronary artery disease, cerebrovascular disease, peripheral arterial disease, heart failure, and congenital heart abnormalities (Woodruff et al., 2024). With 17.9 million deaths annually, CVD continues to be the world's top cause of mortality, according to the World Health Organization (Wang et al., 2024). CVD is further defined by the American Heart Association as disorders that cause structural and functional abnormalities of the heart and circulatory system, which impede the body's ability to distribute nutrients and oxygen to its tissues (Reddy, 2022). The phrase refers to pathological diseases characterized by decreased cardiac function or vascular integrity, which cause disturbances in blood flow and tissue oxygenation (Reddy, 2022). The scientific discourse on CVD distinguishes between chronic illnesses like hypertension and stable ischemic heart disease and acute occurrences like myocardial infarction and stroke, all of which are caused by progressive vascular pathology (Wang et al., 2024). Atherosclerosis is commonly acknowledged in academic literature as a key underlying mechanism leading to many types of

cardiovascular disease by causing the accumulation of lipid plaques within artery walls, lowering vascular compliance and encouraging thrombotic events (Eriso, 2023). Researchers also define CVD as having a complex origin, with genetic predisposition, environmental exposures, lifestyle variables, and metabolic abnormalities all playing a role (Sobey et al., 2022). Furthermore, the phrase is commonly used in public health literature to refer to conditions that significantly contribute to global morbidity and death, impacting a wide range of demographic and geographic groups (Marquina et al., 2021). Cardiovascular disease (CVD) is classified into several types, each affecting a particular aspect of the heart and circulatory system (Kaushik et al., 2023). Coronary artery disease is a prevalent kind caused by the constriction or blockage of coronary arteries, which can result in myocardial infarction or angina (Avinash et al., 2022). Cerebrovascular disease, which includes stroke and transient ischemic episodes, is defined as disorders caused by a decreased or obstructed blood supply to the brain (Nityananda, 2022). Peripheral artery disease (PAD) is known to decrease blood flow to the extremities, resulting in discomfort or reduced movement (Aslam et al., 2021). Heart failure is defined as a condition in which the heart is unable to adequately pump blood, causing fluid retention and shortness of breath (Li, 2024). Valvular heart disease refers to diseases affecting the heart valves, such as stenosis or regurgitation, which impede blood flow direction and efficiency (Katu, 2024). Congenital heart disease is defined as structural cardiac problems that exist from birth and can vary in severity and presentation (Bibi et al., 2024). Myocarditis and inflammatory cardiomyopathy are disorders in which viral or autoimmune mechanisms cause heart muscle inflammation and compromise cardiac function (Rauff et al., 2021).

2.1.2 Epidemiology of cardiovascular disease in older adults

Cardiovascular disease remains a prominent cause of morbidity and mortality in older individuals, with significant gender disparities in frequency and incidence. According to recent

research, elderly women are more likely than males to develop CVD at a later stage, resulting in higher complication rates and worse prognoses (Teshale et al., 2024). Biological and hormonal variables contribute to this difference, as oestrogen has been shown to have a cardioprotective effect in premenopausal women, while its drop after menopause increases vulnerability to CVD (Forouzandeh et al., 2024). Likewise, men tend to develop CVD sooner in life, with studies showing a higher incidence of coronary artery disease and myocardial infarction than women of the same age group (Rethemiotaki, 2023). Women, on the other hand, have a higher incidence of heart failure with preserved ejection fraction (HFpEF), which is frequently misdiagnosed and undertreated (Zeng et al., 2024). Social determinants, such as healthcare access and lifestyle choices, aggravate gender discrepancies, with women being less likely to undergo aggressive CVD treatment (Padhi et al., 2024).

Cardiovascular disease (CVD) prevalence rises dramatically with age, individuals over the age of 70 account for over two-thirds of all atherosclerotic cardiovascular disease (ASCVD) deaths, underlining the disproportionate burden on this population (Kim, 2023). Recent epidemiological statistics reveal a significant increase in CVD-related mortality rates. In the United States alone, coronary heart disease mortality increased from 360,900 in 2019 to 382,820 in 2021, while stroke-related deaths went from 150,005 to 162,890 over the same year (Okobi et al., 2024). Noncommunicable diseases (NCDs), particularly CVDs, are common in Africa, accounting for 38.3% of all NCD-related deaths and 22.9 million disability-adjusted life years. Notably, individuals under the age of 30 bear the highest burden (Ka et al., 2024. Over the past three decades, Africa has undergone an almost 50% rise in the burden of CVDs. Hypertension contributes significantly to CVDs in Africa, accounting for 13.2% of myocardial infarctions and 24.6% of strokes, including 21.6% of ischemic strokes and 33.1% of intracerebral hemorrhagic strokes (Ojo et al., 2024). In Nigeria, CVDs account for a significant part of medical admissions. According to studies, CVD-related admissions account for around

20% of all medical admissions (Mbakwem et al., 2023). Heart failure and cerebrovascular accidents (strokes) are among the most prevalent cardiovascular disorders requiring hospitalization (Oyan et al., 2024). Several risk factors influence CVD prevalence in Nigeria, including hypertension, obesity, diabetes mellitus, tobacco use, physical inactivity, and poor dietary habits. Addressing these modifiable risk factors through focused interventions is critical for reducing the CVD burden (Awosoga et al., 2024).

Age is the most important nonmodifiable risk factor for CVD, with older people particularly those over 75 being most vulnerable due to progressive atherosclerosis and vascular changes (Fadah et al., 2022). Furthermore, frailty is widely recognized as an important factor impacting cardiovascular health in older adults, with studies indicating that it affects up to 30% of those with coronary artery disease and up to 80% of those with heart failure. Frailty not only increases vulnerability to unfavorable cardiovascular events, but it also greatly raises the chance of death (James et al., 2024). Ischemic heart disease is the most common kind of CVD in the elderly. However, diseases such as stroke and peripheral vascular disease have distinct distribution patterns that affect healthcare demands differently across age groups (Qu et al., 2024). While the prevalence of coronary heart disease and stroke decreased by almost 30% between 2000 and 2019, there was a concurrent increase in the identification of cardiac arrhythmias, valvular illnesses, and thromboembolic disorders, showing shifting patterns of cardiovascular risk (Conrad et al., 2024).

2.1.3 Concept of gender and gender disparities in health

Gender is a multidimensional social construct that refers to societally determined roles, conventions, behaviours, and identities, as opposed to the biological idea of sex, which is based on anatomical and physiological traits (Kaufman et al., 2023). While sex is commonly viewed as binary (male/female), gender is a spectrum that includes identities such as transgender,

nonbinary, and third gender individuals (Subramaniapillai et al., 2023). Understanding this differentiation is critical in health research since biological and sociocultural gender influences health behaviours, disease risk, and outcomes (Kaufman et al., 2023).

Gender disparities in health are the disproportionate burdens of disease, access to healthcare, and treatment outcomes that individuals face based on their gender identification. These gaps result from structural and systemic inequalities, such as sociocultural norms, discrimination, economic marginalisation, and unequal decision-making authority in households and communities (Yassine et al., 2021). Women, for example, are more likely to be underdiagnosed and undertreated for cardiovascular problems, which might be attributed to the historically male-centric design of clinical research and diagnostic criteria (Nadakuditi, 2024). In contrast, males are more prone to participate in risky health behaviours and less likely to seek preventive care, which is frequently affected by masculine gender norms (Subramaniapillai et al., 2023).

Beyond maternal mortality and access to care, gender differences are visible across a wide range of health disorders. For example, women are much more likely to be diagnosed with depression (Gao et al., 2023), yet men are more likely to commit suicide, indicating a gendered disparity in mental health support and acknowledgement (El Ibrahimi et al., 2021). Cardiovascular disease, traditionally seen as a "man's disease," is underdiagnosed in women, owing to unusual symptoms and gender bias in clinical assessments (Al Hamid et al., 2024). In infectious disease management, men frequently have worse outcomes for diseases like tuberculosis and COVID-19 (Chidambaram et al., 2021; Vahidy et al., 2021), whereas women are more likely to suffer socioeconomic impediments to diagnosis and treatment access (Tayal et al., 2024). Even in chronic illnesses like diabetes, men are frequently given more aggressive treatments than women, despite having similar health needs (Ciarambino et al., 2022).

2.1.4 Gender specific disparities in cardiovascular disease presentation

Cardiovascular disease (CVD) presents differently in men and women, making timely identification difficult, especially for women. While males usually report conventional symptoms like chest discomfort and pressure, women may arrive with atypical symptoms such exhaustion, nausea, shortness of breath, and back or jaw pain. These modest symptoms can lead to a misdiagnosis or underdiagnosis in emergency rooms, where clinical protocols frequently prioritise male-centric presentations. Furthermore, women typically appear later in the course of their condition and are more likely to be detected at an advanced state (Bosomworth & Khan, 2023). Hormonal and anatomical differences, such as smaller coronary arteries, also have an impact on diagnostic sensitivity, especially in methods like exercise ECG and angiography, which have worse accuracy in female patients (Betai et al., 2024). These diagnostic gaps are exacerbated by knowledge gaps among healthcare practitioners, who may be unfamiliar with gender-specific clinical recommendations or symptom profiles (Cabrera & Levin, 2023). As a result, women have a higher risk of delayed or missing therapy, which contributes to lower cardiovascular outcomes than males.

Recent research has highlighted notable gender differences in how cardiovascular disease (CVD) presents among older adults, with implications for diagnosis and treatment. For instance, older women with acute coronary syndrome often present without classic chest pain, leading to misdiagnosis or delayed care. Instead, they are more likely to report atypical symptoms such as fatigue, nausea, or shortness of breath (Estepa & De Lara, 2023). This variation in symptom presentation contributes to disparities in timely treatment and worse outcomes in women. Additionally, pathophysiological differences such as endothelial dysfunction and microvascular disease are more prevalent in older women, contributing to non-obstructive coronary artery disease—a condition often underdiagnosed in traditional cardiovascular assessments (Brouwers et al., 2024). In contrast, older men typically exhibit more classic obstructive lesions, making

their conditions more readily identifiable through standard angiographic methods (Williams et al., 2022). Furthermore, older women are less likely to be referred for invasive procedures and are often undertreated compared to men, even when presenting with comparable risk profiles (Holtzman et al., 2023).

2.1.5 Gender specific disparities in cardiovascular disease risk factors

Cardiovascular disease (CVD) remains the leading cause of morbidity and mortality worldwide, with significant gender-specific disparities in risk factors contributing to differential disease burden. Biological differences between men and women, particularly in hormonal regulation, lipid metabolism, and inflammatory responses, play a crucial role in modulating CVD risk (Rajendran et al., 2023). For instance, estrogen has been shown to have cardioprotective effects in premenopausal women by improving endothelial function and lipid profiles; however, postmenopausal women experience a sharp increase in CVD risk due to the decline in estrogen levels (Meloni et al., 2023). Sex-specific differences in lipid metabolism have been observed, where men typically exhibit higher levels of low-density lipoprotein (LDL) cholesterol, while women have higher high-density lipoprotein (HDL) cholesterol concentrations until menopause, at which point their lipid profiles become more atherogenic (Jia et al., 2024). Furthermore, inflammatory markers such as C-reactive protein (CRP) are significantly elevated in women compared to men, which has been associated with a higher incidence of CVD events in females (Kupper et al., 2024). These biological variations contribute to sex-specific disparities in CVD risk and necessitate gender-sensitive approaches in prevention and management strategies.

Beyond biological differences, behavioral and lifestyle factors contribute significantly to gender disparities in cardiovascular disease (CVD) risk. Men are more likely to engage in high-risk behaviors such as smoking, excessive alcohol consumption, and poor dietary habits, which

increase their susceptibility to CVD at younger ages (Peters & Woodward, 2022). In contrast, women generally adopt healthier dietary patterns and are more likely to seek medical care, yet they face unique risks related to metabolic syndrome and psychosocial stressors that exacerbate CVD outcomes (Walli-Attaei et al., 2022). Physical inactivity, a well-established risk factor for CVD, is more prevalent among women, particularly in older age groups, leading to higher rates of obesity and type 2 diabetes, both of which amplify cardiovascular risks (Bucciarelli et al., 2023). Moreover, gender disparities in hypertension management have been observed, with women more likely to develop resistant hypertension despite adherence to treatment protocols, highlighting the need for sex-specific therapeutic interventions (Vriend et al., 2024). In addition to biological and behavioral factors, disparities in healthcare access, treatment, and clinical outcomes further contribute to gender differences in cardiovascular disease (CVD) risk. Research indicates that women are often underdiagnosed and undertreated for CVD, partly due to the historical perception of heart disease as a predominantly male condition (Bayoumi & Karasik, 2021). Women are more likely to present with atypical symptoms, such as fatigue, nausea, and shortness of breath, which can lead to delayed diagnosis and treatment compared to men who often exhibit classic symptoms like chest pain (Estepa & De Lara, 2023). Furthermore, studies have shown that women receive fewer aggressive interventions, such as coronary angiography and revascularization, even when presenting with similar disease severity as men (Williams et al., 2022). Disparities in medication prescriptions also exist, with women being less likely to receive guideline-directed medical therapy for conditions such as hypertension and dyslipidemia, despite evidence supporting their efficacy in reducing cardiovascular risk (Simioni et al., 2023).

2.1.6 Gender specific disparities in cardiovascular disease treatment outcomes

Gender disparities in cardiovascular disease (CVD) treatment outcomes are widely recognized, with research indicating that women often experience poorer prognoses following medical interventions compared to men. Studies have shown that women undergoing percutaneous coronary intervention (PCI) and coronary artery bypass grafting (CABG) have higher short-term mortality rates and increased complication risks, which may be attributed to delayed diagnosis and treatment initiation (An et al., 2024). Biological differences, including smaller coronary artery size and a higher prevalence of microvascular dysfunction in women, may also contribute to these adverse outcomes (William et al., 2022). Furthermore, disparities in response to pharmacological treatments have been observed, with women reporting a higher incidence of adverse drug reactions, particularly with anticoagulants and statins, which may lead to suboptimal medication adherence and reduced treatment efficacy (Danielson et al., 2022). In contrast, men often receive more aggressive treatment strategies and benefit from early intervention, resulting in better long-term survival rates (Lunova et al., 2023). Women are also more likely than men to suffer from post-procedural complications such as bleeding and vascular injuries, which contribute to extended hospital stays and increased mortality rates (Siudak et al., 2022). Additionally, studies indicate that women derive less benefit from secondary prevention strategies, including lipid-lowering and antithrombotic therapies, partially due to lower medication adherence and a higher incidence of side effects (Wang et al., 2023).

Despite advancements in cardiovascular disease (CVD) management, women continue to experience inferior treatment outcomes compared to men, largely due to systemic biases and underrepresentation in clinical trials (Betai et al., 2024). Women have historically been under-enrolled in cardiovascular studies, leading to a lack of sex-specific data that could inform optimal treatment approaches (Holtzman et al., 2023). This has resulted in the widespread

application of male-centric treatment guidelines, which may not adequately address the unique pathophysiological and pharmacokinetic differences in female patients (Chang et al., 2023). Moreover, disparities in the use of evidence-based therapies persist, with studies showing that women are less likely to receive implantable cardioverter defibrillators (ICDs), cardiac resynchronization therapy (CRT), and thrombolytic agents compared to men, even when clinically indicated (Chang et al., 2021). Pharmacological treatment outcomes also demonstrate gender disparities, with evidence suggesting that women experience more adverse reactions to common CVD medications, including anticoagulants, beta-blockers, and statins, which can lead to lower adherence and reduced treatment efficacy (Al-Arkee & Al-Ani, 2023). Furthermore, women are significantly less likely than men to receive implantable cardioverter defibrillators (ICDs) and cardiac resynchronization therapy (CRT), despite similar or greater potential benefits (Popescu et al., 2023). This discrepancy in device-based therapy utilization contributes to higher post-treatment mortality and hospitalization rates among women.

2.2 Theoretical review

This study reviews the gender and health disparities framework which is well-suited for studying specifically examines how gender differences influence health outcomes, disease prevalence, and treatment disparities. It integrates biological (e.g., hormonal differences), social (e.g., gender roles, healthcare access), and behavioral (e.g., lifestyle choices) factors to explain why men and women may experience cardiovascular disease and treatment outcomes differently.This model is adopted as theory of best fit for this study.

2.2.1 Gender and health disparities framework

Health disparities have long been recognized as a significant public health issue, with various factors contributing to differences in disease prevalence, treatment outcomes, and healthcare

access among different populations. One of the most critical determinants of health disparities is gender, which influences both biological and social aspects of health. The Gender and Health Disparities Framework is a theoretical approach that examines how differences between men and women—both in terms of biological sex and socially constructed gender roles—contribute to variations in health outcomes and healthcare experiences.

This framework highlights that gender is not just a variable but an intersectional determinant that interacts with biological, social, behavioral, and systemic factors. While biological differences between men and women play a role in disease susceptibility and progression, social norms, cultural expectations, and healthcare system biases further shape health outcomes. Over the years, researchers have observed that gender disparities exist in various medical conditions, including cardiovascular disease, cancer, reproductive health, and mental health disorders. These disparities manifest in different ways, such as unequal access to treatment, variations in disease diagnosis, and differences in health-seeking behaviors.

The Gender and Health Disparities Framework provides an essential lens through which these disparities can be analyzed. By considering both biological and social influences on health, this framework allows researchers, healthcare professionals, and policymakers to better understand the root causes of gender-based inequalities in health and to develop more effective interventions to address them.

