PREVALENCE OF ANXIETY AND ITS ASSOCIATED FACTORS AMONG CARDIAC PATIENTS ON FOLLOW-UP IN THE CARDIOLOGY CLINIC AT KENYATTA NATIONAL HOSPITAL IN NAIROBI, KENYA

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DECLARATION OF ORIGINALITY FORM

I, Dr. Franz Owano Ombija declare that this research project is my original work and has not been presented for a degree or an academic award at any other learning institution or university for honor of any degree or any other purpose.

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DEDICATION

To God Almighty my strength and to my parents and siblings for your enormous support and encouragement in my life. Also, to patients suffering from mental illness, may your lives change for the better as a result of the findings of this research.

ACKNOWLEDGEMENT

I am thankful to all lecturers in the Department of Psychiatry, University of Nairobi for your mentorship. To my Supervisors Dr. Mburu and Dr. Kigamwa, my sincere gratitude for your guidance in the development of my project and carrying out this study.

I am also grateful to my family and friends for your support. God bless you all.

LIST OF ABBREVIATIONS

APA: American Psychiatric Association

CAD: Coronary Artery Disease

CABG: Coronary Artery Bypass Grafting

CHF: Congestive Heart Failure

CHD: Coronary Heart Disease

CVD: Cardiovascular deaths

DSM5: Diagnostic and Statistical Manual for Mental Disorders, Fifth edition

ERC: Ethics and Research Committee

GAD: General Anxiety Disorder

HADS: Hospital Anxiety Depression Scale

KNH: Kenyatta National Hospital

IHD: Ischemic heart Disease

MI: Myocardial infarction

NCDs: Non-communicable disease

OCD: Obsessive Compulsive Disorder

PCI: Percutaneous Coronary Intervention

PTSD: Post Traumatic Stress Disorder

RHD: Rheumatic Heart Disease

SCAD: Spontaneous Coronary Artery Dissection

UA: Unstable angina

UON: University of Nairobi

US: United States.

VAS: Visual Analogue Scale

WHO: World Health Organization

YLDs: Years Lived with Disability

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Anxiety is a frequently encountered condition in individuals with heart-related illnesses. It is linked to heightened rates of cardiovascular morbidity and mortality, which consequently negatively impact overall well-being and associated quality of life. On a global scale, research has consistently demonstrated that early identification and implementation of suitable therapeutic interventions for managing anxiety in cardiac diseases can effectively decrease mortality rates associated with cardiovascular ailments. However, in the context of Kenya, there exists a paucity of data regarding the extent to which anxiety is prevalent among patients with heart conditions. Thus, the objective of this study is to ascertain the prevalence of anxiety among individuals diagnosed with cardiac diseases. xi

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In order to guarantee the study's accuracy, relevance, and ethical soundness, a meticulously constructed set of inclusion criteria has been implemented. These criteria have been carefully designed to identify a group of participants whose experiences and insights can provide valuable knowledge about the prevalence and factors associated with anxiety in the context of cardiovascular conditions. .....**Error! Bookmark not defined.**

To meet the first criterion, individuals must be of age 18 years or older. This age requirement ensures that the study involves individuals who possess the necessary maturity and cognitive development to participate in comprehensive assessments and provide meaningful responses. Additionally, this criterion aligns with ethical considerations, as individuals below the age of 18 may require specific ethical safeguards and considerations in research. ..... **Error! Bookmark not defined.**

3.3.2 Exclusion Criteria ..... **Error! Bookmark not defined.**

While the inclusion criteria lay the groundwork for identifying participants whose experiences are vital to the investigation, a set of exclusion criteria has been established to uphold the integrity and validity of the study's findings. These criteria outline specific circumstances under which individuals may be excluded from participating in the research, ensuring that the group of participants remains representative of the target population and that the data collected is reliable and relevant. ..... **Error! Bookmark not defined.**

To begin with, individuals who are considered too unwell to complete the study's questionnaires are excluded. This criterion acknowledges that certain individuals with severe medical conditions may be physically compromised to an extent that prevents active participation in the study's assessments. Since comprehensive responses to questionnaires and interviews are crucial to the research, this criterion protects the accuracy of the collected data. ..... **Error! Bookmark not defined.**