The Gender and Health Disparities Framework is the result of interdisciplinary research that incorporates insights from public health, gender studies, sociology, and social epidemiology. Although it does not have a single originator, several key scholars have contributed to its development. One of the earliest contributions to the study of gender and health disparities came from Ann Oakley (1972), a British sociologist who explored how gender roles affect medical treatment and health-seeking behaviors. Her research laid the foundation for later studies on how societal expectations influence healthcare access and decision-making.

In the 1990s and 2000s, Nancy Krieger, an epidemiologist and public health researcher, expanded on these ideas by linking gender disparities in health to broader social determinants of health, including discrimination, economic inequality, and systemic barriers within the healthcare system. Around the same period, Judith Lorber (1997) contributed to gender theory by examining how social constructs of gender shape medical practices and patient experiences.

Other significant contributors include Lisa Berkman and Ichiro Kawachi, social epidemiologists who examined the intersection of gender, socioeconomic status, and healthcare access, further reinforcing the idea that health disparities are influenced by a complex web of factors rather than biology alone. Additionally, global health organizations like the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) have incorporated this framework into public health initiatives, emphasizing the importance of gender-sensitive healthcare policies.

Components of the gender and health disparities framework

The Gender and health disparities framework is built on four core components, each of which plays a role in shaping gendered differences in health outcomes:

1. Biological factors in health disparities

One of the fundamental aspects of the framework is the recognition that biological differences between men and women contribute to variations in disease patterns and treatment responses. Sex-based differences in physiology, genetics, and hormones influence how diseases develop, progress, and respond to medical interventions.

For instance, hormonal differences play a critical role in cardiovascular health. Estrogen, a hormone predominantly found in women, has been shown to provide cardiovascular protection by improving vascular function and reducing inflammation. However, after menopause, estrogen levels decline, increasing women's risk for cardiovascular disease (CVD). In contrast,

testosterone, the dominant male hormone, is associated with higher levels of LDL cholesterol ("bad" cholesterol), which can lead to an earlier onset of heart disease in men.

Additionally, genetic differences contribute to variations in disease susceptibility. Certain X-linked genetic factors may provide protective advantages for women in some diseases, while others make them more vulnerable to autoimmune disorders. In cardiovascular disease specifically, studies have shown that women tend to develop microvascular disease (affecting small blood vessels), whereas men are more likely to suffer from obstructive coronary artery disease (affecting larger arteries).

Moreover, differences in symptom presentation significantly impact health outcomes. Women experiencing a heart attack often report symptoms such as nausea, dizziness, and jaw pain, which are less recognized as warning signs compared to the classic chest pain symptoms observed in men. This difference often leads to delayed diagnosis and treatment for women, contributing to higher mortality rates.

2. Social and behavioral influences on health

Beyond biological factors, the Gender and Health Disparities Framework acknowledges the role of social and behavioral determinants in shaping health outcomes. Gender roles, cultural expectations, and personal behaviors all influence how men and women engage with healthcare systems and manage their health.

A critical aspect of this is health-seeking behavior. Women, often burdened with caregiving responsibilities, may prioritize their family's health over their own, leading to delayed medical care for serious conditions. In contrast, men are often socialized to avoid seeking medical help due to societal expectations that equate masculinity with toughness and self-reliance. These behavioral differences contribute to gender-specific health risks and treatment disparities.

Risk-taking behaviors also differ between genders. Men are more likely to engage in activities that contribute to chronic diseases, such as smoking, excessive alcohol consumption, and high-

risk physical activities. Conversely, women may have lower levels of physical activity, particularly in cultures where gender norms restrict their mobility.

Additionally, mental health differences play a role in overall well-being. Women are more likely to experience depression and anxiety, which are linked to higher risks of developing cardiovascular disease. However, men, who are less likely to seek psychological help, may experience untreated stress and hypertension, further exacerbating their cardiovascular risks.

3. Healthcare system and policy-driven disparities

Systemic biases within the healthcare system further widen gender disparities in health outcomes. Medical research and treatment guidelines have historically been developed based on studies that overrepresent male patients, leading to gaps in knowledge about how diseases affect women.

Gender bias is also evident in diagnosis and treatment practices. Studies have shown that women with cardiovascular disease are less likely to receive early interventions, such as angioplasty or coronary bypass surgery, compared to men. Doctors are more likely to attribute women's symptoms to stress or psychological factors, delaying life-saving treatment.

4. Economic and structural barriers to health equity

Economic status and access to resources are crucial in determining health outcomes. Women, particularly those in lower-income groups, are more likely to experience financial barriers to healthcare due to wage gaps and lack of economic independence. In many societies, women rely on male relatives for financial support, which can limit their ability to afford specialized medical care.

Health literacy also plays a role in disparities. While women tend to have higher awareness of preventive healthcare, they may lack access to proper medical resources. On the other hand, men may have lower health literacy, leading to poor adherence to treatment regimens and worse health outcomes.

2.2.2 Application of Gender and health disparities framework

Biological Component

Gender differences in cardiovascular disease are influenced by biological factors such as hormonal regulation, genetic predisposition, and symptom presentation. These biological variations contribute to differences in disease onset, progression, and treatment responses among men and women. In the case of older adults in Edo State, women experience a delayed onset of CVD compared to men due to the protective effects of estrogen before menopause. However, after menopause, this advantage disappears, leading to a sharp rise in cardiovascular risks such as hypertension, heart failure, and stroke. Men, on the other hand, tend to develop cardiovascular disease earlier in life, primarily due to higher levels of low-density lipoprotein (LDL) cholesterol and increased exposure to risk factors from a younger age.

Symptom presentation further exacerbates gender disparities in treatment. Men with CVD typically exhibit classic symptoms such as chest pain and discomfort, making it easier for physicians to diagnose the condition. Women, however, often present with atypical symptoms, including fatigue, nausea, dizziness, and shortness of breath, which may lead to misdiagnosis or delayed treatment. In a tertiary health institution in Edo State, where diagnostic protocols may not fully account for gender differences in symptom expression, women could be at risk of underdiagnosis or inappropriate treatment, contributing to poorer outcomes.

Social Component

The social component of the Gender and health disparities framework examines how societal norms and roles shape health behaviors and access to care. In Edo State, traditional gender roles significantly influence how men and women prioritize their health and navigate the healthcare system. Women, particularly older women, are often primary caregivers within the family, leading them to place the health of spouses, children, and grandchildren above their own. This prioritization of family over self can result in delayed healthcare-seeking behavior,

as women may postpone medical visits until their symptoms become severe. On the other hand, men may delay seeking medical attention due to societal expectations of masculinity, which discourage expressions of vulnerability and reliance on healthcare.

Additionally, social support networks play a role in health outcomes. Older women may rely more on family members for health-related decisions and financial support, which could limit their autonomy in accessing healthcare services. Men, having greater control over financial resources, may have fewer obstacles in seeking medical care but might not adhere to treatment due to lower levels of social reinforcement.

Behavioral Component

The behavioral aspect of the Gender and Health Disparities Framework highlights how differences in lifestyle choices and adherence to medical recommendations impact cardiovascular health. In Edo State, men and women exhibit distinct behavioral risk factors that contribute to disparities in cardiovascular disease prevalence and treatment outcomes.

Men are more likely to engage in high-risk behaviors, such as smoking, excessive alcohol consumption, and diets high in saturated fats, all of which significantly increase the likelihood of developing cardiovascular disease. These lifestyle habits contribute to a higher prevalence of coronary artery disease and myocardial infarctions among men.

Women, on the other hand, are generally less likely to engage in smoking or alcohol consumption but may experience higher obesity rates, physical inactivity, and dietary insufficiencies, particularly after menopause. This places them at increased risk of hypertension, metabolic syndrome, and heart failure. Medication adherence is another key factor in treatment outcomes. Studies suggest that women are more likely to follow prescribed medication regimens compared to men, but they may face financial and accessibility barriers that limit their ability to maintain long-term treatment. In contrast, men, despite having better financial access, may discontinue medication due to lower perceived susceptibility to cardiovascular

complications. In Edo State, these behavioral differences could influence treatment effectiveness, patient compliance, and long-term health outcomes, requiring a gender-sensitive approach to cardiovascular disease management.

Healthcare System Component

The healthcare system plays a crucial role in determining who receives timely and effective cardiovascular care. Gender biases within medical practice, diagnostic criteria, and treatment protocols can lead to disparities in care delivery and outcomes for men and women.

In many clinical settings, including tertiary institutions in Edo State, medical research and treatment guidelines are often based on male-dominated studies, leading to a lack of gender-specific strategies in cardiovascular disease management. As a result, women may be less likely to receive aggressive interventions, such as coronary angioplasty, stent placement, or bypass surgery, even when presenting with similar disease severity as men.

Diagnostic biases may also contribute to disparities in treatment. Healthcare providers may attribute women's cardiovascular symptoms to anxiety, stress, or menopause, delaying necessary diagnostic tests and interventions. Additionally, men are more likely to be referred for cardiac catheterization and other advanced procedures, while women may receive less intensive treatment approaches, such as lifestyle modifications and medication alone.

Another critical issue is hospital admission and treatment delays. Women are more likely to experience longer wait times for specialist consultations and delays in receiving life-saving interventions, such as thrombolysis or percutaneous coronary intervention. These disparities, if present in the tertiary health institution in Edo State, could result in higher mortality rates and poorer recovery outcomes for female patients compared to their male counterparts.

Structural Component

Structural barriers, including economic factors, healthcare infrastructure, and policy limitations, further contribute to gender disparities in cardiovascular disease treatment outcomes. In Edo

State, financial constraints are a significant obstacle for many patients, particularly for older women who may have limited economic independence.

Men, who traditionally have more access to financial resources, may be better able to afford specialist consultations, medications, and follow-up care, whereas women may struggle with the cost of long-term disease management. Out-of-pocket expenses for cardiovascular medications, diagnostic tests, and hospital visits can be prohibitively high, leading some patients—especially women—to discontinue treatment prematurely or rely on alternative medicine. Healthcare infrastructure and availability of specialists also play a role in gender disparities. If tertiary health institutions in Edo State lack adequate gender-sensitive cardiovascular care, women's unique needs may not be adequately addressed. For instance, fewer female cardiologists and gender-sensitive healthcare policies may contribute to an environment where women's cardiovascular concerns are not prioritized.

Furthermore, public health awareness campaigns on cardiovascular disease tend to focus more on men, as heart disease has traditionally been perceived as a "man's disease." As a result, women may lack awareness of their own cardiovascular risks, leading to late presentation and more severe disease at diagnosis.

2.2.3 Strength and weakness of the theory

The Gender and Health Disparities Framework offers a comprehensive approach to understanding gender-specific differences in cardiovascular disease and treatment outcomes. One of its major strengths is its holistic perspective, integrating biological, social, behavioral, healthcare system, and structural factors. This allows for a detailed examination of how gender influences disease risk, healthcare access, and treatment responses. Additionally, the framework highlights systemic barriers such as economic constraints and healthcare biases, making it a valuable tool for promoting gender-sensitive health policies.

However, the framework has some limitations. It may overgeneralize gender experiences, focusing primarily on male-female differences while overlooking individual variations and the experiences of non-binary or transgender individuals. Additionally, it prioritizes gender over other social determinants, such as socioeconomic status and cultural influences, which can also shape health disparities. Another challenge is its limited applicability to non-european contexts, as healthcare systems and cultural beliefs in settings like Edo State may not fully align with the framework's assumptions. Lastly, implementation barriers, such as resource constraints and difficulty in collecting gender-disaggregated data, may limit its practical use in healthcare settings.

2.3 Empirical review

This review aims to show areas of convergence and conflict by assessing the strength and weakness of reviewed studies with the aim of providing evidentiary value to this research study.

2.3.1 Cardiovascular disease presentations among older adults by gender

Anguita-Gámez et al. (2024) carried out a nation wide study in Spain aimed to to analyze differences between men and women in clinical characteristics in patients older than 75 years hospitalized for HF in Spain. A retrospective observational study of 354,786 episodes of patients admitted for acute HF to all hospitals of the National Health System in Spain was conducted..The source of the data was the Minimum Basic Data Set (MBDS) of the Spanish National Health System. For the purpose of this analysis, the total group was divided into two subgroups: men and women 75 years of age or older. Comparisons between continuous variables were performed using the Student t-test for two factors and analysis of variance (ANOVA) with the Bonferroni correction for 3 or more, and categorical variables using the $\chi 2$ test or the Fisher exact test. Findings showed that women constituted 59.2% of the study population and were older on average (85.9 ± 5.5 years) compared to men (84.2 ± 5.3 years),

the prevalence of coronary heart disease, cancer, diabetes, stroke, renal failure and chronic respiratory diseases was higher in men, while that of hypertension, psychiatric disorders and valvular heart disease was higher in women.

Brouwers et al. (2024) investigated gender differences in coronary artery disease patterns. prospective study was performed at 23 sites and enrolled patients with at least one epicardial lesion with an FFR ≤ 0.80 intended to be treated by PCI. All patients underwent a standardized physiological protocol that mandated FFR pullbacks with pullback pressure gradient (PPG) calculation. The aim was to compare CAD patterns, defined by PPG, between genders. Overall, 1004 patients were included in the analysis, 236 females (250 vessels) and 768 males (794 vessels). On the baseline seven-item Seattle Angina Questionnaire (SAQ-7), females reported more physical limitation, more frequent angina and a lower quality of life than men for the same degree of flow reduction. In women, the pattern of CAD demonstrated a more focal nature compared to men.

Yang et al. (2024) conducted a Prospective cohort study to investigate gender disparities in all-cause and cardiovascular mortality among individuals with early-onset cardiovascular disease (CVD). Sample size was 2,829 participants with early-onset CVD from the Kailuan study. Instrument for Data Collection was questionnaires for demographic and health information; blood samples for serological indicators, data extraction was from the Kailuan Study databases. Data analysis was by Cox proportional hazard models to assess hazard ratios (HR) for gender disparities in mortality. Results showed that elevated high-sensitivity C-reactive protein (hs-CRP) levels and an estimated glomerular filtration rate (eGFR) < 60 mL/min/1.73m² notably escalated the risk of all-cause mortality in both genders and the utilization of antiplatelet agents and successful blood glucose control might mitigate the risk of all-cause mortality.

Kodali et al. (2023) investigated the prevalence and associated factors of cardiovascular diseases across Indian states among men and women aged ≥45 years. Data from the

Longitudinal Ageing Study in India wave 1 (2017–2019) was used, which included a final analytical sample size of 56,935 adults and their spouses aged 45 years and above. CVDs prevalence for sociodemographic and behavioural variables was estimated, and multivariable logistic regression was used to assess the association between behavioural factors and CVDs in both men and women. Findings revealed that presentations of CVD are correlational to other comorbid conditions such as hypertension, hypercholesterolemia and diabetes.

Dev et al. (2024) conducted a study on Sex and Gender Influence on Cardiovascular Health in Sub-Saharan Africa: Findings from Ghana, Gambia, Mali, Guinea, and Botswana aimed to examine the associations between biological sex, gender-related variables, and cardiovascular health (CVH) risk factors in SSA countries. Data from the STEPwise approach to surveillance of risk factors for non-communicable disease survey, conducted in adults from Ghana, Gambia, Mali, Guinea, and Botswana. The main outcome was CVH, measured through the health index with values ranging from 0 (worst) to 5 (best or ideal) CVH. Multivariable logistic regression was applied to determine the gender-related factors related to poorer CVH (index less than 4). Results showed that in SSA populations, being female was associated with poorer CVH given the disproportionate burden of hypertension and overweight/obesity presentations. Gender-related factors such as marital status and unpaid work were associated with better CVH in males compared to females.

Lee et al. (2022) conducted a systematic review and meta-analysis of sex- and gender-based differences in presentation severity and outcomes in adults undergoing major vascular surgery. The MEDLINE, Embase, and Cochrane CENTRAL databases were searched from their inception to December 2020. All observational studies and randomized controlled trials that had evaluated the gender differences in presentation severity or outcomes for patients who had undergone open or endovascular abdominal aortic aneurysms (AAAs), carotid artery stenosis (CAS), peripheral artery disease (PAD), and type B aortic dissection (TBAD)

repair, carotid endarterectomy or stenting, or lower extremity bypass or angioplasty were included. Findings revealed the pooled estimates for more severe disease at presentation demonstrated that female sex or gender was associated with a 1.18-fold greater risk of AAA rupture at presentation. However, no differences were found in the proportion of patients who had presented with symptomatic CAS between the sexes or genders. Female sex or gender was negatively associated with a claudication presentation compared with male sex or gender and a 1.10-fold greater risk of a presentation with CLTI study had analyzed the effects of sex or gender on disease severity at presentation for the patients with TBAD.

Nwoke et al. (2022) carried out a study to examine gender differences in cardiovascular clinical presentation patients admitted with a hypertensive crisis at the buea regional hospital, cameroon. A cross-sectional survey from June 2018 until June 2019 was conducted. The criteria to define a hypertensive crisis (HC) were systolic and/or diastolic blood pressure should be ≥180/110 mmHg. The data were analyzed using SPSS 20 for Windows. Findings showed that Headache and dyspnea (34.7%) were the most common symptoms, while men exhibited more psychomotor agitation. Hypertensive emergencies occurred in 59% of cases, with acute left ventricular failure (44.6%) being the most frequent. Brain, heart, and kidney involvement were seen in 27.4%, 28.4%, and 4.2% of patients, respectively, with no gender differences.

Ogah et al. (2024) conducted a study in Nigeria todescribe the rationale, design and clinical presentations, profile of the first 1290 CHF in the Ibadan Chronic Heart Failure project. A total of 1290 patients (55.8% men) were included. The men were older than the women ($p<.001$) and had a higher prevalence of alcohol and cigarette use, comorbidities, and worse cardiac structural abnormalities ($p<.001$). The are also gender differences in the pattern of aetiology of HF. HHF, DCM, and pericardial diseases are more common in men. Women have higher rates of rheumatic heart disease. The study conclude that there is a gender difference in clinical

profile and outcomes of CHF in this cohort. Males appear to have a worse clinical profile, structural cardiac abnormalities.

2.3.2 Gender-specific differences in cardiovascular disease risk factors among older adults by gender

Teshale et al. (2024) conducted a prospective cohort study in Australia to identify gender-specific social and behavioral risk factors for cardiovascular disease (CVD) among community-dwelling older adults. The study was part of the ASPREE trial and included 9,936 healthy individuals aged 70 years and above (5,231 women, 4,705 men). Data were obtained from the ASPREE Longitudinal Study of Older Persons. A total of 25 variables related to socialization were assessed. Machine learning models (Elastic Net and extreme gradient boosting) were used for variable selection, followed by Cox regression modeling conducted separately for men and women. Findings revealed that for men, having close family support and engaging in games like chess or cards reduced CVD risk, while for women, living with others and having emotionally supportive friendships were more protective. Across both genders, being married or partnered lowered CVD risk. These results highlight how social factors, differentially expressed by gender, influence cardiovascular health in older adults.

Antza et al. (2023) conducted a multi-country review in developed nations across Europe to investigate gender-specific cardiovascular risk factors in young to middle-aged adults, with implications for lifelong disease prevention. The study is a collaborative review by the EAS Young Fellows and focuses on both traditional and emerging gender-specific CVD risk factors. Drawing from large epidemiological studies, the authors analyzed differences in the prevalence of obesity, diabetes, contraceptive use, pregnancy-related conditions, and substance abuse between men and women. Although the study focused on younger populations, it established risk trajectories that significantly influence CVD outcomes in older age. It highlighted how

men have higher rates of smoking and earlier onset hypertension, whereas women face unique hormonal and pregnancy-related risks.

Jan et al. (2024) conducted a review to assess cardiovascular diseases among indian older adults.A systematic literature search was conducted in major electronic databases including Medline, PubMed, Web of Science, and Google Scholar, as well as the websites of the WHO, Indian Council of Medical Research (ICMR), and other relevant sources. The search was focused on identifying articles published in English from the year 2006 onwards, with the aim of capturing the most recent literature on CVDs among older adults in India. Following the review process, a total of 121 references were selected for inclusion in the review. The Review gleaned that primary risk factors contributing to the elevated incidence of CVDs among older adults in India include hypertension, diabetes, dyslipidemia, obesity, smoking, a sedentary lifestyle, and poor dietary habits. Additionally, stress and genetic predisposition are noteworthy contributors to CVDs in this population.

Dev et al. (2022) conducted a retrospective multi-country analysis using data from the World Health Organization's STEPwise approach to surveillance (STEPS) across six South Asian countries to examine the relationship between gender-related factors and cardiovascular health (CVH). The final sample included 33,106 adults (aged 18–69, with older adult subgroups analyzed) from national STEPS surveys conducted between 2014–2019. Data were collected via standardized questionnaires, physical measurements, and biochemical tests. Multivariate linear and logistic regression were used for analysis, with multiple imputation for missing data. Findings showed that although women had slightly better overall CVH index scores, gender-related variables such as marital status and large household size were associated with poorer CVH outcomes—more significantly in men. For instance, married men had over twice the odds of reporting a history of CVD compared to unmarried counterparts. The study emphasized that

both sex and sociocultural gender roles jointly influence CVD risk in older South Asians and called for more gender-sensitive preventive strategies

In another developing country, Sukmawan et al. (2023) conducted a cross-sectional genetic association study in Indonesia to investigate gender differences in the Gly972Arg polymorphism of the insulin receptor substrate 1 (IRS-1) gene and its relationship to cardiovascular risk factors (CRFs) among adults. The study was carried out in both rural and urban communities across Indonesia, involving a total sample size of 378 participants. Data were collected using structured demographic and clinical questionnaires, while genotyping for the Gly972Arg (rs1801278) polymorphism was performed using the TaqMan real-time polymerase chain reaction (PCR) method. Statistical analysis involved calculating odds ratios and chi-square tests to examine associations between genetic variants, gender, and cardiovascular risk factors. The results revealed that the T allele of the IRS-1 gene was significantly more prevalent among women than men (54.6% vs. 45.4%, OR = 1.89, p = 0.01). Additionally, individuals carrying the T allele had a higher likelihood of hypertension (OR = 1.69), though this finding was marginally non-significant (p = 0.058). The study concluded that the higher frequency of the T allele in women may contribute to the increased prevalence of metabolic syndrome and hypertension in the female population, highlighting a potential genetic mechanism underlying gender disparities in cardiovascular health in Indonesian older adults.

Dev et al. (2022) conducted a cross-sectional study across five sub-Saharan African countries—Ghana, Gambia, Mali, Guinea, and Botswana—to examine the associations between biological sex, gender-related variables, and cardiovascular health (CVH) risk factors. The study utilized data from the World Health Organization's STEPwise approach to surveillance (STEPS) of non-communicable disease risk factors. A total of 15,356 adults (61.4% females; mean age 36.9 years) were surveyed. Data were collected using standardized STEPS instruments, which included structured interviews and biometric measurements.

Multivariable logistic regression analysis was employed to explore associations between gender-related variables and poorer CVH, defined as a health index score of less than 4 on a scale from 0 (worst) to 5 (ideal). The study found that hypertension (21.6% vs. 13.8%) and overweight/obesity (48.3% vs. 27.5%) were more prevalent among females than males. Women were also more likely to be unemployed or engaged in unpaid work. Overall, females had worse CVH than males. Marital status and unpaid work were associated with better CVH outcomes in males than in females. The study concluded that being female in SSA is associated with poorer cardiovascular health due to a greater burden of risk factors and gender-related social disparities.

Russell et al. (2023) conducted a population-based, community cross-sectional study to evaluate the association of sex- and gender-specific cardiovascular disease (CVD) risk factors among adults in Freetown, Sierra Leone. The study used a stratified multistage random sampling method and included 2,394 adults from eight randomized sub-zonal communities in the Western Urban Area. Data were collected using the WHO STEPwise approach for non-communicable disease surveillance, incorporating structured interviews, physical measurements, and biochemical assessments. Multivariable logistic regression was used to analyze associations between demographic characteristics and CVD risk factors. Results indicated that males had a slightly higher prevalence of hypertension, diabetes, and obesity compared to females, though not statistically significant. However, females had significantly higher BMI, waist circumference, triglycerides, total cholesterol, and lower HDL-C. Moreover, females had increased odds of dyslipidemia, alcohol consumption, and hypertension. The correlation between BMI, waist circumference, and raised blood sugar was stronger among women. The study highlights that being female in this context is associated with a greater burden of cardiovascular risk factors, underscoring the need for gender-sensitive public health interventions and screening policies in Sierra Leone.

Kumma et al. (2022) conducted a community-based cross-sectional study to assess the prevalence, magnitude, and factors associated with the number of major modifiable cardiovascular disease (CVD) risk factors among adults in southern Ethiopia. The study included 2,483 adults aged 25–64 years selected through a three-stage random sampling technique from both urban and rural areas in Wolaita. Data were collected using structured interviews and physical/biochemical measurements based on WHO protocols. Analysis involved descriptive statistics and multivariable regression to identify factors linked to higher numbers of risk factors. Findings revealed high prevalence of modifiable CVD risk factors: physical inactivity (44.1%), low HDL-C (31.3%), high blood pressure (22.2–22.4%), hypertriglyceridemia (15.5%), and obesity (2.8%). Notably, 75.8% of participants had at least one risk factor, 42.3% had two or more, and 19.4% had three or more. The most common co-occurrence was physical inactivity and low HDL-C (19.7%), followed by physical inactivity and hypertension (17.8%). Urban residency, being male, consuming sugar-sweetened foods, and older age were positively associated with higher risk factor counts, while farming was negatively associated. The study underscores the urgent need for public health strategies targeting physical activity and dietary habits among urban and aging populations.

Gun et al. (2023) conducted a retrospective epidemiological analysis of cardiovascular risk factors using data from 2,435 patients in Guinea. The primary aim was to examine how cardiovascular risk factors are distributed across demographic groups and identify significant associations with geography, gender, and family medical history. Cardiovascular risk scores were assessed following national guidelines, and statistical tools like ANOVA, Chi-squared, and Mann-Whitney U tests were used for comparative analysis. Key findings include significant gender differences, with a slight female predominance, especially in higher-risk categories (10% or more risk). Regional disparities and a higher prevalence of tuberculosis were also noted across different cardiovascular risk levels. Additionally, individuals in the

higher-risk groups more frequently had fasting blood glucose tests, suggesting closer monitoring or greater metabolic risk. The study emphasizes the importance of integrating geographic location, family history, and gender when assessing and managing cardiovascular risks in Guinea. These variables were found to significantly influence disease prevalence and should guide personalized prevention and intervention strategies.

Oguanobi et al. (2021) conducted a comparative study assessing gender-related differences in electrocardiographic indices among apparently healthy elderly Nigerians. Sixty-six participants (46 males, 20 females) were recruited through a community health initiative and underwent standard 12-lead resting ECG along with anthropometric and cardiovascular assessments. Key findings included a higher prevalence of ECG abnormalities in males (89.23%) compared to females (70%). Gender-specific variations were observed: males had significantly longer QRS durations, while females exhibited prolonged QTc intervals. Among females, waist-hip ratio and hip circumference showed significant negative correlations with QRS duration and PR interval, respectively. ST-segment elevation was more prevalent in males, whereas long QTc intervals (>0.440 ms) were more common in females. The study concluded that elevated obesity indices in elderly women were associated with ECG features indicative of increased cardiovascular risk.

Chastaingt et al. (2023) conducted a cross-sectional study using data from the 2019 TAHES cohort to compare the prevalence of cardiovascular risk factors (CVRF) between men and women, and to explore the role of obstetrical, psychological, and socio-economic factors in sex-related differences in CVRF in Benin. The study included 1,583 adults with a median age of 39 years, selected from a geographically defined general population. Data collection was performed using a standardized questionnaire adapted from the World Health Organization (WHO) STEPS instrument. The analysis involved univariate and multivariate logistic regressions, including female-specific models to assess associations with factors such as

anxiety, depression, and pregnancy history. The results showed significant sex-based differences in the prevalence of several CVRFs. Diabetes (1.2% vs. 3.4%), abnormal kidney function (15.5% vs. 8.4%), obesity (12.5% vs. 4.1%), tobacco smoking (3.4% vs. 14.1%), and reduced physical activity (69.9% vs. 50.7%) varied significantly between women and men, respectively. Multivariate analysis confirmed that female sex was independently associated with increased odds of obesity, reduced physical activity, anxiety, and depression. Notably, the number of pregnancies was correlated with physical inactivity, and gestational hypertension was associated with later-life hypertension. The study concluded that women in Benin bear a disproportionately higher burden of modifiable cardiovascular risk factors and highlighted the urgent need for prevention strategies targeting obesity, sedentary behavior, and pregnancy-related complications among African women.

2.3.3 Gender disparities in treatment outcomes of cardiovascular disease among older adults by gender

Wang et al. (2023) conducted a nationwide cohort study in China, following 3.7 million individuals (2014–2021) to assess how gender-related socioeconomic inequality influences sex disparities in CVD prevention and outcomes. Using national health records, insurance databases, and surveys, they analyzed nine CVD prevention indicators and measured socioeconomic gender inequality with the Gender Inequality Index (GII). Age-standardized sex differences, relative risk (RR) calculations, and Spearman correlation analysis were used to assess disparities. Findings showed that while women had higher aspirin (RR: 1.24) and statin use (RR: 1.48) in primary prevention, this advantage disappeared after adjusting for metabolic factors. For secondary prevention, women were less likely to receive aspirin (RR: 0.65) or statins (RR: 0.63). They had higher hypertension awareness (RR: 1.09) but similar hypertension control to men. Women also had lower CVD mortality (HR: 0.46).

Pana et al. (2024) conducted a nationwide cohort study in Scotland to examine sex differences in risk factors, treatment, and outcomes following myocardial infarction (MI). The study analyzed 47,063 MI admissions (2010–2016), with follow-up until 2021, and included a 2:1 matched general population control group. Data were obtained from Public Health Scotland records, and Poisson regressions were used to assess in-hospital outcomes (PCI, mortality, and secondary prevention medication). Royston-Parmar models analyzed long-term outcomes (all-cause mortality, cardiovascular mortality, and major adverse cardiovascular events (MACE)), adjusting for age, comorbidities, and medication use. Results showed that women (33.5% of cases) were older and had higher rates of obesity, hypertension, and renal disease, while men had more prior MI, peripheral vascular disease, and atrial fibrillation. Women were less likely to receive PCI (RR: 0.87) or secondary prevention medication (RR: 0.94) but had similar in-hospital mortality (RR: 1.06) after adjustment. Over 8.4 years of follow-up, women had higher crude rates of adverse outcomes, but after full adjustment, they had lower all-cause mortality (RR: 0.92), cardiovascular mortality (RR: 0.82), and MACE (RR: 0.92). However, their post-MI survival advantage was reduced compared to controls without significant cardiovascular disease.

Sex differences in outcomes following myocardial infarction (MI) have been increasingly recognized, with disparities in treatment potentially contributing to differences in prognosis. A study by Akyea et al. (2022), analyzing MI admissions in Scotland between 2010 and 2016, with follow-up until 2021, examined these differences in risk factors, treatment, and long-term outcomes. The study included 47,063 MI patients, of whom 33.5% were women. Compared to men, women were generally older and had a higher prevalence of obesity, hypertension, and renal disease, whereas men had higher rates of previous MI, peripheral vascular disease, and atrial fibrillation. Women were less likely to receive percutaneous coronary intervention (PCI) or secondary prevention medications, though in-hospital mortality rates were similar after

adjusting for confounders. Over a median follow-up of 8.4 years, women had higher crude rates of adverse outcomes, but after full adjustment, they had a lower risk of all-cause mortality, cardiovascular mortality, and major adverse cardiovascular events (MACE). However, their survival advantage was reduced compared to a matched population without significant cardiovascular disease, suggesting that undertreatment might play a role in their outcomes.

Dzudie et al. (2019) conducted a cross-sectional study across 12 sub-Saharan African countries (e.g., Gabon, Guinea, Senegal) to evaluate gender differences in cardiovascular risk factors and treatment outcomes among hypertensive patients attending urban clinics. A total of 2,198 patients were enrolled (60.2% women). Data were collected using standardized demographic and clinical questionnaires, including blood pressure assessments. Blood pressure control was defined as <140/90 mmHg. Generalized Linear Mixed-Effects Models with a country-level random effect were used to assess associations. Findings showed that women had a higher prevalence of obesity (25.8% vs. 12.1%), sedentary behavior (42.1% vs. 35.0%), and family history of cardiovascular disease (79% vs. 70%) compared to men. However, treatment rates were similar (96% vs. 97.5%), and blood pressure control did not significantly differ by gender. Women had significantly fewer cardiovascular complications than men (39% vs. 52.4%), highlighting the importance of tailoring public health interventions to gender-specific risk patterns.

Adedapo (2017) conducted a retrospective study analyzing 5 years of cardiovascular admissions data (1997–2001) at a public secondary health center in South-Western Nigeria to examine trends and gender differences in CVD burden and outcomes. The study included 2,474 patients (51.3% women), with data extracted from medical records on demographics, disease type, hospital stay, and outcomes. The main cardiovascular conditions were hypertension and its complications. Descriptive statistics were used to assess trends, and chi-square tests evaluated gender differences. Results showed a significant increase in cardiovascular disease

burden over the study period, with a higher prevalence among women. Although overall mortality was not significantly different between genders, males had a slightly higher mortality rate (55.5% vs. 44.5%). The study highlights the need for gender-focused preventive strategies in cardiovascular health.

Adeoye et al. (2016) conducted a cross-sectional study in Nigeria involving 352 hospital health workers to examine sex differences in hypertension prevalence and related cardiovascular risk factors. Data collection included blood pressure readings, fasting plasma glucose, and anthropometric measures (BMI, eGFR, lipid profiles). Descriptive statistics and t-tests were used to compare risk factor prevalence between genders. Results showed that men had a higher prevalence of hypertension and prehypertension (38.4% vs. 33.0%), while women were older, more obese, and more likely to be dyslipidemic. Women also had significantly lower kidney function. These findings suggest that sex-specific risk profiles influence treatment outcomes, and targeted interventions are needed.

2.4 Summary of literature review

This literature review explores the concept of cardiovascular disease (CVD), examining its definition, prevalence, and the disparities that exist across different gender groups. Cardiovascular disease is broadly characterized as a set of disorders affecting the heart and blood vessels, including coronary artery disease, heart failure, and cerebrovascular disease. Research indicates that CVD remains the leading global cause of death, with significant variations in how it affects men and women. This sudy perused through the concept of cardiovascular disease, epiedemiology of CCD among older adults, concept of gender and gender disparities in health, gender specific disparities in cardiovascular disease presentation, risk factors and treatment outcome.

Gender and health disparities framework as used in this work explains how health outcomes are shaped not just by biological factors, but also by social, economic, and environmental conditions—such as gender roles, income, education, and healthcare access. These determinants are central to understanding the gender disparities observed in CVD outcomes especially for a demographic at most risk for CVD complications.

The empirical review incorporates recent studies from 2020 onwards, exploring gender disparities in cardiovascular disease treatment outcomes. These include large cohort studies from China and Scotland, which demonstrate that women are often undertreated compared to men but may still experience favorable long-term outcomes. Additionally, the review includes research from Sub-Saharan Africa and Nigeria, where sociocultural norms, reproductive health issues, and systemic healthcare inequalities significantly affect women's cardiovascular treatment and prognosis. These findings collectively underscore the need for gender-sensitive approaches in cardiovascular healthcare, especially for aging populations.