At the same time, individuals who are unable to comprehend English or Kiswahili are excluded from the study. Effective communication is essential for engaging participants in meaningful interactions and data collection. Because the study is being conducted in Nairobi, Kenya, and these two languages are widely spoken, utilizing them ensures that participants can provide accurate information, thus maintaining the validity of the findings. This criterion is rooted in the practical reality of conducting research within a specific linguistic and cultural context. **Error! Bookmark not defined.**

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ABSTRACT

Background

Anxiety is a frequently encountered condition in individuals with heart-related illnesses. It is linked to heightened rates of cardiovascular morbidity and mortality, which consequently negatively impact overall well-being and associated quality of life. On a global scale, research has consistently demonstrated that early identification and implementation of suitable therapeutic interventions for managing anxiety in cardiac diseases can effectively decrease mortality rates associated with cardiovascular ailments. However, in the context of Kenya, there exists a paucity of data regarding the extent to which anxiety is prevalent among patients with heart conditions. Thus, the objective of this study is to ascertain the prevalence of anxiety among individuals diagnosed with cardiac diseases.

Purpose

This study aimed to assess the prevalence and socio-demographic factors associated with anxiety among adult patients with cardiac conditions attending Kenyatta National Hospital cardiology outpatient clinic.

Study Design and site

A cross-sectional descriptive study using cardiac patients at the Kenyatta National Hospital's cardiology outpatient clinic.

Method

This was a descriptive cross-sectional study. Convenience sampling method was used to enroll 174 patients with confirmed cardiovascular conditions on follow up at the cardiology outpatient clinic at KNH. Data collection was done by interviews utilizing the GAD-7 and a researcher designed sociodemographic questionnaire to capture crucial data. Data was coded and analyzed using a statistical software (SPSS version 22) and presented in form of frequencies and percentages in tables. P values of ≤ 0.05 were considered statistically significant at 95% confidence interval following a bivariate analysis.

Results

The examination enrolled one hundred and seventy-four participants attending the cardiac department at KNH. Out of the examination's population, thirty-five point four percent were male and sixty-five point three percent were female. The median age was fifty-eight years. Most (34% of the one hundred and seventy-four participants) were married. The majority of the participants, thirty-two percent (n=57), had completed primary level education. In terms of occupation, fifty percent (n=88) were unemployed. Out of the participants engaged in income-generating activities, thirty-one percent (n=54) had an income between 10,000-40,000. Sixty-three point two percent of the participants were Protestants, twenty-five point three percent were Catholic, and seven participants were Muslims. The most prevalent cardiovascular condition observed was Hypertensive Heart Disease. The prevalence of anxiety in the examination was sixty-seven percent and was observed mostly among the widowed. Hypertensive Heart Disease was also significantly associated with anxiety with a ($p<0.038$). Age, gender, marital status, education, occupation, and income were found to be significant factors in the development of anxiety in cardiac disease.

Conclusion

As evidenced by this study, the prevalence of anxiety is higher among patients with cardiac disease in comparison to the general population.

Age, gender, marital status, education attainment, occupation and level of income appeared to have an impact on the presence or absence of anxiety among the participants.

Recommendation

Routine screening for anxiety in cardiac patients needs to be undertaken as they may be more susceptible to anxiety compared to the general public. Anxiety has also been shown to increase the rates of mortality in cardiac patients thus necessitating the need for screening and timely management.

CHAPTER ONE: INTRODUCTION, PROBLEM STATEMENT, JUSTIFICATION, SIGNIFICANCE AND RATIONALE, RESEARCH QUESTION AND OBJECTIVES.

1.1 Introduction

The World Health Organization (WHO) highlights cardiac conditions as one of the leading cause of death globally. In 2019, there were 18 million deaths arising from cardiac conditions globally. This was 32 percent of all the global deaths in that year. The majority of these deaths, 85%, are a result heart attacks and strokes, and most being in countries that are categorized as either low- or middle-income. In 2019, cardiovascular diseases accounted for 37.8% of the nearly 18 million premature deaths secondary to NCDs. (World Health Organization, 2021).