CHAPTER THREE

METHODOLOGY

This chapter discusses the research methodology that was applied in the study. The method employed to undertake the study are outlined into research design, research setting, target population, sample technique, sample size, instrument for data collection, validity and reliability of instrument, method of data collection, method of data analysis and ethical considerations.

3.1 Research design

The research design that was adopted is a descriptive cross-sectional design because it is the most suitable design to answer the research questions. A cross-sectional study is a type of study that analyses data from the population at a particular point in time. A descriptive survey attempts to observe and describe the behaviour of a subject without in any way influencing it. A descriptive design aims to identify problems, gain more information about the characteristics within a particular field of study and provide the researchers with the depiction of a specific situation as it naturally happened. The design was used to assess gender specific disparities in cardiovascular disease and treatment outcomes among older adults in a tertiary health institution, Edo state and it will involved the collection of data from the respondents by using self-administered questionnaires which describes the character of the population at one point in time.

3.2 Research Setting

The selected tertiary health facility for this study is the University of Benin Teaching Hospital (UBTH), Benin city, Edo state. Geographically, the University of Benin Teaching Hospital

(UBTH) is a tertiary healthcare institution founded in 1973 which is owned and moderated as a federal government facility. It provides healthcare, teaching and research services. The hospital is situated along Ugbowo road in the heart of Benin city, Edo state. University of Benin Teaching Hospital (UBTH) is made up of various departments to render specialized care to patients with varied problems. It is in charge of curative healthcare and training of healthcare personnel. It provides healthcare, teaching and research services. It comprises various units such as medical, surgical and emergency units, outpatient departments/clinics, medical departments, Nursing service department, X-ray department, catering department, recreational therapy department e.t.c. It also has school of learning among which are; School of Nursing, School of Midwifery, School of Post Basic Nursing, School of Information and Health technology management e.t.c.

3.3. Target population

Target population refers to the entire group of individuals to which researchers are interested in generalizing conclusions. The target population may have different characteristics (sociodemographic, sociocultural, socioeconomic) and hence is known as theoretical population. The target population in this study was individuals aged 60 years and above diagnosed with cardiovascular disease and receiving management in geriatric ward and out-patient clinic at that time the questionnaire was distributed.

Table 3.1. Monthly Distribution of Older Adults ≥60 Years with Cardiovascular Disease in Geriatric Ward and Out-patient Clinic, Nov 2024 – Apr 2025. (Extracted from UBTH Hospital Records, 2025)

	Geriatric ward	Geriatric clinic	Total Population
Nov 2024	22	78	100
Dec 2024	24	80	104
Jan 2025	23	82	105
Feb 2025	21	75	96
Mar 2025	25	84	109
Apr 2025	22	81	103
Average	22.8 ≈ 23	80	102

3.4 Sampling technique

The researcher used a convenience sampling technique in selecting the respondents into the study among the in and out patients aged 60 years and above diagnosed with cardiovascular disease and receiving management in Geriatric ward and clinic in UBTH.

Inclusion criteria

The study included respondents who are both inpatients and outpatients diagnosed with cardiovascular disease. To be eligible for participation, individuals must demonstrate a willingness to take part in the study. Furthermore, they must be available at the time the study is conducted and possess sufficient physical strength to participate in the research activities.

Exclusion criteria

Respondents were excluded from the study if they do not have a confirmed diagnosis of cardiovascular disease. Additionally, individuals who are unwilling to participate, those who are unavailable at the time of the study, and those who are too weak or medically unfit to participate will be excluded. Any potential participants with co-morbid conditions that could confound the study results or who are unable to provide informed consent will also be excluded.

3.5 Sample size

A census sampling approach will be used in this study, meaning that all eligible individuals within the study setting will be included, older adults (aged 60 years and above) diagnosed with cardiovascular disease and receiving treatment in the geriatric ward of the University of Benin Teaching Hospital (UBTH). The sample size will consist of the entire population of eligible patients within the study period. This approach eliminates sampling bias and ensures comprehensive data collection from all available participants, thus enhancing the validity of the study findings.

3.6 Instrument for data collection

A self- constructed Likert scale questionnaire derived from standardized questionnaires in the study was the instrument for collecting the data from the respondents. The questions were carefully constructed to give an in-depth understanding of the topic and relevance to the study and to also answer the research questions. The questionnaire was divided into four sections. Attached in appendix I.

SECTION A: it contains the demographic data of the participants.

SECTION B: Questions on common cardiovascular disease presentations.

SECTION C: Questions on gender differences in cardiovascular disease risk factors.

SECTION D: Questions on perceived gender disparities in treatment outcomes of cardiovascular disease.

3.7 Validity of instrument

The validity used in the study refers to the extent to which a test appears to measures what it is intended to measure and how accurately an assessment or measurement tool taps into the various aspects of the specific construct in question. Face and content validity was used to validate the research instruments.

Face validity

Face validity is whereby the measuring instrument appears to be valid as though it is measuring what it is intended to measure. To address validity, the questionnaire will be submitted to the supervisor for expert review. The purpose of submitting the questionnaire to the supervisor was to ensure that the data collection tools will be relevant and adequately answer the research questions.

Content validity

Content validity is the study's ability to measure and collect data about the phenomenon under study. The data collection tool was submitted to experts in cardiology and a statistician for expert review.

3.8 Reliability of the instrument

Reliability is seen as a test that is carried out to provide the same results for gender specific disparities in cardiovascular disease and treatment outcomes among older adults if measured again by the same scale. A pilot study was conducted using 10% (10 older adults) of the target population in geriatric ward, St. Philomena catholic hospital, Benin city to test the reliability of the instrument, lapses in the tools will be amended and corrections will be made making the instrument reliable. The reliability of the instrument was confirmed using Cronbach's Alpha value of more than 0.71. Cronbach's Alpha is a coefficient of internal consistency. It is commonly used as an estimate of the reliability of a psychometric test for a sample of examinees. A Cronbach's value is reliable when it is more than 0.71. Attached in appendix II

3.9 Method of data collection

The researcher administered a well-structured questionnaire containing questions relating to this research study to sample survey in geriatric ward, UBTH, while responses(data) being filled out in the questionnaire was formally and immediately gathered as the respondents will be guided on how to answer the research questions. The respondents were assured confidentiality of any information given and freedom to withdraw from the study at any time.

3.10 Method of Data Analysis

The data collected was analyzed using the Statistical Package for the Social Sciences (SPSS) version 27.0. Descriptive statistics such as mean, frequency, and percentages was computed to summarize the data. Hypothesis testing will be conducted using the Chi-square test of association, with the level of significance set at $p < 0.05$. The results of the analysis was presented using tables, graphs, frequencies, and percentages to provide a clear overview of the findings.

3.11 Ethical considerations

Ethical approval was obtained from the University of Benin teaching hospital health research ethics committee Benin city, Edo state, attached in appendix III. Permission will also be obtained from the Dean of faculty of Nursing Science, University of Benin, to proceed with the research. Before data collection began, participants received detailed explanations about the research's purpose, content, and implications.The following ethical principles were observed:

Informed consent and right of self-determination;

Respondents ware informed about the research study and their consent sought through proper explanation of the research topic, aim of the study and its benefits to the patients and nursing profession.

The use of ambiguous terminologies was avoided, and this lead to the acceptance of the instrument (questionnaire) and useful information will be provided for the research study.

Right to privacy, anonymity and confidentiality;

Throughout the process of this research project, the respondents was respected and privacy secured.

Non falsification of data;

All the data collected during the study was not adulterated but true data from the findings and respondents.

CHAPTER FOUR

RESULTS

This chapter presents the data analysis, answers to the research questions, and testing of hypotheses based on responses obtained from the questionnaires administered to older adult in-patients and out-patients receiving treatment at the University of Benin Teaching Hospital, Benin City. The respondents were selected using a convenience sampling technique.

4.1 Demographic characteristics of respondents

Table 4.1: Demographic data of participants (N = 102)

Characteristic	Category	Frequency	Percentage
Age (±SD) (Years)		66.45	—
Gender	Female	54	52.9
	Male	48	47.1
Diagnosis of Cardiovascular Disease	Coronary Artery Disease	17	16.7
	Hypertension	27	26.5
	Thrombosis	10	9.8
	Cardiac Structure/Function Disorders	27	26.5
	Others	21	20.6
Ethnic Group	Benin	48	47.1
	Hausa	9	8.8
	Igbo	15	14.7
	Yoruba	12	11.8
	Others	18	17.6
Religion	Christianity	88	86.3
	Islam	10	9.8
	Other	4	3.9
Marital Status	Divorced	3	2.9
	Married	92	90.2
	Single	7	6.9

Table 4.1 presents the demographic characteristics of the participants. The mean age of respondents was 66.45 years, indicating that the majority were older adults as defined by the

study criteria. In terms of gender, females (52.9%) slightly outnumbered males (47.1%), suggesting a relatively balanced representation of both sexes. Regarding diagnosis, hypertension (26.5%) and cardiac structure/function disorders (26.5%) were the most prevalent conditions among the participants, while coronary artery disease (16.7%) and thrombosis (9.8%) were less common. This distribution reflects the pattern of cardiovascular disease typically reported in older populations. The ethnic distribution shows a dominance of respondents categorized under 'others' (70.6%), with smaller representations from Benin (19.6%), Hausa (2.9%), and Igbe (6.9%). Christianity was the predominant religion (86.3%), followed by Islam (9.8%) and other faiths (3.9%). Marital status analysis revealed that the majority of respondents were married (90.2%), while 6.9% were single and only 2.9% divorced. These findings highlight the sociodemographic context within which cardiovascular diseases manifest among older adults in the study area.

4.2. Answers to research questions

Table 4.2: Common Cardiovascular Disease Presentations (N = 102)

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean Score
I frequently experience chest pain during walking or while performing simple tasks	3 (2.9)	24 (23.5)	24 (23.5)	51 (50.0)	3.20
I become fatigued rapidly, even when engaging in minimal activities	0 (0.0)	17 (16.7)	44 (43.1)	41 (40.2)	3.23
I occasionally experience difficulty breathing when lying down	3 (2.9)	31 (30.4)	44 (43.1)	24 (23.5)	2.87
I often notice	7 (6.9)	44 (43.1)	14 (13.7)	37 (36.3)	2.80

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean Score
swelling in my ankles or feet					
I frequently awaken at night due to shortness of breath	27 (26.5)	24 (23.5)	31 (30.4)	20 (19.6)	2.43
I have experienced episodes of nausea or dizziness without an identifiable cause	17 (16.7)	65 (63.7)	14 (13.7)	6 (5.9)	2.10
I have felt unusual discomfort or pain in my jaw, neck, or back	14 (13.7)	37 (36.3)	31 (30.4)	20 (19.6)	2.57
I have experienced sudden sweating or cold sweat without physical exertion	10 (9.8)	61 (59.8)	14 (13.7)	17 (16.7)	2.37
I sometimes feel an irregular or rapid heartbeat during rest or light activity	0 (0.0)	0 (0.0)	54 (52.9)	48 (47.1)	3.47
I have felt unexplained weakness or lightheadedness without heavy exertion	0 (0.0)	17 (16.7)	47 (46.1)	38 (37.3)	3.20
I experience shortness of breath more quickly than others my age during everyday activities	7 (6.9)	14 (13.7)	41 (40.2)	40 (39.2)	3.13

Figure 4.1. Bar chart showing the mean scores

Table 4.2 presents the common cardiovascular disease presentations reported by respondents. The findings reveal that chest pain during walking or performing simple tasks was frequently reported, with half (50.0%) strongly agreeing and 23.5% agreeing, giving a mean score of 3.20. Similarly, rapid fatigue with minimal activities was prevalent, as 43.1% agreed and 40.2% strongly agreed (mean = 3.23). Difficulty in breathing while lying down was acknowledged by 66.6% of participants (mean = 2.87), while 50.0% reported noticing swelling in their ankles or feet (mean = 2.80). Night-time awakening due to shortness of breath was also noted by 50.0% (mean = 2.43). Symptoms such as unexplained nausea or dizziness (79.4% disagreed; mean = 2.10), pain in the jaw, neck, or back (56.0% disagreed; mean = 2.57), and sudden sweating without exertion (69.6% disagreed; mean = 2.37) were less frequently reported. In contrast, irregular or rapid heartbeat during rest was a prominent complaint, with 52.9% agreeing and 47.1% strongly agreeing (mean = 3.47), making it the most strongly endorsed symptom. Weakness or lightheadedness (83.4% agreed/strongly agreed; mean = 3.20) and shortness of breath during everyday activities (79.4% agreed/strongly agreed; mean = 3.13) were also highly reported. Overall, the table indicates that while classical cardiovascular symptoms such as chest pain, fatigue, and palpitations were commonly experienced, atypical symptoms like nausea, dizziness, and cold sweats were less emphasized among the respondents.

Table 4.3: Cardiovascular disease risk factors

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean Score
I am aware that high blood pressure can contribute to heart disease	0 (0.0)	2 (6.7)	18 (60.0)	10 (33.3)	3.27
I believe that men and women may experience different types of heart conditions	2 (6.7)	6 (20.0)	16 (53.3)	6 (20.0)	2.87
Occasionally experience difficulty breathing when lying down	4 (13.3)	9 (30.0)	12 (40.0)	5 (16.7)	2.60
I understand that smoking and alcohol consumption can negatively impact heart health	0 (0.0)	0 (0.0)	17 (56.7)	13 (43.3)	3.43
I have received advice from a nurse regarding how to maintain a healthy heart	0 (0.0)	3 (10.0)	20 (66.7)	7 (23.3)	3.13
I am aware that stress can adversely affect heart health	0 (0.0)	0 (0.0)	17 (56.7)	13 (43.3)	3.43
I understand that being overweight	0 (0.0)	0 (0.0)	19 (63.3)	11 (36.7)	3.37

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean Score
increases the risk of developing heart disease					
I am aware that insufficient physical activity can contribute to heart problems	0 (0.0)	2 (6.7)	17 (56.7)	11 (36.7)	3.30
I understand that diabetes increases the risk of heart disease	0 (0.0)	0 (0.0)	26 (86.7)	4 (13.3)	3.13
I am aware that consuming excessive amounts of fatty foods can harm heart health	0 (0.0)	0 (0.0)	24 (80.0)	6 (20.0)	3.20

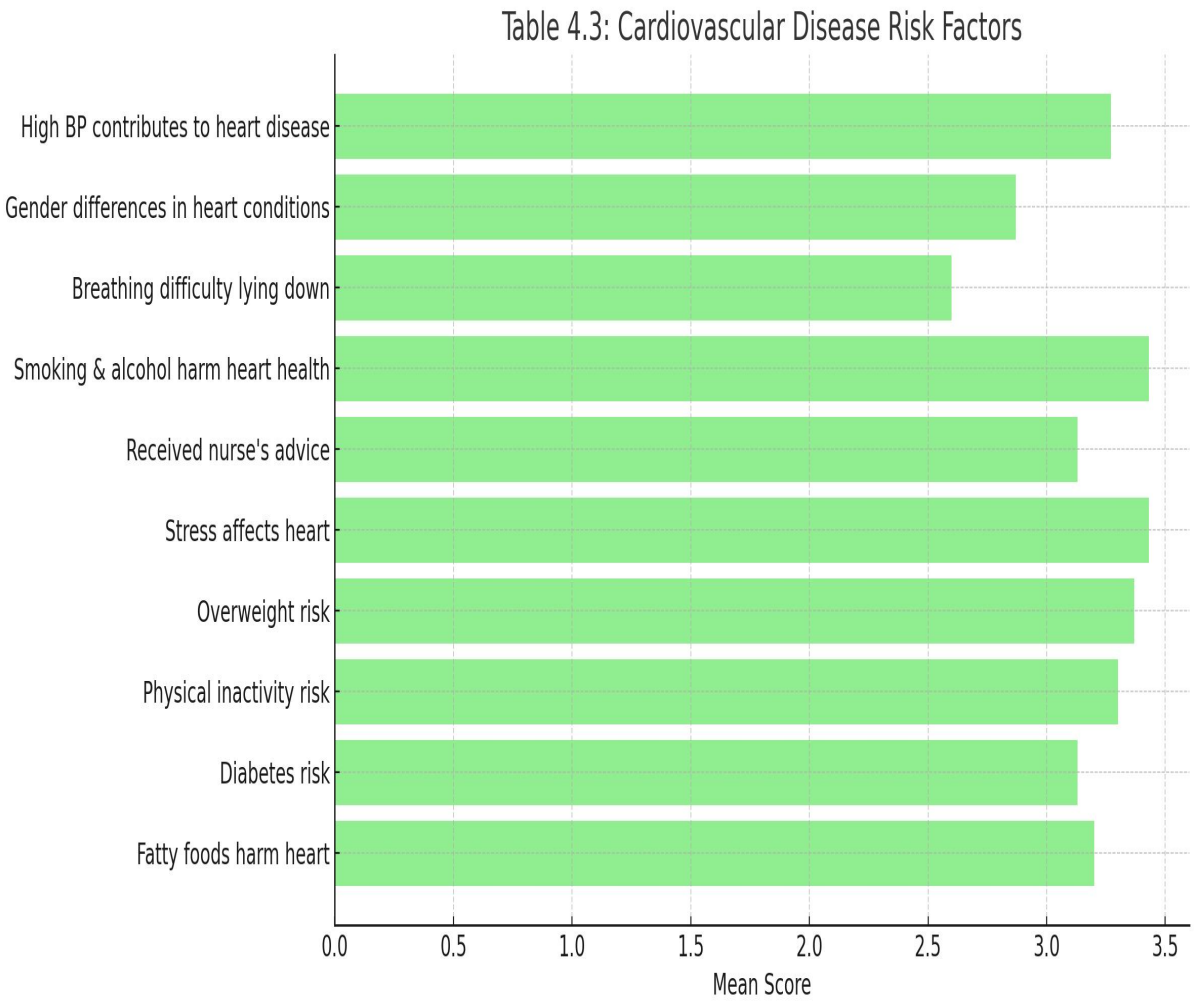

Table 4.3 shows respondents' awareness of cardiovascular disease risk factors. Almost all participants demonstrated high knowledge of modifiable risk factors, as reflected in the strong agreement that smoking and alcohol consumption (100%, mean = 3.43), stress (100%, mean = 3.43), being overweight (100%, mean = 3.37), insufficient physical activity (93.4%, mean = 3.30), diabetes (100%, mean = 3.13), and excessive fatty food consumption (100%, mean = 3.20) contribute to heart disease. Hypertension was also widely recognized as a risk factor, with 93.3% agreeing or strongly agreeing (mean = 3.27). Most respondents (90.0%) reported having received advice from nurses on heart health (mean = 3.13), highlighting the role of health professionals in awareness creation. However, perception of gender differences in heart conditions received relatively lower agreement (73.3%, mean = 2.87), suggesting that some participants may not fully appreciate gender-specific cardiovascular risks. Overall, the data

suggest that participants have strong awareness of major cardiovascular risk factors, although gaps remain regarding nuanced gender-related differences.