A local analysis by the Kenya Bureau of Statistics shows that the mortality rate due to cardiovascular diseases ranged from 6% to 8%, with rheumatic heart disease being a common cause among both minors and the elderly ("Ministry of Health," 2015). The male-to-female ratio for cardiac conditions in Kenya is 3:1, with cardiovascular diseases contributing to 13% of deaths and myocardial infarction being the most common condition. Kenya recorded an overall cardiovascular mortality rate of 14% in 2019, with 8% of these deaths considered premature.

A prospective meta-analysis by Ryder et al. (2021) involving 44 studies found an elevated 21% risk of death among participants diagnosed with comorbid anxiety and CAD. Cheah et al. (2020) also found positive relationships between GAD and a specific demographic, showing that young, single women with limited academic qualifications were more susceptible to GAD.

Dionne et al. (2021) highlighted that there have been limited prospective studies focused on investigate the involvement and influence of anxiety disorders on the impact of cardiovascular conditions, particularly in those with a confirmed coronary artery disease diagnosis. Yuyun et al. (2020) explored the contrast in the prevalence of cardiac conditions in Africa with that of high-income countries and found that cardiac conditions contributed

to 13% of all deaths and 37% of NCD deaths within Sub-Saharan Africa. Moser (2007) found that anxiety is believed to be more common than depression, with a 70% prevalence among participants who have experienced critical cardiovascular events, and a 20% recurrence across a prolonged period of time. Celano et al. (2016) found a 14% lifetime prevalence of generalized anxiety disorder in participants with heart failure, compared to 26% in participants diagnosed with CAD. Psychosocial function has been noted to be impaired and overall productivity compromised, particularly in those suffering from threshold and subthreshold forms of anxiety.

1.2 Problem Statement

According to a report by the WHO, by 2015, approximately 4 percent of the world population was estimated to be living with anxiety disorders, resulting in 24.6 million Years Lost to Disability globally in 2015 and negatively impacting the economy. The global disability-adjusted life-years (DALYs) attributed to psychiatric conditions rose from 3% to 5% between 1990-2019, with anxiety disorders contributing 23% of the burden. Ndetei et al. (2011) sought to determine the epidemiological patterns of anxiety within Kenya and established a link between anxiety and chronic comorbidities managed at peripheral facilities. 20% of patients with chronic medical conditions, including cardiac ailments, exhibited characteristics of generalized anxiety disorder (GAD). Kwobah et al. (2017) evaluated the psychiatric morbidity among a sampled population in the Western region of Kenya and found that 45% of the respondents had a lifetime diagnosis of a psychiatric condition, with 16% having a diagnosis of anxiety. Dhadphale et al. (1983) discovered a psychiatric morbidity of 29% in a target population being attended to in medical facilities in semi-urban and remote regions of Kenya, with anxiety being the psychiatric condition with the most diagnoses apart from depression. Daunis et al. (2016) indicated that anxiety disorders enhance the likelihood of developing cardiovascular conditions, particularly heart failure and CAD among others.

Celano et al. (2016) realized that anxiety is a frequent occurrence in patients diagnosed with cardiovascular conditions, with 20% of patients reporting increased anxiety following an acute coronary syndrome and 50% reporting prolonged symptoms 12 months after the cardiac event. Despite its negative impact, Moser (2007) emphasized why proper diagnosis

of anxiety and treatment of affected patients with cardiovascular illnesses was important, however, unfortunately, anxiety is often not evaluated or treated adequately. Meier et al. (2016) evaluated the mortality risk in patients with anxiety, with 2% of the 1066 participants with a diagnosed anxiety disorder dying after being monitored for 10 years, indicating higher susceptibility to death in comparison to the general populace. There is limited data on anxiety prevalence in Africa, particularly in Kenya, among individuals being treated for cardiovascular conditions, making it important to assess this in adult patients on follow-up for cardiac conditions. This study seeks to examine the prevalence of anxiety in adult patients being monitored for cardiac conditions at the Cardiology Clinic at Nairobi's Kenyatta National Hospital, on an outpatient basis. Furthermore, it aims to explore the relationship between sociodemographic factors and anxiety prevalence.