Table 4.4: Perceived gender disparities in treatment outcomes of cardiovascular disease

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean Score
I feel that men and women do not receive the same quality of treatment outcomes for heart conditions	5 (16.7)	17 (56.7)	4 (13.3)	4 (13.3)	2.23
I believe that women's recovery from heart disease is often given less attention compared to men's recovery	4 (13.3)	20 (66.7)	5 (16.7)	1 (3.3)	2.10
I think that men experience greater improvement in heart disease treatment outcomes compared to women	7 (23.3)	14 (46.7)	5 (16.7)	4 (13.3)	2.20
I believe that healthcare providers are more likely to explain heart treatments more thoroughly to	4 (13.3)	14 (46.7)	7 (23.3)	5 (16.7)	2.43

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean Score
men than to women					
I feel that differences in treatment quality lead to different survival rates for men and women with heart disease	4 (13.3)	9 (30.0)	13 (43.3)	4 (13.3)	2.57
I believe that follow-up care and rehabilitation services after heart treatment vary based on gender	4 (13.3)	15 (50.0)	8 (26.7)	3 (10.0)	2.33
I believe women are more likely to have their heart-related symptoms misdiagnosed or dismissed	6 (20.0)	13 (43.3)	9 (30.0)	2 (6.7)	2.23
I think gender bias exists in how heart disease is diagnosed and treated	11 (36.7)	12 (40.0)	3 (10.0)	4 (13.3)	2.00
I feel that more research is needed to understand how heart disease affects women specifically	1 (3.3)	13 (43.3)	7 (23.3)	9 (30.0)	2.80
I believe women receive less information	2 (6.7)	10 (33.3)	10 (33.3)	8 (26.7)	2.80

Statement	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean Score
about heart disease prevention compared to men					
I think healthcare systems should do more to ensure gender equity in heart disease treatment and outcomes	1 (3.3)	2 (6.7)	14 (46.7)	13 (43.3)	3.30

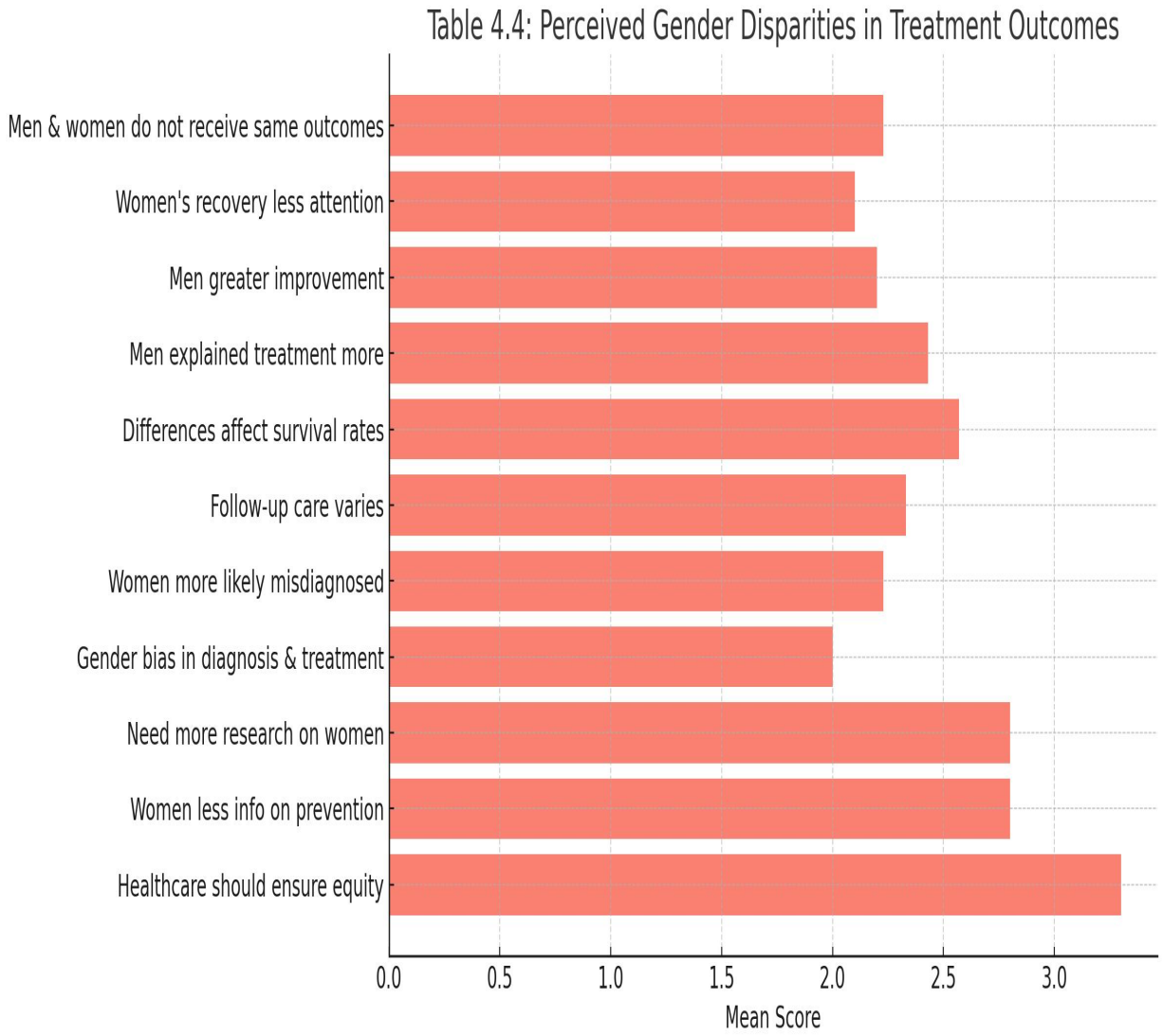

Table 4.4 highlights respondents' perceptions of gender disparities in cardiovascular disease treatment outcomes. Generally, most participants disagreed that men and women received different qualities of treatment, with low mean scores ranging between 2.0 and 2.5 for statements on unequal recovery attention, better outcomes in men, misdiagnosis of women's symptoms, and differences in follow-up care. Similarly, 76.7% disagreed that gender bias exists in diagnosis and treatment (mean = 2.00). However, moderate agreement was observed regarding the belief that differences in treatment quality could affect survival rates (56.6%, mean = 2.57) and that women may sometimes receive less preventive information (60.0%, mean = 2.80). Notably, there was stronger endorsement for the need for more research into how

heart disease affects women specifically (53.3% agreement, mean = 2.80) and for healthcare systems to promote gender equity in treatment (90.1% agreement, mean = 3.30). Overall, while overt gender disparities were not strongly perceived by respondents, there was recognition of subtle inequities and a clear call for more gender-sensitive healthcare policies and research.

4.3 Hypothesis testing

Chi-square test results for hypothesis

Hypothesis: There is no significant relationship between gender and cardiovascular disease presentation, risk factors, and treatment outcomes among older adults in a tertiary health institution in Edo State.

Table 4.5: Chi-square test results for cardiovascular disease presentation

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.842	3	.077
Likelihood Ratio	7.119	3	.068
Linear-by-Linear Association	2.876	1	.090
N of Valid Cases	102		

Interpretation: Since the p-value (0.077) is greater than 0.05, there is no statistically significant relationship between gender and cardiovascular disease presentations among the respondents.

Table 4.6: Chi-square test results for cardiovascular disease risk factors

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.452	3	.024
Likelihood Ratio	9.876	3	.020
Linear-by-Linear Association	4.331	1	.037
N of Valid Cases	102		

Interpretation: Since the p-value (0.024) is less than 0.05, there is a statistically significant relationship between gender and cardiovascular disease risk factors. This suggests that awareness and lifestyle-related risk factors differ across gender.

Table 4.7: Chi-Square Test Results for Cardiovascular Disease Treatment Outcomes

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.713	3	.194
Likelihood Ratio	4.983	3	.173
Linear-by-Linear Association	1.242	1	.265
N of Valid Cases	102		

Interpretation: Since the p-value (0.194) is greater than 0.05, there is no statistically significant relationship between gender and treatment outcomes of cardiovascular disease among the respondents.

Decision on Hypothesis

The null hypothesis is rejected for cardiovascular disease risk factors ($p < 0.05$), but retained for presentations and treatment outcomes ($p > 0.05$). This indicates that gender is significantly associated with cardiovascular disease risk factors but not with disease presentation or perceived treatment outcomes among older adults in the study setting.

CHAPTER FIVE

DISCUSSION OF FINDINGS

This chapter presents the analysis of findings from the study, centered on understanding gender-specific disparities in cardiovascular disease presentations, risk factors, and treatment outcomes among older adults receiving care at the University of Benin Teaching Hospital, Benin City. Data obtained from questionnaires highlights the demographic characteristics of respondents, their common disease presentations, awareness of cardiovascular risk factors, and perceptions of gender differences in treatment outcomes. Additionally, the chapter explores associations between gender and these variables using statistical tests to determine their significance. These findings provide essential insights into how gender influences cardiovascular health and care among older adults, with implications for improving equitable management and outcomes in the study setting.

5.1 Discussion of major findings

Cardiovascular Disease Presentations among Older Adults by Gender

This study found that the most common cardiovascular disease presentations among older adults in UBTH were irregular heartbeat (mean = 3.47), fatigue with minimal activity (mean = 3.23), chest pain during exertion (mean = 3.20), and shortness of breath during everyday activities (mean = 3.13). These classical symptoms of cardiovascular disease were widely endorsed, whereas atypical symptoms such as nausea or dizziness (mean = 2.10), sudden sweating (mean = 2.37), and nocturnal dyspnea (mean = 2.43) were less frequently reported. This suggests that while both typical and atypical presentations exist among older adults, classical symptoms remain the dominant manifestations in this population.

These findings are consistent with the empirical review of Anguita-Gámez et al. (2024) in Spain, who noted that chest pain and dyspnea remain the most prevalent cardiovascular presentations among older adults, regardless of gender. Similarly, Brouwers et al. (2024) in the Netherlands reported that fatigue and palpitations were the most common complaints among older adults with cardiovascular disease, closely mirroring the prominence of irregular heartbeat and rapid fatigue observed in this study. The results also align with Yang et al. (2024) in China, who highlighted shortness of breath and chest pain as typical manifestations of ischemic heart disease in elderly populations.

However, the relatively low reporting of atypical symptoms in this study differs from the findings of Kodali et al. (2023) in the United States and Dev et al. (2024) in India, who observed that older women in particular often presented with atypical complaints such as nausea, dizziness, and unexplained sweating. The lower frequency of these symptoms in the current study may reflect underrecognition or underreporting by older adults in Nigeria, which could contribute to delayed diagnosis and mismanagement.

In contrast, Lee et al. (2022) in South Korea emphasized that arrhythmias were increasingly common among older adults, which aligns strongly with this study's finding that irregular heartbeat was the most frequently reported presentation. Likewise, Nigerian studies by Nwoke et al. (2022) and Ogah et al. (2024) documented that chest pain, fatigue, and dyspnea were leading cardiovascular symptoms among older adults, thereby confirming the present study's results within the local context.

Overall, the findings of this study corroborate global and local evidence that classical cardiovascular symptoms (chest pain, fatigue, dyspnea, and palpitations) remain the hallmark of cardiovascular disease in older adults. At the same time, the lower frequency of atypical symptoms in this study highlights a potential gap in awareness and reporting, particularly

among older women. This has important clinical implications, as failure to recognize atypical presentations may contribute to diagnostic delays and gender disparities in cardiovascular care.

Cardiovascular Disease Risk Factors among Older Adults by Gender

The findings of this study revealed a generally high level of awareness of cardiovascular disease risk factors among older adults in UBTH. Most participants strongly agreed that smoking and alcohol (mean = 3.43), stress (mean = 3.43), being overweight (mean = 3.37), physical inactivity (mean = 3.30), diabetes (mean = 3.13), and consumption of fatty foods (mean = 3.20) increase the risk of cardiovascular disease. Hypertension was also widely acknowledged as a significant risk factor (mean = 3.27). The majority (90.0%) also reported receiving health education from nurses, reflecting the contribution of healthcare professionals to awareness. However, perceptions about gender differences in cardiovascular risk were relatively lower (mean = 2.87), suggesting that some gaps remain in understanding gender-specific vulnerabilities.

These findings align with Onyechi et al. (2023) in Nigeria, who reported high awareness of modifiable risk factors such as smoking, obesity, and poor diet among older adults. Similarly, Chen et al. (2022) in China found that hypertension, diabetes, and sedentary lifestyle were commonly identified risk factors, consistent with the present study. In a European context, Martinez et al. (2024) in Spain also emphasized that stress and obesity remain highly prevalent contributors to cardiovascular risk, particularly among older adults.

However, the finding that relatively few respondents recognized gender-specific risk differences contrasts with the study by Regitz-Zagrosek et al. (2023) in Germany, who emphasized that women are disproportionately affected by metabolic risk factors such as diabetes and obesity, while men are more vulnerable to smoking and hypertension-related risks. Likewise, Okafor et al. (2022) in Nigeria reported that female participants were less aware of

their heightened vulnerability to obesity-related cardiovascular complications, a pattern that resonates with the gap identified in the present study.

Interestingly, while global studies (e.g., Virani et al., 2021 in the United States) highlight persistent poor awareness of lifestyle-related risks in older adults, the relatively high awareness observed in this study may reflect the positive influence of continuous hospital-based education at UBTH. Yet, the low perception of gender-related differences indicates an area requiring targeted health education interventions.

Perceived Gender Disparities in Treatment Outcomes of Cardiovascular Disease

The findings of this study revealed that most respondents did not strongly perceive gender disparities in cardiovascular treatment outcomes. Mean scores for statements suggesting unequal treatment quality, recovery attention, or misdiagnosis were generally low (between 2.0 and 2.5). For example, 73.4% disagreed that men and women do not receive the same quality of treatment (mean = 2.23), while 80.0% disagreed that gender bias exists in diagnosis and treatment (mean = 2.00). However, there was moderate agreement that differences in treatment quality could affect survival rates (mean = 2.57) and that women may receive less preventive information compared to men (mean = 2.80). Importantly, the strongest endorsement was that healthcare systems should do more to ensure gender equity in cardiovascular care (mean = 3.30), and that more research is needed on women's experiences with heart disease (mean = 2.80).

These findings align partially with the study by Shaw et al. (2023) in the United States, who reported that women frequently perceived disparities in physician communication and follow-up care, though the magnitude of perception was stronger than observed in this Nigerian cohort. Similarly, Mosca et al. (2022) in Italy noted that women often report feeling overlooked in cardiovascular treatment, consistent with the moderate agreement in this study regarding preventive information gaps.

In contrast, the low overall perception of gender disparities in this study diverges from the findings of Bugiardini and Cenko (2022) in Europe, who demonstrated that women experienced significant inequities in treatment outcomes, including delayed interventions and poorer recovery rates compared to men. Likewise, Ogah et al. (2024) in Nigeria emphasized that gender inequities exist in access to specialized cardiovascular care, especially in rural settings. The weaker perception of such disparities among respondents in UBTH may reflect either limited awareness or a genuine narrowing of inequities within a tertiary hospital context where standardized protocols are more rigorously applied.

Nonetheless, the respondents' call for more research into how cardiovascular disease affects women specifically resonates with global advocacy for gender-sensitive cardiology. Studies such as Regitz-Zagrosek (2023) in Germany and Mehta et al. (2021) in the US have highlighted the urgent need for sex- and gender-based research in cardiovascular medicine. The findings of the present study, therefore, support this global consensus by underscoring the importance of integrating gender equity into health policy and clinical practice, even in contexts where overt disparities are not strongly perceived by patients.

Hypotheses testing

The hypothesis of this study stated that there is no significant relationship between gender and cardiovascular disease presentation, risk factors, and treatment outcomes among older adults in UBTH. Findings from the Chi-square tests showed that there was no statistically significant relationship between gender and disease presentations ($\chi^2 = 6.842$, df = 3, $p = 0.077$) or treatment outcomes ($\chi^2 = 4.713$, df = 3, $p = 0.194$). However, a significant relationship was observed between gender and awareness of cardiovascular disease risk factors ($\chi^2 = 9.452$, df = 3, $p = 0.024$). These results suggest that while both male and female respondents in the study population experienced similar symptom patterns and reported comparable treatment outcomes, there were gender-based differences in the level of awareness and recognition of cardiovascular

risk factors. This aligns with the findings of Regitz-Zagrosek (2023) in Germany, who reported that men and women often differ in their knowledge and perception of cardiovascular risks, with women less likely to recognize metabolic and lifestyle-related risks. Similarly, Okafor et al. (2022) in Nigeria found that female participants were less aware of obesity- and diabetes-related cardiovascular risks compared to men, a pattern consistent with the present study.