1.3 Background information and study justification

Cardiovascular disease can broadly be described as a condition affecting the blood vessels or the heart. Some of the cardiac conditions observed in our setting include Hypertensive heart disease, rheumatic heart disease, dilated cardiomyopathy, infective endocarditis, coronary artery disease, heart failure and congenital heart disease. The main symptoms of cardiac disease include palpitations, dizziness, fatigue, dyspnoea and chest pain.

The WHO describes anxiety disorders as conditions characterized by excessive fear and worry and related behavioural disturbances. With symptoms severe enough to result in either significant distress or impairment of functions.

General Anxiety Disorder according to DSM is diagnosed by the presence of the following symptoms: -

A. Excessive anxiety and worry, which is characterized by a constant feeling of apprehension and expectation, happens more frequently than not for a minimum of six months. This overwhelming concern is directed towards various events or activities, such as performance at work or school.
B. The person finds it difficult to control their worry.
C. The feeling of apprehension and unease is linked to three or more of the following six indicators (with these indicators occurring more frequently than not over the past half-year).

i. Irritability
ii. Restlessness
iii. Difficulty concentrating
iv. Muscle tension
v. Being easily fatigued
vi. Difficulty in sleeping

D. The concentration of tension and apprehension is not restricted to the characteristics of an Axis I disorder.
E. Anxiety, worry, or the physical symptoms associated with it must result in significant distress or limitations in social, work, or other important aspects of life.
F. The disruption is not caused by the direct physical impact of a substance (like a drug or medication) or a general medical condition (such as hyperthyroidism). It also doesn't happen only during a mood disorder, psychotic disorder, or pervasive developmental disorder.

Individuals with Generalized Anxiety Disorder (GAD) often experience prolonged worry and apprehension that goes beyond what is considered normal. Unlike other anxiety disorders, like panic disorder or social phobia, the worries in GAD are not focused on a specific issue. Instead, they are more widespread and difficult to control.

Psychological arousal is a common symptom of GAD and can manifest as irritability, poor concentration, and sensitivity to noise. Some patients may also complain of poor memory, but this is usually due to their difficulty concentrating rather than true memory impairment. It's important to rule out any other potential causes for memory issues.

Autonomic overactivity is another characteristic of GAD and is often felt as symptoms such as sweating, palpitations, dry mouth, epigastric discomfort, and dizziness. Some patients may seek help for these physical symptoms without mentioning the psychological symptoms of anxiety. It's worth noting that GAD can present differently in individuals, and not all symptoms mentioned here may apply to everyone with the disorder.

Some physical symptoms of anxiety include muscle tension, hyperventilation, and sleep disturbances. Constricted muscles can precipitate agitation, shakes, incapacity to unwind and discomfort in the rear and trapezius. Overly rapid respiration could result in light-

headedness, paresthesia of limbs as well our perception is robbed from us for air consumption. The anomalies of slumber encapsulate struggles with entering a state of restful unconsciousness; relentless invasive contemplations disrupting tranquility; temporal discontinuity within sleep that fails to rejuvenate basically unpleasant fantasies coupled with nocturnal horrifying episodes. It's important to consider the possibility of physical illnesses with similar symptoms when diagnosing anxiety disorders, especially when there is no obvious psychological cause or history of past anxiety.

The following conditions are very important: Thyrotoxicosis, which can cause irritability, restlessness, tremors, and a fast heart rate. During a physical examination, doctors may observe signs of thyrotoxicosis such as an enlarged thyroid, atrial fibrillation, and bulging eyes. If there's any uncertainty, doctors should order thyroid function tests. Phaeochromocytoma and hypoglycemia usually cause symptoms in episodes, so they might be mistaken for phobic disorders or panic disorders. However, it's also important to consider them as possible causes of GAD. If there's any doubt, doctors should conduct appropriate physical examinations and laboratory tests to determine the exact cause.

Anxiety often is the underlying cause of physical complaints in some individuals who are worried that their symptoms may indicate a serious illness. However, if the symptoms are vague or nonspecific, they may be mistakenly attributed to anxiety. Interestingly, some patients do not disclose all of their symptoms unless specifically prompted. This is especially true for patients who have a personal fear of severe illness, such as cardiac disease, or have witnessed someone they know suffer from similar symptoms.

Although there is evidence suggesting a high prevalence of anxiety among patients with cardiac conditions, it is often overlooked and not properly assessed, hindering effective treatment and overall health improvement.

In line with the Kenya National Cardiovascular Guidelines, it is approximated that cardiac conditions contribute to a significant proportion of hospital admissions in the country, accounting for around one-fourth. Shockingly, 13% of these cases ultimately lead to mortality.

A study conducted by Ndetei et al. (2009) aimed at determining the prevalence of psychiatric conditions among adults at various medical facilities in Kenya found that the detection rate of psychiatric conditions by medical professionals was 4.1%. This indicates that a significant proportion of psychiatric disorders, including anxiety, remain undetected and therefore, evade management.

Celano et al. (2016) conducted a study to determine the relationship between cardiac conditions and anxiety and concluded that difficulties in diagnosing anxiety disorders in cardiac patients are partly due to the overlapping symptomatology of both disorders, particularly the similarities between the symptoms of Generalized Anxiety Disorder (GAD) and Heart Failure. The study also found that anxiety has a negative correlation to clinical outcomes in those diagnosed with Coronary Artery Disease (CAD), however, research exploring its screening in this demographic is still lacking.

Despite numerous studies conducted globally, local data on the prevalence of anxiety in patients being managed for cardiac disease is limited. The only study related to this topic that was discovered by the researcher was conducted by Ndetei et al. (2011), which aimed to establish the epidemiological patterns of anxiety in Kenya, but did not provide any link or relation to cardiac disease.

1.4 Significance and Rationale

It is important to note the high level of concern surrounding anxiety among cardiac patients. Numerous negative consequences such as reduced quality of life and adverse outcomes have been linked to this condition. In order to effectively address and manage anxiety in this population, it is essential to understand the factors associated with it. This study aims to contribute to the existing knowledge on anxiety among cardiac patients by focusing specifically on those receiving follow-up care at the Cardiology Clinic in Nairobi, Kenya.

One significant aspect of this study is its ability to provide insights into the prevalence of anxiety among cardiac patients in Kenya. Although studies conducted in other countries exist, there is a lack of comprehensive research in the Kenyan context. By examining the local population, this study will help fill this gap in knowledge and assist in the development of culturally appropriate interventions for managing anxiety in cardiac patients.

Identifying the factors associated with anxiety among cardiac patients is a crucial step towards designing targeted interventions. By understanding the specific risk factors contributing to anxiety in this population, healthcare professionals and policymakers can create personalized treatment plans. These plans may include psychological support, counseling, and other interventions aimed at reducing anxiety and improving the overall well-being of the patients.

The results of this study can also have important implications for integrating mental health services into routine cardiac care. If a significant prevalence of anxiety is found, it will highlight the need for a multidisciplinary approach that involves mental health professionals as part of the cardiac care team. This integrated model of care can enhance patient outcomes by addressing both the physical and psychological aspects of their condition.

Furthermore, understanding the psychological impact of anxiety on cardiac patients is crucial for optimizing healthcare delivery. Anxiety has been associated with negative outcomes such as increased hospital readmissions, longer hospital stays, and higher

healthcare costs. By determining the specific psychological challenges faced by cardiac patients, healthcare providers can tailor their interventions to better meet their needs. The findings of this study can guide the development of interventions that focus on patient education, coping mechanisms, and support systems to alleviate anxiety and improve the overall well-being of cardiac patients.

1.5 Research questions

How prevalent is anxiety among patients with cardiac related issues at the cardiology clinic of Kenyatta National Hospital, and how is it related to sociodemographic factors?

1.6 Research objectives

1.6.1 Main objective

To determine the prevalence of anxiety and its associated factors in adults with cardiac conditions who were being followed up at the cardiology outpatient clinic at KNH in Nairobi, Kenya.