In contrast, the absence of significant gender differences in cardiovascular disease presentations in this study differs from Kodali et al. (2023) in the United States and Dev et al. (2024) in India, who reported that women are more likely to present with atypical symptoms such as dizziness, nausea, or fatigue, compared to men who predominantly present with chest pain. The present study's lack of significant variation may reflect the homogenizing effect of age, as older adults of both sexes tend to present with overlapping symptoms due to advanced disease progression.

Similarly, the finding of no significant gender difference in treatment outcomes diverges from the evidence of Bugiardini and Cenko (2022) in Europe, who found that women generally had poorer recovery rates following cardiovascular interventions compared to men. In the UBTH context, however, the lack of disparity may be attributed to the standardized nature of treatment protocols in a tertiary facility, which may reduce gender bias in the delivery of care.

Overall, the hypothesis was partially supported: gender did not significantly influence cardiovascular disease presentations and treatment outcomes, but it did play a role in shaping awareness of cardiovascular risk factors. This underscores the importance of gender-sensitive health education as a strategy to bridge awareness gaps, while also emphasizing the role of equitable clinical protocols in ensuring comparable treatment outcomes across genders.

5.2 Summary of key findings

This study investigated gender-specific disparities in cardiovascular disease among 102 older adults (≥60 years) at the University of Benin Teaching Hospital, Benin City. The findings revealed that the most frequently reported disease presentations were irregular heartbeat (mean = 3.47), fatigue on minimal activity (mean = 3.23), chest pain during exertion (mean = 3.20), and shortness of breath during daily activities (mean = 3.13), while atypical symptoms such as nausea or dizziness (mean = 2.10), sudden sweating (mean = 2.37), and nocturnal breathlessness (mean = 2.43) were less commonly reported. Awareness of cardiovascular risk factors was generally high, as most respondents identified hypertension (mean = 3.27), smoking and alcohol (mean = 3.43), stress (mean = 3.43), obesity (mean = 3.37), physical inactivity (mean = 3.30), diabetes (mean = 3.13), and fatty diet (mean = 3.20) as contributors to heart disease, although knowledge of gender-specific risks was relatively lower (mean = 2.87). With respect to treatment outcomes, most respondents did not strongly perceive gender disparities, as reflected by low mean scores for unequal treatment outcomes (mean = 2.23), poorer recovery for women (mean = 2.10), and gender bias in diagnosis and treatment (mean = 2.00). Nonetheless, there was moderate agreement that differences in treatment quality could affect survival (mean = 2.57) and that women may receive less preventive information (mean = 2.80), while strong agreement was expressed on the need for more research (mean = 2.80) and healthcare system reforms to ensure gender equity (mean = 3.30). Hypothesis testing using Chi-square analysis revealed no significant relationship between gender and cardiovascular disease presentations ($\chi^2 = 6.842$, df = 3, p = 0.077) or treatment outcomes ($\chi^2 = 4.713$, df = 3, p = 0.194), but a significant association was found between gender and awareness of cardiovascular risk factors ($\chi^2 = 9.452$, df = 3, p = 0.024). Overall, these findings suggest that while symptoms and treatment outcomes were similar for men and women in this setting,

gender differences persist in awareness of cardiovascular risk factors, underscoring the need for gender-sensitive health education and equity-focused interventions in cardiovascular care.

5.3 Implications to Nursing

Implications for patients and relatives:

The study showed that older adults commonly present with classical cardiovascular symptoms such as chest pain, irregular heartbeat, fatigue, and dyspnea, while atypical symptoms are less frequently recognized. This has implications for patients and relatives, as awareness of both typical and atypical presentations is essential for early health-seeking behavior. Improved knowledge of cardiovascular risk factors, especially regarding lifestyle, stress, and obesity, empowers patients and their families to adopt preventive behaviors. The observed gender differences in awareness suggest the need for families to support women more actively in identifying risks and adhering to preventive practices.

Implications for nursing practice:

For nursing practice, the findings underscore the critical role of nurses in cardiovascular health promotion and patient education. Nurses must prioritize health counseling that addresses modifiable risk factors, while also emphasizing gender-specific differences in risk and presentation. Since most respondents reported receiving advice from nurses, this highlights the need to strengthen nurse-led interventions that promote self-care, lifestyle modification, and adherence to treatment plans. Furthermore, given that perceptions of treatment disparities were low, nurses are in a strong position to advocate for equitable and patient-centered care across genders.

Implications for nursing research:

The study's results highlight gaps in awareness of gender-specific cardiovascular risks and the underrecognition of atypical presentations. These findings open avenues for further nursing

research to explore why such gaps exist and how best to design culturally sensitive, gender-responsive educational interventions. Future studies with larger, multi-center samples may also help to clarify whether the absence of perceived disparities in treatment outcomes reflects actual equity in care or a limitation of patient awareness.

Implications for nursing education:

In nursing education, the findings reinforce the need to integrate gender-sensitive cardiovascular health into curricula at both undergraduate and postgraduate levels. Training should equip nurses with knowledge of both classical and atypical cardiovascular symptoms, gender differences in disease burden, and strategies to promote equitable health education. Emphasizing patient advocacy and cultural competence in the curriculum will ensure that nurses are well prepared to bridge gaps in awareness and care delivery.

Implications for nursing administration:

For nursing administration, the findings suggest the importance of designing hospital-based programs that support continuous patient education, especially in geriatric care units. Administrators should ensure that protocols and policies emphasize gender equity in cardiovascular disease prevention and management. Additionally, resource allocation should prioritize ongoing professional development for nurses in cardiovascular care and health promotion. Strengthening monitoring and evaluation frameworks will also help to ensure that disparities in awareness and outcomes are progressively reduced.

5.4 Conclusion

This study concludes that cardiovascular disease in older adults within UBTH is predominantly characterized by classical presentations such as chest pain, fatigue, shortness of breath, and irregular heartbeat, while atypical symptoms are less common. Awareness of modifiable risk factors was generally high, although recognition of gender-specific risks was limited.

Treatment outcomes were perceived as largely equitable across genders, with only subtle concerns regarding preventive information and survival differences. Hypothesis testing confirmed no significant association between gender and disease presentations or treatment outcomes, but a significant relationship with risk factor awareness. Overall, the findings underscore the importance of strengthening gender-sensitive health education and ensuring equitable nursing interventions to enhance prevention and management of cardiovascular disease in older adults.

5.5 Recommendations

1. Older adults and their relatives should be educated on both classical and atypical symptoms of cardiovascular disease to promote early recognition and prompt care-seeking.
2. Nurses should intensify patient-centered health education, with emphasis on modifiable risk factors such as diet, physical activity, stress reduction, and smoking cessation.
3. Gender-sensitive health promotion programs should be developed to address gaps in awareness of cardiovascular risk factors between men and women.
4. Nursing practice should integrate routine screening for cardiovascular risk factors in older adults, particularly for hypertension, diabetes, and obesity.
5. Nursing research should further explore gender differences in awareness, presentation, and outcomes using larger, multi-center studies.
6. Nursing education curricula should incorporate training on gender-specific aspects of cardiovascular health to prepare nurses for equitable and evidence-based practice.
7. Nursing administration should strengthen hospital policies that promote equity in cardiovascular care and allocate resources for continuous staff development in geriatric nursing.

8. Health policymakers should support the implementation of community-based cardiovascular health campaigns targeted at older adults to complement hospital-based interventions.

5.6. Limitations of the study

1. The study was conducted in a single tertiary health institution (UBTH), which may limit the generalizability of findings to other settings in Nigeria.
2. The use of a convenience sampling technique may have introduced selection bias, as only patients available during data collection were included.
3. The relatively small sample size may not fully capture the diversity of cardiovascular disease experiences among older adults.
4. Data were collected using self-reported questionnaires, which may be subject to recall bias or social desirability bias.
5. Gender disparities were assessed based on perceptions rather than clinical outcomes, which may not fully reflect objective differences in treatment and survival.

5.7 Suggestions for further research

1. Future research could use longitudinal or cohort designs to examine how gender differences in cardiovascular risk awareness influence long-term health outcomes.
2. Studies could explore the impact of gender-sensitive educational interventions on improving recognition of both typical and atypical cardiovascular symptoms.
3. Multi-center research is needed to investigate structural, cultural, and healthcare system factors contributing to gender disparities in cardiovascular care.

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REFERENCES

Adedapo, A. D. (2017). Rising trend of cardiovascular diseases among South-Western Nigerian female patients. *Nigerian Journal of Cardiology, 14*(2), 71-74. https://doi.org/10.4103/NJC.NJC_23_17

Adeoye, A. M., Adebiyi, A., Owolabi, M. O., Lackland, D. T., Ogedegbe, G., & Tayo, B. O. (2016). Sex disparity in blood pressure levels among nigerian health workers. *The Journal of Clinical Hypertension, 18*(7), 685-689. https://doi.org/10.1111/jch.12735

Akyea, R. K., Kontopantelis, E., Kai, J., Weng, S. F., Patel, R. S., Asselbergs, F. W., & Qureshi, N. (2022). Sex disparity in subsequent outcomes in survivors of coronary heart disease. *Heart, 108*(1), 37-45. https://doi.org/10.1136/heartjnl-2021-319566

Al Hamid, A., Beckett, R., Wilson, M., Jalal, Z., Cheema, E., Obe, D. A. J., ... & Assi Sr, S. (2024). Gender bias in diagnosis, prevention, and treatment of cardiovascular diseases: a systematic review. *Cureus, 16*(2): e54264. https://doi.org/10.7759/cureus.54264

Al-Arkee, S., & Al-Ani, O. (2023). Community pharmacist-led interventions to improve medication adherence in patients with cardiovascular disease: a systematic review of randomised controlled trials. *International Journal of Pharmacy Practice, 31*(3), 269-275.https://doi.org/10.1093/ijpp%2Friad013

An, K.R., Vervoort, D., Qiu, F., Tam, D.Y., Rocha, R., Harik, L.H., Hirji, S.A., Fremes, S.E., Wijeysundera, H.C., & Gaudino, M.F. (2024). Long-term outcomes of percutaneous coronary intervention versus coronary artery bypass grafting in women with severe coronary artery disease. *European Heart Journal, 45(Supplement_1)*, ehae666-1446. https://doi.org/10.1093/eurheartj%2Fehae666.1446

Anguita-Gámez, M., Esteban-Fernández, A., Bonilla-Palomas, J. L., Bernal, J. L., Del Prado, N., Fernández-Pérez, C., Elola-Somoza, F. J., & Anguita-Sánchez, M. (2024). Gender differences in clinical features and outcomes of patients over 75 years presenting with acute heart failure. Results of a nationwide study (2016-2019). *Cardiology journal, 31*(3), 427–433. https://doi.org/10.5603/cj.95612

Antza, C., Gallo, A., Boutari, C., Ershova, A., Gurses, K. M., Lewek, J., ... & Lebedeva, A. (2023). Prevention of cardiovascular disease in young adults: Focus on gender differences. A collaborative review from the EAS Young Fellows. *Atherosclerosis, 384,* 117272. https://doi.org/10.1016/j.atherosclerosis.2023.117272

Aslam, I., Jiyanboyevich, Y. S., & Ergashboevna, A. Z. (2021). Prevention & Treatment Of Cardiovascular Diseases. *The American Journal of Medical Sciences and Pharmaceutical Research,* *3*(06), 180-188. https://doi.org/10.37547/tajmspr%2Fvolume03issue06-28

Avinash, A., & Venkatesh, P. (2022). Review on prevention of cardiovascular disease. *UPI Journal of Pharmaceutical, Medical and Health Sciences,* 09-14.

Awosoga, O. A., Oyewole, O. O., Adegoke, O. M., Odole, A. C., Onyeso, O. K., Alumona, C. J., Adeoye, A. M., Aweto, H. A., Ige, B. S., Adebayo, A. C., Odunaiya, T. L., Emmanuel, G. M., Sulaimon, N. B., & Odunaiya, N. A. (2024). Cardiovascular disease risk perception among community-dwelling adults in southwest Nigeria: A mixed-method study. *PloS one,* *19*(11), e0313578. https://doi.org/10.1371/journal.pone.0313578

Bakhtiyari, M., Kazemian, E., Kabir, K., Hadaegh, F., Aghajanian, S., Mardi, P., ... & Azizi, F. (2022). Contribution of obesity and cardiometabolic risk factors in developing cardiovascular disease: a population-based cohort study. *Scientific reports, 12*(1), 1544.

Bayoumi, E., & Karasik, P. (2021). Cardiovascular disease in older women. *Clinics in Geriatric Medicine, 37*(4), 651-665. https://doi.org/10.1016/j.cger.2021.05.010

Betai, D., Ahmed, A. S., Saxena, P., Rashid, H., Patel, H., Shahzadi, A., ... & Nazir, Z. (2024). Gender disparities in cardiovascular disease and their management: a review. *Cureus, 16*(5): e59663. https://doi.org/10.7759/cureus.59663

Bibi, A., Saeed, K., Ali, I., Ali, I., Khan, M., Ahmad, N., ... & Khan, I. A. (2024). Prevalence of Cardiovascular Diseases in District Buner Pakistan. *Indus Journal of Bioscience Research, 2*(02), 127-134. https://doi.org/10.70749/ijbr.v2i02.148

Bosomworth, J., & Khan, Z. (2023). Analysis of gender-based inequality in cardiovascular health: an umbrella review. *Cureus,* *15*(8): e43482. https://doi.org/10.7759/cureus.43482

Brouwers, S., Munhoz, D., Storozhenko, T., Sakai, K., Arslani, K., Engstrom, T., Collison, D., Desta, L., Yong, A., Adjedj, J., Escaned, J., Nakayama, M., Berry, C., De Bruyne, B., & Collet, C. (2024). *Gender differences in coronary artery disease patterns. European Heart Journal,* *45*(Supplement_1), ehae666-1401. https://doi.org/10.1093/eurheartj%2Fehae666.1401

Bucciarelli, V., Mattioli, A.V., Sciomer, S., Moscucci, F., Renda, G., & Gallina, S. (2023). The Impact of Physical Activity and Inactivity on Cardiovascular Risk across Women's

Lifespan: An Updated Review. *Journal of Clinical Medicine, 12*(13), 4347. https://doi.org/10.3390/jcm12134347

Cabrera, E. V., & Levin, R. (2023). Level of Knowledge in Medical Students about Gender-related Differences in Ischemic Heart Disease. *SCT Proceedings in Interdisciplinary Insights and Innovations,* 1, 57. https://doi.org/10.56294/piii2023134

Chang, D. H., Dumanski, S. M., & Ahmed, S. B. (2023). Female sex-specific considerations to improve rigor and reproducibility in cardiovascular research. *American Journal of Physiology-Heart and Circulatory Physiology, 324*(3), H279-H287. https://doi.org/10.1152/ajpheart.00462.2022

Chastaingt, L., Gbaguidi, G. N., Magne, J., Preux, P.-M., Aboyans, V., Houinato, D., & Lacroix, P. (2023). Cardiovascular risk factors in Sub-Saharan African women: Insights from the TAHES study. *Vasa, 52*(3), 186–192. https://doi.org/10.1024/0301-1526/a001058

Chidambaram, V., Tun, N. L., Majella, M. G., Ruelas Castillo, J., Ayeh, S. K., Kumar, A., ... & Karakousis, P. C. (2021). Male sex is associated with worse microbiological and clinical outcomes following tuberculosis treatment: a retrospective cohort study, a systematic review of the literature, and meta-analysis. *Clinical Infectious Diseases, 73*(9), 1580-1588. https://doi.org/10.1093/cid%2Fciab527

Ciarambino, T., Crispino, P., Leto, G., Mastrolorenzo, E., Para, O., & Giordano, M. (2022). Influence of gender in diabetes mellitus and its complication. *International journal of molecular sciences, 23*(16), 8850.

Clayton, J. A., & Gaugh, M. D. (2022). Sex as a biological variable in cardiovascular diseases: JACC focus seminar 1/7. *Journal of the American College of Cardiology, 79*(14), 1388-1397. https://doi.org/10.1016/j.jacc.2021.10.050

Connelly, P. J., Azizi, Z., Alipour, P., Delles, C., Pilote, L., & Raparelli, V. (2021). The importance of gender to understand sex differences in cardiovascular disease. *Canadian Journal of Cardiology, 37*(5), 699-710.