1.6.2 Specific objectives

- To ascertain the prevalence of anxiety among cardiac patients on follow-up at KNH's cardiology clinic.
- To ascertain the socio-demographic traits of cardiac patients diagnosed with anxiety on follow-up at KNH's cardiology clinic.
- To determine the association between socio-demographic characteristics and anxiety.

1.7 Scope and Limitations

The focus of this research will be on cardiac related patients receiving follow-up care at the Cardiology Clinic in Nairobi, Kenya's Kenyatta National Hospital. The study will

involve male and female patients who are 18 years old or older. Standardized tools will be used to collect data and assess anxiety levels, as well as identify any related factors.

It is worth noting that this research will have certain limitations. Firstly, the limited number of eligible participants during the study timeframe may restrict the sample size. This may affect the ability to generalize the findings to a larger group of heart patients in Kenya. Additionally, conducting the study in a single healthcare facility might limit the applicability of the findings to other settings.

Another possible limitation is relying on self-reported measures of anxiety, which could be prone to recall bias or social desirability bias. To mitigate these limitations, the researchers will employ rigorous data collection protocols, ensure participant confidentiality, and utilize validated assessment tools.

Furthermore, the study's cross-sectional design will restrict the ability to establish a cause-and-effect relationship between anxiety and related factors. To gain a better understanding of the temporal relationship between anxiety and heart outcomes, longitudinal studies might be necessary.

Lastly, the study will be conducted in a specific cultural context, and cultural factors may influence how anxiety is experienced and expressed. Acknowledging the potential influence of cultural variables is crucial, and the findings should be interpreted within the context of this specific culture.

Despite these limitations, this research will provide valuable insights into the prevalence of anxiety among heart patients at the Cardiology Clinic in Kenyatta National Hospital. The findings can contribute to existing literature, inform clinical practices, and guide the development of interventions to enhance the psychological well-being and overall outcomes of heart patients in Kenya.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Contained within the spectrum of anxiety disorders are multiple psychological conditions defined by feelings of trepidation and angst, incorporating generalized anxiety disorder, panic episodes disturbance, fears or phobias manifestations, societal interaction apprehension ailment often known as social anxiety disorder. Moreover, pathological obsessions-compulsions syndrome alongside post-traumatic stress aftermath malady also fall into this category (World Health Organization's statement in 2015).

The manifestations may range from mild to severe. Global investigations indicate a potential connection between cardiovascular disease and anxiety, as anxiety impacts approximately 7.3% of the general population.

Anxiety can have both positive and negative effects in cardiac patients. On one hand, it can prompt medical intervention in the case of emergencies. Conversely, chronic anxiety can result in incompliance with treatment, reluctance to adopt lifestyle changes, and unhealthy habits that increase the risk of cardiovascular events. Despite this, anxiety is often downplayed by medical professionals, particularly in patients with cardiovascular conditions.

The national stepwise survey for non-communicable diseases has found that hypertension is a major contributor to the development of cardiovascular conditions, accounting for 25% of admissions in the country. Patients diagnosed with psychiatric conditions, including anxiety, have a higher prevalence of medical comorbidities, particularly in terms of cardiovascular diseases.

Approximately 50% of cardiac episodes have been linked to hypertension, which is considered a primary determinant of cardiovascular morbidity and mortality. A study conducted in a population in western Kenya transitioning into urbanity revealed an increase in cardiovascular diseases and risk factors due to lifestyle choices. Another study exploring the factors contributing to cardiovascular mortality in informal settlements in Nairobi

found that hypertension was a major contributor, positively associated with mortality (Wekesah et al., 2020).

2.2 Prevalence of anxiety in cardiac disease

Several studies have been done to investigate the link between cardiovascular conditions and anxiety. Batelaan et al. (2016) analyzed the association linking the two and found that there was a direct relationship, with anxiety increasing the chances of developing cardiovascular disease by 52%. Nekouei et al. (2011) sought to draw parallels between the levels of anxiety in patients scheduled for angiography to those in the general population and found that patients undergoing the procedure experienced significantly increased intensity of anxiety. Gu et al. (2016) recruited 170 participants with CAD who were scheduled for a percutaneous coronary intervention and found that 35% of the respondents reported experiencing anxiety in the 24 hours before the procedure, with a male predominance of 69%. Roest et al. (2010) analyzed 20 studies examining the relationship between incidental CHD and anxiety and found that 70% of the analyzed data revealed a significant connection between the two. Haines et al. (1987) in a study conducted of prospective nature in England assessed the correlation between phobic anxiety and IHD and found a strong association between the two. N-Louis et al. (2011) demonstrated that elevated chronic anxiety was linked to a surge in development of atherosclerosis over a 4-year timeline based on alterations in the intima-media thickness of the common carotid artery in 726 participants in the US. Grace et al. (2004) recruited 913 participants with a history of unstable angina and MI and found that more than a third of the patients reported increased levels of anxiety during the cardiac events and 50% acknowledged persistent symptoms up to a year after. Karlsen et al. (2021) in a meta-analysis revealed the correlation between anxiety and the incidence of CHD, with anxiety found to influence the progression of the condition. Wekesah et al. (2020) explored the factors contributing to cardiovascular mortality in informal settlements in the capital and found that unemployment and associated anxiety, along with income inequality, may contribute to cardiovascular mortality.

In 1999, Oyoo and Ogola conducted a cross-sectional descriptive study to analyze the etiology, precipitants, and demographic variables of participants diagnosed with

congestive heart failure (CHF) in Kenya National Hospital (KNH). 91 participants met the inclusion criteria, RHD was the most prevalent condition and was found in 32% of the participants (Oyoo & Ogola, 1999).

Das et al. (2022) studied the severity of anxiety in cardiovascular patients undergoing catheterization in India. The severity of anxiety in patients was assessed while they were admitted, one day after diagnosis, and 12 hours before cardiac catheterization. Almost 32 percent of the 54 participants in the study reported severe anxiety (Das et al., 2022).**7**

Assari et al. (2017) conducted a cross-sectional study investigating the relationship between coronary angiographic findings and anxiety levels in patients undergoing coronary angiography in Iran. The study involved administering the Hospital Anxiety Depression Scale to 106 patients. The researchers discovered an inverse relationship between anxiety and the severity of coronary stenosis (Assari et al., 2017).

Cardiac patients, who already face difficulties in managing their physical health, often experience heightened psychological distress, such as anxiety. According to a comprehensive meta-analysis conducted by Smith et al. (2019), which reviewed a large body of research involving more than 10,000 participants, the prevalence of anxiety disorders among cardiac patients is approximately 20.5% (Smith et al., 2019). This statistic emphasizes the significant impact of anxiety on the cardiac patient population.

Moreover, anxiety does not decrease over time for cardiac patients. A longitudinal study by Johnson et al. (2017) revealed that during the first year after experiencing a heart attack, almost 30% of individuals still get to experience anxiety symptoms (Johnson et al., 2017). This extended presence of anxiety underscores the importance of addressing psychological well-being alongside physical recovery.

Anxiety is prevalent among cardiac patients with various cardiac conditions. Individuals dealing with heart failure, arrhythmias, or coronary artery disease are susceptible to anxiety due to the uncertainty surrounding their condition, the fear of future cardiac events, and the necessary adjustments in their daily lives (Shen et al., 2018). Additionally, cardiac interventions, such as surgery or implantable device implantation, can evoke anxiety due to concerns about the procedure's outcome and potential complications.

The prevalence of anxiety is not limited to patients with diagnosed cardiac conditions. Aspects of the cardiac journey, such as waiting for diagnostic results or undergoing cardiac assessments, can trigger anticipatory anxiety. Although this temporary anxiety often subsides after the uncertainty is resolved, it adds to the overall emotional burden that cardiac patients endure.

Furthermore, anxiety in cardiac patients affects not only the individual but also their families and caregivers. The psychological distress experienced by loved ones as they witness the cardiac journey of their family members can influence their own anxiety levels. This ripple effect underscores the importance of providing holistic support to both patients and their support networks.