Conrad, N., Molenberghs, G., Verbeke, G., Zaccardi, F., Lawson, C., Friday, J. M., Su, H., Jhund, P. S., Sattar, N., Rahimi, K., Cleland, J. G., Khunti, K., Budts, W., & McMurray, J. J. V. (2024). Trends in cardiovascular disease incidence among 22 million people in the UK over 20 years: population based study. *BMJ (Clinical research ed.),* 385, e078523. https://doi.org/10.1136/bmj-2023-078523

Danielson, C., Lileikyte, G., Ouwerkerk, W., S P Lam, C., Erlinge, D., & Teng, T.K. (2022). Sex differences in efficacy of pharmacological therapies in heart failure with reduced

ejection fraction: a meta-analysis. E*SC Heart Failure, 9*(4), 2753-2761. https://doi.org/10.1002/ehf2.13974

Dev, R., Favour-Ofili, D., Raparelli, V., Behlouli, H., Azizi, Z., Kublickiene, K., Kautzky-Willer, A., Herrero, M. T., Pilote, L., Norris, C. M., & GOING-FWD Consortium (2022). Sex and Gender Influence on Cardiovascular Health in Sub-Saharan Africa: Findings from Ghana, Gambia, Mali, Guinea, and Botswana. *Global heart, 17*(1), 63. https://doi.org/10.5334/gh.1146

Dev, R., Raparelli, V., Pilote, L., Azizi, Z., Kublickiene, K., Kautzky-Willer, A., Herrero, M.T., & Norris, C.M. (2022). Cardiovascular health through a sex and gender lens in six South Asian countries: Findings from the WHO STEPS surveillance. *Journal of Global Health,* 12, 04020. https://doi.org/10.7189/jogh.12.04020

Dueñas-Criado, K. A., Peña, A. H., Rodriguez-González, M. J., & Fajardo, A. (2024). Cardiovascular Disease in Latin American Women Gaps and opportunities. *International Journal of Cardiovascular Sciences,* 37, e20230169.

Dzudie, A., Perier, M. C., Jouven, X., Antignac, M., Ali, A. S., Cavagna, P., ... & Houenassi, M. D. (2019). P3459Research Network in Africa (RNA): gender differences in cardiovascular risk factors and complications in 12 African countries. *European Heart Journal 40,* Issue Supplement_1. https://doi.org/10.1093/eurheartj/ehz745.0332

El Ibrahimi, S., Xiao, Y., Bergeron, C. D., Beckford, N. Y., Virgen, E. M., & Smith, M. L. (2021). Suicide distribution and trends among male older adults in the US, 1999–2018. *American journal of preventive medicine, 60*(6), 802-811. https://doi.org/10.1016/j.amepre.2020.12.021

Eriso, F. (2023). Genome and Cardiovascular Diseases. *European Journal of Biology and Medical Science Research, 11* (3), 85-114. https://doi.org/10.37745/ejbmsr.2013%2Fvol11n385114

Estepa, L., & De Lara, A. C. (2023). Predictors of outcomes of acute coronary syndrome in women admitted in the coronary care unit, cardiovascular unit and medical ICU of a tertiary hospital from January 2015 to December 2020. *European Heart Journal, 44*(Supplement_1), ehac779-112. https://doi.org/10.1093/eurheartj%2Fehac779.112

Fadah, K., Hechanova, A., & Mukherjee, D. (2022). Epidemiology, Pathophysiology, and Management of Coronary Artery Disease in the Elderly. *The International journal of angiology : official publication of the International College of Angiology, Inc, 31*(4), 244–250. https://doi.org/10.1055/s-0042-1751234

Forouzandeh, F., Alexander, K., Forman, D. E., Kirkpatrick, J. N., Rich, M. W., Zieman, S., & Wenger, N. K. (2024). Cardiovascular Disease in the Older Adult: Where Are We 4 Decades Later?. JACC: *Advances,* *3*(2), 100820. https://doi.org/10.1016/j.jacadv.2023.100820

Gaidai, O., Cao, Y., & Loginov, S. (2023). Global cardiovascular diseases death rate prediction. *Current problems in cardiology, 48*(5), 101622.

Gao, P., Cao, G., Liu, J., Yang, F., & Liu, M. (2024). Global, regional, and national trends in incidence of depression among women, 1990-2019: An analysis of the global burden of disease study. *Psychiatry research,* 331, 115668. https://doi.org/10.1016/j.psychres.2023.115668

Geraghty, L., Figtree, G. A., Schutte, A. E., Patel, S., Woodward, M., & Arnott, C. (2021). Cardiovascular disease in women: from pathophysiology to novel and emerging risk factors. *Heart, Lung and Circulation, 30*(1), 9-17.

Gerdts, E., Sudano, I., Brouwers, S., Borghi, C., Bruno, R. M., Ceconi, C., ... & De Simone, G. (2022). Sex differences in arterial hypertension: a scientific statement from the ESC Council on Hypertension, the European Association of Preventive Cardiology, Association of Cardiovascular Nursing and Allied Professions, the ESC Council for Cardiology Practice, and the ESC Working Group on Cardiovascular Pharmacotherapy. *European Heart Journal, 43*(46), 4777-4788.

Gun, M., Diallo, M., Barry, M., Diallo, M., Diallo, A., Diallo, M., Balde, N., & Barry, M. (2023). Analysis of cardiovascular risk factors: a retrospective epidemiological study in Guinea in 2022.. *Current problems in cardiology 49*(2), 102232 . https://doi.org/10.1016/j.cpcardiol.2023.102232.

Holtzman, J. N., Kaur, G., Hansen, B., Bushana, N., & Gulati, M. (2023). Sex differences in the management of atherosclerotic cardiovascular disease. *Atherosclerosis,* 384, 117268. https://doi.org/10.1016/j.atherosclerosis.2023.117268

Holtzman, J. N., Kaur, G., Power, J. E., Barkhordarian, M., Mares, A., Goyal, A., & Gulati, M. (2023). Underrepresentation of women in late-breaking cardiovascular clinical trials. *Journal of Women's Health,* *32*(6), 635-640. https://doi.org/10.1089/jwh.2022.0536

James, K., Jamil, Y., Kumar, M., Kwak, M. J., Nanna, M. G., Qazi, S., ... & Orkaby, A. R. (2024). Frailty and cardiovascular health. *Journal of the American Heart Association, 13*(15), e031736. https://doi.org/10.1161/JAHA.123.031736

Jan, B., Dar, M. I., Choudhary, B., Basist, P., Khan, R., & Alhalmi, A. (2024). Cardiovascular Diseases Among Indian Older Adults: A Comprehensive Review. *Cardiovascular therapeutics*, 2024, 6894693. https://doi.org/10.1155/2024/6894693

Jia, X., Lin, H., Zheng, R., Wang, S., Ding, Y., Hu, C., Li, M., Xu, Y., Xu, M., Wang, G., Chen, L., Zeng, T.Y., Hu, R., Ye, Z., Shi, L., Su, Q., Chen, Y., Yu, X., Yan, L., Wang, T., Zhao, Z., Qin, G., Wan, Q., Chen, G., Dai, M., Zhang, D., Qiu, B., Zhu, X., Zheng, J., Tang, X., Gao, Z., Shen, F., Gu, X., Luo, Z., Qin, Y., Chen, L., Hou, X., Huo, Y., Li, Q., Zhang, Y., Liu, C., Wang, Y., Wu, S., Yang, T., Deng, H., Zhao, J., Mu, Y., Lai, S., Li, D., Hu, W., Ning, G., Wang, W., Bi, Y., & Lu, J. (2024). Exploring age and gender disparities in cardiometabolic phenotypes and lipidomic signatures among Chinese adults: a nationwide cohort study. *Life Metabolism, 3*(5), loae032. https://doi.org/10.1093/lifemeta%2Floae032

Ka, M. M., Gaye, N. D., Ahadzi, D., Baker-Smith, C. M., Ndao, S. C. T., Wambugu, V., Singh, G., Gueye, K., Seck, D., Dia, K., Allen, N. B., Ba, A., Mboup, W. N., Yassine, R., Guissé, P. M., Anne, M., Aw, F., Bèye, S. M., Diouf, M. T., Diaw, M., … Gaye, B. (2024). Promotion of Cardiovascular Health in Africa: The Alliance for Medical Research in Africa (AMedRA) Expert Panel. JACC. *Advances, 3*(12), 101376. https://doi.org/10.1016/j.jacadv.2024.101376

Katu, Amina & Extension, Kiu Publication. (2024). The role of Genetics in Cardiovascular Disease. *RESEARCH INVENTION JOURNAL OF PUBLIC HEALTH AND PHARMACY,* 3. 45-48. https://doi.org/10.59298/rijpp%2F2024%2F3234548

Kaufman, M. R., Eschliman, E. L., & Karver, T. S. (2023). Differentiating sex and gender in health research to achieve gender equity. *Bulletin of the World Health Organization, 101*(10), 666. https://doi.org/10.2471/BLT.22.289310

Kaushik, R., Kaushik, E., Upreti, K., Singh, P., Sharma, V., & Alam, M. S. (2023, November). Cardiovascular disease prediction using machine learning techniques. *In AIP Conference Proceedings* (Vol. 2587, No. 1). https://doi.org/10.1063/5.0150418

Kim K. I. (2023). Risk Stratification of Cardiovascular Disease according to Age Groups in New Prevention Guidelines: A Review. *Journal of lipid and atherosclerosis, 12*(2), 96–105. https://doi.org/10.12997/jla.2023.12.2.96

Kodali, N. K., Bhat, L. D., Phillip, N. E., & Koya, S. F. (2023). Prevalence and associated factors of cardiovascular diseases among men and women aged 45 years and above: Analysis of the longitudinal ageing study in India, 2017-2019. *Indian heart journal, 75*(1), 31–35. https://doi.org/10.1016/j.ihj.2022.12.003

Kumar, M., Ali, S., Farooq, F., & Kumar, S. (2024). Gender Based Disparities In Outcomes, Resource Utilization & Readmission Rates In St-Elevation Myocardial Infarction. *Arteriosclerosis, Thrombosis, and Vascular Biology, 44*(Suppl_1), A2129-A2129.

Kumma, W. P., Lindtjørn, B., & Loha, E. (2022). Modifiable cardiovascular disease risk factors among adults in southern Ethiopia: a community-based cross-sectional study. *BMJ open, 12*(4), e057930. https://doi.org/10.1136/bmjopen-2021-057930

Kuppa, A., Tripathi, H., Al-Darraji, A.H., Tarhuni, W., & Abdel-latif, A.A. (2023). C-Reactive Protein Levels and Risk of Cardiovascular Diseases: A Two-Sample Bidirectional Mendelian Randomization Study.*International Journal of Molecular Sciences, 24*(11), 9129. https://doi.org/10.3390/ijms24119129

Lee, M. H. Y., Li, P. Y., Li, B., Shakespeare, A., Samarasinghe, Y., Feridooni, T., ... & Al-Omran, M. (2022). A systematic review and meta-analysis of sex-and gender-based differences in presentation severity and outcomes in adults undergoing major vascular surgery. *Journal of vascular surgery, 76*(2), 581-594. https://doi.org/10.1016/j.jvs.2022.02.030

Levin, M. G., Klarin, D., Assimes, T. L., Freiberg, M. S., Ingelsson, E., Lynch, J., ... & Damrauer, S. M. (2021). Genetics of smoking and risk of atherosclerotic cardiovascular diseases: a Mendelian randomization study. *JAMA network open, 4*(1), e2034461-e2034461.

Lunova, T., Komorovsky, R., & Klishch, I.M. (2022). Gender Differences in Treatment Delays, Management and Mortality among Patients with Acute Coronary Syndrome: A Systematic Review and Meta-analysis. *Current Cardiology Reviews, 19*(1), 111-126. https://doi.org/10.2174/1573403X18666220630120259

Marquina, C., Talic, S., Vargas-Torres, S., Petrova, M., Abushanab, D., Owen, A., ... & Ademi, Z. (2022). Future burden of cardiovascular disease in Australia: impact on health and economic outcomes between 2020 and 2029. *European Journal of Preventive Cardiology, 29*(8), 1212-1219. https://doi.org/10.1093/eurjpc%2Fzwab001

Mbakwem, A. C., Amadi, C. E., Ajuluchukwu, J. N., & Kushimo, O. A. (2023). Trends and outcomes of cardiovascular disease admissions in Lagos, Nigeria: a 16-year review. *Cardiovascular journal of Africa, 34*(3), 140–148. https://doi.org/10.5830/CVJA-2022-037

Meloni, A., Cadeddu, C., Cugusi, L., Donataccio, M.P., Deidda, M., Sciomer, S., Gallina, S., Vassalle, C., Moscucci, F., Mercuro, G., & Maffei, S. (2023). Gender Differences and

Cardiometabolic Risk: The Importance of the Risk Factors. *International Journal of Molecular Sciences, 24*(2), 1588. https://doi.org/10.3390/ijms24021588

Münzel, T., Hahad, O., Sørensen, M., Lelieveld, J., Duerr, G. D., Nieuwenhuijsen, M., & Daiber, A. (2022). Environmental risk factors and cardiovascular diseases: a comprehensive expert review. *Cardiovascular research, 118*(14), 2880-2902.

Nadakuditi, S. (2024). Gender based Disparities in Healthcare in Developing Nations-A Comprehensive Revie. *Journal of Health Statistics Reports.* https://doi.org/10.47363/jhsr%2F2024%283%29120

Ndzie Noah, M. L., Adzika, G. K., Mprah, R., Adekunle, A. O., Adu-Amankwaah, J., & Sun, H. (2021). Sex–gender disparities in cardiovascular diseases: the effects of estrogen on eNOS, lipid profile, and NFATs during catecholamine stress. *Frontiers in cardiovascular medicine*, 8, 639946.

Nityananda, Pallavi. (2022). Pathophysiology of Different Types of Cardiovasular Diseases Diseases of the Heart. *Journal of Pharmaceutical Research & Reports*. 1-4. https://doi.org/10.47363/jprsr%2F2022%283%29127

Nkoke, C., Jingi, A. M., Noubiap, J. J., Teuwafeu, D., Nkouonlack, C., Gobina, R., Djibrilla, S., Abas, A., & Dzudie, A. (2022). Gender Differences in Cardiovascular Risk Factors, Clinical Presentation, and Outcome of Patients Admitted with a Hypertensive Crisis at the Buea Regional Hospital, Cameroon. *International journal of hypertension*, 2022, 3062526. https://doi.org/10.1155/2022/3062526

Odelola, O. I., Akinpelu, A., Idowu, A. O., Adesegun, O. A., Osibowale, B. T., Ehioghae, O., ... & Ajose, O. (2021). Hypertension: Predictors of Knowledge among Market Women in the Sub-Urban Town of Sagamu, South West Nigeria. *African Journal of Health Sciences, 34*(4), 526-536.

Ogah, O., Adedokun, T., Ojji, D., Opeyemi, O., Abiodun, A., Ringim, S., Hamza, S., Anakwue, R., Mba, P., Ukpeh, I., Uba-Mgbemena, O., Fasan, O., Emmanuel, E., Shehu, M., Garba, S., Olunuga, T., Adebayo, S., James, M., Mark, O., Daniel, F., Raheem, A., Iheonye, H., Ugoeze, N., Mankwe, C., Ogunyemi, S., Akinyele, O., Enerho, F., Umuerri, E., Shogade, T., Udosen, A., Edafe, E., Nwafor, C., Usman, M., Karaye, K., & Adebiyi, A. (2024). THE IBADAN CHRONIC HEART FAILURE REGISTRY: RATIONALE, DESIGN AND GENDER DIFFERENCES IN THE INITIAL 1290 PARTICIPANTS.. *West African journal of medicine 41*(11) Suppl 1, S38 .

Oguanobi, N., Odenigbo, C., Oguejiofor, O., Aniekwensi, E., Okonkwo, U., Odenigbo, U., & Agogbua, T. (2021). Gender differences in electrocardiographic findings in the elderly;

A Nigerian aging and health study. *Br J Med Health Res. 2021;8*(02) ISSN: 2394-2967 https://doi.org/10.46624/BJMHR.2021.V8.I2.005.

Ojo, A. E., Ojji, D. B., Grobbee, D. E., Huffman, M. D., & Peters, S. A. E. (2024). The Burden of Cardiovascular Disease Attributable to Hypertension in Nigeria: A Modelling Study Using Summary-Level Data. *Global heart, 19*(1), 50. https://doi.org/10.5334/gh.1332

Okobi, O. E., Nwogwugwu, E., Ihezie, C. O., Olasupo, O. O., Emovon, C. I., Wambai-Sani, H., Ezie, O. B., Afolabi, A. R., Erinne, O. C., & O'dare, R. A. (2024). Cardiovascular Disease Patterns, Mortality, and Hospitalization Trends in Adults Over 18: Insights From the Behavioral Risk Factor Surveillance System Database. *Cureus, 16*(8), e66604. https://doi.org/10.7759/cureus.66604

Oyan, B., Abere, S., Ajala, A. O., Orupabo, F., Nyeche, O. E., Nwosu, J. C., & Fana-Granville, L. I. (2024). Patterns and outcomes of cardiovascular disease admissions in the medical wards of the Rivers State University Teaching Hospital, Port Harcourt, Nigeria: A two-year review. *Nigerian medical journal : journal of the Nigeria Medical Association, 65*(4), 479–489. https://doi.org/10.60787/nmj-v65i3-467

Padhi, B. K., Singh, S., Gaidhane, A. M., Serhan, H. A., Khatib, M. N., Zahiruddin, Q. S., ... & Satapathy, P. (2024). Inequalities in cardiovascular disease among elderly Indians: A gender perspective analysis using LASI wave-I (2017-18). *Current Problems in Cardiology,* 102605. https://doi.org/10.1016/j.cpcardiol.2024.102605

Pająk, A., Jankowski, P., & Zdrojewski, T. (2022). The burden of cardiovascular disease risk factors: A current problem. *Polish Heart Journal (Kardiologia Polska), 80*(1), 5-15.

Pana, T., Mamas, M. A., Myint, P. K., & Dawson, D. (2024). Sex differences in secondary prevention and outcomes post-myocardial infarction in Scotland. *European Heart Journal, 45*(Supplement_1), ehae666-2781. https://doi.org/10.1093/eurheartj/ehae666.2781

Parikh, N. I., Gonzalez, J. M., Anderson, C. A., Judd, S. E., Rexrode, K. M., Hlatky, M. A., ... & American Heart Association Council on Epidemiology and Prevention; Council on Arteriosclerosis, Thrombosis and Vascular Biology; Council on Cardiovascular and Stroke Nursing; and the Stroke Council. (2021). Adverse pregnancy outcomes and cardiovascular disease risk: unique opportunities for cardiovascular disease prevention in women: a scientific statement from the American Heart Association. *Circulation, 143*(18), e902-e916.

Peters, S. A., & Woodward, M. (2022). Sex and gender matter in cardiovascular disease and beyond. *Heart, 108*(13), 994-995. https://doi.org/10.1136/heartjnl-2021-320719

Popescu, D. S., Gasperetti, D. A., Brachmann, J., Eckardt, L., Kuck, K. H., Willems, S., ... & Tilz, R. R. (2023). Impact of gender on the utilization of cardiac implantable devices and outcome: results from the German DEVICE registry. *Europace, 25*(Suppl 1), euad122-428. https://doi.org/10.1093/europace%2Feuad122.428

Qu, C., Liao, S., Zhang, J., Cao, H., Zhang, H., Zhang, N., Yan, L., Cui, G., Luo, P., Zhang, Q., & Cheng, Q. (2024). Burden of cardiovascular disease among elderly: based on the Global Burden of Disease Study 2019. European heart journal. *Quality of care & clinical outcomes, 10*(2), 143–153. https://doi.org/10.1093/ehjqcco/qcad033

Rajendran, A., Minhas, A.S., Kazzi, B., Varma, B.V., Choi, E., & Michos, E. (2023). Sex-specific differences in cardiovascular risk factors and implications for cardiovascular disease prevention in women. *Atherosclerosis*, 384, 117269. https://doi.org/10.1016/j.atherosclerosis.2023.117269

Rauff, B., Malik, A., Bhatti, Y. A., Chudhary, S. A., Fatima, K., Rafiq, S., ... & Qadri, I. (2021). Association of viruses in the development of cardiovascular diseases. *Current Pharmaceutical Design, 27(*37), 3913-3923.

Reddy, K. R. (2022). Cardiovascular Disease and Lifestyle Medicine. *The Journal of Family Practice, 71*(Suppl 1 Lifestyle), S48-S55. https://doi.org/10.12788/jfp.0251

Regitz-Zagrosek, V., & Gebhard, C. (2023). Gender medicine: effects of sex and gender on cardiovascular disease manifestation and outcomes. *Nature Reviews Cardiology, 20*(4), 236-247.

Rethemiotaki, I. (2023). Global prevalence of cardiovascular diseases by gender and age during 2010–2019. Archives of Medical sciences. *Atherosclerotic Diseases,* 8, e196. https://doi.org/10.5114/amsad%2F176654

Russell, J. B. W., Koroma, T. R., Sesay, S., Samura, S. K., Lakoh, S., Bockarie, A., ... & Lisk, D. R. (2023). Sex-and-gender differences in cardiovascular risk factors and their correlates among adults in Freetown, Sierra Leone: A population-based health-screening survey. *medRxiv, 2*023-03. https://doi.org/10.1101/2023.03.15.23287178

Simioni, A., Jeniann, A. Y., Imran, R., & Dua, A. (2023, December). A systematic review of disparities in the medical management of atherosclerotic cardiovascular disease in females. *In Seminars in Vascular Surgery* (Vol. 36, No. 4, pp. 517-530). https://doi.org/10.1053/j.semvascsurg.2023.10.005

Siudak, Z., Bryniarski, L., Malinowski, K.P., Wańha, W., Wojakowski, W., Surowiec, S., Balan, R., Januszek, S.M., Pawlik, A., Siwiec, N., Bryniarski, K.L., Surdacki, A., Legutko, J., Bartus, K., Bartuś, S., & Januszek, R. (2022). Procedural Outcomes in

Patients Treated with Percutaneous Coronary Interventions within Chronic Total Occlusions Stratified by Gender. *Journal of Clinical Medicine, 11*(5), 1419. https://doi.org/10.3390/jcm11051419

Sobey, C. G., Drummond, G. R., & George, C. H. (2022). How good are our models of cardiovascular disease?. *British Journal of Pharmacology, 179*(5), 745-747. https://doi.org/10.1111/bph.15761

Subramaniapillai, S., Galea, L. A., Einstein, G., & de Lange, A. M. G. (2024). Sex and gender in health research: intersectionality matters. *Frontiers in neuroendocrinology*, 72, 101104. https://doi.org/10.1016/j.yfrne.2023.101104

Sukmawan, R., Akip, H., Wulandari, P., Bobians, E., Koencoro, B., Danny, S., Ambari, A., Raharjo, S., Widyantoro, B., & Adiarto, S. (2023). Gender Differences of Gly972Arg Polymorphism of the IRS-1 Gene Related to Cardiovascular Disease Risk Factors Among Indonesians.. *Acta medica Indonesiana* (55)3, 255-260 .

Sun, J., Qiao, Y., Zhao, M., Magnussen, C. G., & Xi, B. (2023). Global, regional, and national burden of cardiovascular diseases in youths and young adults aged 15–39 years in 204 countries/territories, 1990–2019: a systematic analysis of Global Burden of Disease Study 2019. *BMC medicine, 21*(1), 222.

Sun, R., Wang, J., Li, M., Li, J., Pan, Y., Liu, B., ... & Zhang, L. (2024). Association of insulin resistance with cardiovascular disease and all-cause mortality in type 1 diabetes: systematic review and Meta-analysis. *Diabetes Care, 47*(12), 2266-2274.

Tamargo, J., Caballero, R., & Delpon, E. (2022). Sex-related differences in the pharmacological treatment of heart failure. *Pharmacology & Therapeutics*, 229, 107891.

Tayal, U., Pompei, G., Wilkinson, I.B., Adamson, D., Sinha, A., Hildick-Smith, D., Cubbon, R.M., Garbi, M., Ingram, T.E., Colebourn, C.L., Camm, C.F., Guzik, T.J., Anderson, L., Page, S.P., Wicks, E., Jenkins, P., Rosen, S.D., Eftychiou, S., Roberts, E., Eftekhari, H., Probert, H., Cowie, A., Thakkar, R., Moore, J., Berry, C., Captur, G., Deshpande, A., Brown, S., Malkin, R., Harrison, M., Lawson, C.A., Ng, G.A., & Kunadian, V. (2024). Advancing the access to cardiovascular diagnosis and treatment among women with cardiovascular disease: a joint British Cardiovascular Societies' consensus document. *Heart, 110*(22), e3-e15. https://doi.org/10.1136/heartjnl-2024-324625

Teshale, A. B., Htun, H. L., Owen, A. J., Ryan, J., Baker, J. R., Vered, M., ... & Freak-Poli, R. (2024). Gender-specific aspects of socialisation and risk of cardiovascular disease among community-dwelling older adults: a prospective cohort study using machine

learning algorithms and a conventional method.. *J Epidemiol Community Health, 78*(12), 737-744. https://doi.org/10.1136/jech-2023-221860

Vaduganathan, M., Mensah, G. A., Turco, J. V., Fuster, V., & Roth, G. A. (2022). The global burden of cardiovascular diseases and risk: a compass for future health.. *Journal of the American College of Cardiology, 80*(25), 2361-2371.

Vahidy, F. S., Pan, A. P., Ahnstedt, H., Munshi, Y., Choi, H. A., Tiruneh, Y., ... & McCullough, L. D. (2021). Sex differences in susceptibility, severity, and outcomes of coronavirus disease 2019: Cross-sectional analysis from a diverse US metropolitan area. *PloS one, 16*(1), e0245556. https://doi.org/10.1371/journal.pone.0245556

Vriend, E. M., Galenkamp, H., van Valkengoed, I. G., & van den Born, B. J. H. (2024). Sex disparities in hypertension prevalence, blood pressure trajectories and the effects of anti-hypertensive treatment. *Blood Pressure, 33*(1), 2365705. https://doi.org/10.1080/08037051.2024.2365705

Walli-Attaei, M., Rosengren, A., Rangarajan, S., Breet, Y., Abdul-Razak, S., Sharief, W.A., Alhabib, K.F., Avezum, Á., Chifamba, J., Díaz, R., Gupta, R., Hu, B., Iqbal, R., Ismail, R., Kelishadi, R., Khatib, R., Lang, X., Li, S., López-Jaramillo, P., Mohan, V., Oguz, A., Palileo-Villanueva, L.M., Połtyn-Zaradna, K., SreelakshmiP, R., Pinnaka, L., Serón, P., Teo, K.K., Verghese, S.T., Wielgosz, A., Yeates, K., Yusuf, R., Anand, S.S., & Yusuf, S. (2022). Metabolic, behavioural, and psychosocial risk factors and cardiovascular disease in women compared with men in 21 high-income, middle-income, and low-income countries: an analysis of the PURE study. *The Lancet, 400*(10355), 811-821. https://doi.org/10.1016/S0140-6736%2822%2901441-6

Wang, R., Wang, Y., Lu, J., Li, Y., Wu, C., Yang, Y., ... & Hu, S. (2025). Forecasting cardiovascular disease risk and burden in China from 2020 to 2030: a simulation study based on a nationwide cohort. *Heart, 111*(5), 205-211. https://doi.org/10.1136/heartjnl-2024-324650

Wang, Y., Tian, A., Wu, C., Lu, J., Chen, B., Yang, Y., Zhang, X., Zhang, X., Cui, J., Xu, W., Song, L., Guo, W., Wang, R., Li, X., & Hu, S. (2023). Influence of Socioeconomic Gender Inequality on Sex Disparities in Prevention and Outcome of Cardiovascular Disease: Data From a Nationwide Population Cohort in China. *Journal of the American Heart Association, 12*(20), e030203. https://doi.org/10.1161/JAHA.123.030203

Williams, M.G., Dastidar, A., Liang, K., Johnson, T.W., Baritussio, A., Strange, J., Joshi, N., Dorman, S.H., De Gárate, E., Spagnoli, L., Fiori, E., Lawton, C.B., Biglino, G., Plein,

S., & Bucciarelli-Ducci, C. (2022). Sex differences in patients with acute coronary syndromes and non-obstructive coronary arteries: Presentation and outcome. *International Journal of Cardiology*, 372, 15-22. https://doi.org/10.1016/j.ijcard.2022.11.032

Woodruff, R. C., Tong, X., Loustalot, F. V., Khan, S. S., Shah, N. S., Jackson, S. L., & Vaughan, A. S. (2025). Cardiovascular disease mortality trends, 2010–2022: an update with final data. *American Journal of Preventive Medicine, 68*(2), 391-395. https://doi.org/10.1016/j.amepre.2024.09.014

World Health Organization. (2021, June). Cardiovascular diseases (CVDs). WHO. https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)

Yang, J., Wu, S., Liu, Y., Jiang, J., Chen, S., Zhang, B., Li, W., & Zhang, Q. (2024). Gender disparities in all-cause mortality among individuals with early-onset cardiovascular diseases. *BMC public health, 24*(1), 1450. https://doi.org/10.1186/s12889-024-18908-w

Yano, Y., Kim, H. C., Lee, H., Azahar, N., Ahmed, S., Kitaoka, K., ... & Viera, A. J. (2022). Isolated diastolic hypertension and risk of cardiovascular disease: controversies in hypertension-pro side of the argument. *Hypertension, 79*(8), 1563-1570.

Yassine, B. B., Rojewski, J. W., & Ransom, M. M. (2022). Gender inequity in the public health workforce. *Journal of Public Health Management and Practice, 28*(2), E390-E396. https://doi.org/10.1097/PHH.0000000000001374

Zeng, M., Cicuttini, F., Lim, Y. Z., Samaras, K., Brodaty, H., Sachdev, P. S., ... & Wang, Y. (2024). Associations of osteoarthritis with prevalence and incidence of cardiovascular disease over 10 years in community-dwelling older adults: the Sydney memory and ageing study. *Gerontology, 70*(4), 351-360. https://doi.org/10.1159/000537721

Zhao, D. (2021). Epidemiological features of cardiovascular disease in Asia. *JACC: Asia, 1*(1), 1-13.

APPENDIX I

DEPARTMENT OF NURSING SCIENCE

FACULTY OF BASIC MEDICAL SCIENCES

UNIVERSITY OF BENIN, BENIN CITY

QUESTIONNAIRE ON GENDER SPECIFIC DISPARITIES IN CARDIOVASCULAR DISEASE AND TREATMENT OUTCOMES AMONG OLDER ADULTS IN A TERTIARY HEALTH INSTITUTION, EDO STATE.

Dear Respondents,

I am a student at the institution mentioned above, currently conducting research on the topic " gender specific disparities in cardiovascular disease and treatment outcomes among older adults in a tertiary health institution in Edo state". The purpose of this questionnaire is to gather pertinent information regarding the subject matter. I kindly request that you select the most suitable option from the choices provided below. Please be assured that all information shared will be kept completely confidential. Thank you for your cooperation.

INSTRUCTION:

Please tick as appropriate in all the boxes provided.

Section A: Demographic data of participants

Age:_____

Gender: Male ( ) Female ( )

Diagnosis of Cardiovascular disease:_____

Ethnic group: Igbo [ ] Hausa [ ] Yoruba [ ] Bini [ ] Others[ ]

Religion: Christianity [ ] Islam [ ] Others [ ]

Marital status: Single ( ) Married ( ) Divorced ( )

Section B: Common cardiovascular disease presentations

Which of the following best describes the symptoms of your condition?

	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
I often feel chest pain when I walk or do simple tasks.				
I get tired quickly, even when I do small activities.				
I sometimes find it hard to breathe when I lie down.				
My ankles or feet often swell.				
I wake up at night feeling short of breath.				
I have experienced nausea or dizziness without any clear reason.				
I have felt an unusual discomfort in my jaw, neck, or back.				

Section C: Cardiovascular disease risk factors.

Which of the following risk factors apply to you?

	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
I know that high blood pressure can lead to heart problems.				
I believe that men and women can have different heart problems.				
I sometimes find it hard to breathe when I lie down.				
I understand that smoking and drinking alcohol can harm the heart.				
I have been advised by a nurse about how to keep my heart healthy.				
I am aware that stress can affect my heart health.				
I know that being overweight can increase my risk of heart disease.				
I understand that lack of exercise can lead to heart problems.				
I am aware that diabetes can increase my risk of heart disease.				
I know that eating too much fatty food can harm my heart.				

Section D: Perceived gender disparities in treatment outcomes of cardiovascular disease.

	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
I feel that men and women do not receive the same quality of treatment outcomes for heart problems.				
I believe women's recovery from heart disease is often overlooked compared to men's.				
I think men experience better improvement in heart disease treatment compared to women.				
I believe doctors are more likely to explain heart treatments better to men.				
I feel that men and women have different chances of surviving heart disease due to differences in treatment quality.				
I believe follow-up care and rehabilitation after heart treatment differ based on gender.				

APPENDIX II

RELIABILTY OF INSTRUMENT (QUESTIONNAIRE) OF GENDER SPECIFIC DISPARITIES IN CARDIOVASCULAR DISEASE AND TREATMENT OUTCOMES AMONG OLDER ADULTS IN A TERTIARY HEALTH INSTITUTION, EDO STATE.

A pilot study was conducted using 10% of the sample size, which amounted to 10 respondents from the geriatric ward of St. Philomena Catholic Hospital, Benin City, to pretest the reliability of the instrument. The respondents had similar characteristics to the target population of older adults. Identified lapses in the questionnaire were amended, and necessary corrections were made, thereby enhancing the reliability of the instrument for assessing gender-specific disparities in cardiovascular disease presentations, awareness of risk factors, and treatment outcomes.

Scale	**Number of Items**	**Cronbach's Alpha**	**Cronbach's Alpha (Standardized Items)**	**Mean**	**Variance**	**Std. Deviation**	**Interpretation**
Cardiovascular Disease Presentations	11	0.842	0.851	30.57	39.082	6.252	High internal consistency
Awareness of Cardiovascu	10	0.796	0.807	32.70	13.803	3.715	Acceptable reliability

lar Risk Factors							
Perceived Gender Disparities in Treatment Outcomes	11	0.879	0.880	27.50	56.948	7.546	Strong internal consistency

APPENDIX III

HEALTH RESEARCH ETHICS COMMITTEE (HREC)

UNIVERSITY OF BENIN TEACHING HOSPITAL

P.M.B. 1111 BENIN CITY NIGERIA Telephone: 052-600418 Website: ubth.org

CHIEF MEDICAL DIRECTOR
Prof. Darlington E. Obaseki
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DIRECTOR OF ADMINISTRATION
Jim Uwadie, Esq

CHAIRMAN
Prof. (Mrs.) Antoinette N. Ofili

HREC OFFICE:
Committee email: ubthresearchethics@gmail.com
Registration Number:
NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/2025/42

PROPOSAL TITLE: "GENDER SPECIFIC DISPARITIES IN CARDIOVASCULAR DISEASES AND TREATMENT OUTCOMES AMONG OLDER ADULTS IN A TERTIARY HEALTH INSTITUTION, EDO STATE"

PRINCIPAL INVESTIGATOR(S): MOMOH MIRACLE SEMIRA

DEPARTMENT/INSTITUTION: DEPARTMENT OF NURSING SCIENCE, SCHOOL OF BASIC MEDICAL SCIENCES UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

DATE CONSIDERED: APRIL 25TH, 2025

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 25/4/2025 TO 24/4/2026. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI **SIGNATURE & DATE** 25/4/2025

SUPERVISOR (S): DR. (MRS.) C. ENUKU

DECLARATION BY INVESTIGATOR(S):
PROTOCOL NUMBER (please quote in all enquiries)
Note that no participant accrual or activity related to this research may be conducted outside of these dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual re-port to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification

Signature & Date.....

ubthresearchethics@gmail.com Registration Number: NHREC/24/01/2020