Johnson et al. (2020) investigated the prevalence of PTSD and anxiety among Spontaneous Coronary Artery Dissection survivors in the United States. The study utilized a survey, and of the 512 surveys returned, the majority of respondents were women (97.5%). 41% of the participants reported experiencing anxiety, and 28% of the respondents reported elements of PTSD (Johnson et al., 2020).

Mal et al. (2019) analyzed the association between myocardial infarction (MI) and its risk factors, with a focus on anxiety. The study utilized the HADS to assess anxiety in the participants. 52.83% of the participants were noted to have experienced anxiety a fortnight prior to the incidence of an MI (Mal et al., 2019).

Paterniti et al. (2001) carried out a study in France to establish the correlation between anxiety disorders and atherosclerosis. The study enrolled 726 subjects who did not have a diagnosis of cardiovascular disease at the initial assessment or two years later. The anxiety of the participants was assessed using the French translated Spielberger Inventory. The assessments were performed two and four years after the initial examination. The outcome revealed that men experiencing persistent anxiety recorded a greater increase in common carotid intima-media thickness (Paterniti et al., 2001).

Bunevicius et al. (2013) investigated the utility of self-rating scales in anxiety screening and its prevalence in CAD patients in Lithuania. A total of 520 CAD patients were enrolled,

and 7% of them had anxiety disorders such as panic disorder, agoraphobia, Generalized Anxiety Disorder, and social phobia.

A meta-analysis done by Easton et al. (2016) included 73 studies to determine the prevalence of anxiety in cardiovascular participants being managed for Heart Failure. The results showed a 13.1% prevalence of anxiety. Additionally, a 40-year follow-up study conducted by the American Heart Association (n.d.) found a direct correlation between elevated anxiety and the compounded probability of developing cardiovascular diseases as the years progressed.

Arfasa et al. (2022) enrolled 267 participants in a cross-sectional study in Ethiopia to assess the levels of anxiety among patients undergoing cardiac catheterization. Results showed that 70.4% of participants slated for cardiac catheterization recorded elements of anxiety.

Another study by Tsabedze et al. (2021) prospectively evaluated anxiety levels among 103 heart failure clinic participants in Johannesburg, South Africa using the Depression, Anxiety, and Stress questionnaire. Results showed that 18.4% of the participants recorded unusually elevated levels of anxiety.

In a cross-sectional study conducted by Tarimo (2019), 272 participants being managed for heart failure were included in Dar es Salaam, Tanzania. The study found that 60% of female participants had anxiety symptoms, and 49% of all participants were reported to have experienced anxiety.

Research has shown that anxiety is a common problem among cardiac patients worldwide. According to a review article by Roest et al. (2010), anxiety disorders were found in 13% to 28% of heart disease patients across 47 studies. The prevalence of anxiety varied depending on the specific cardiac condition, with higher rates seen in those with acute coronary syndrome and heart failure.

A study conducted by Tully et al. (2015) analyzed 34 studies and discovered that approximately 21.9% of individuals with heart conditions experienced anxiety disorders. The research also highlighted that patients with coronary artery disease or those who had undergone cardiac surgery were more susceptible to anxiety. Furthermore, the study

emphasized that anxiety had detrimental effects on cardiac outcomes, such as increased mortality rates, recurring cardiac events, and a diminished quality of life.

Numerous elements play a part in the progression and exacerbation of anxiety among individuals with cardiac ailments. A notable element involves emotional and psychological reactions towards being identified as having an illness capable of causing sudden death. Feelings of apprehension about coming times, fear due to potential unexpected heart issues, along with worries related to loss of life can collectively intensify levels of unease (Dekker et al., 2013).

Moreover, physical indicators such as discomfort within the chest area, unusual heartbeat rhythms or palpitations coupled with challenges while breathing all have been known to elevate stress even further for patients suffering from heart maladies. The study by Albus & colleagues(2013), has discovered that there's mutual impact between panic feelings and bodily symptoms where increased anxiousness heightens recognition and anguish relating specifically these factors which may potentially again amplify subsequent nervous sensations.

Within the realm of cardiological patients, psychosocial and pecuniary elements play an appreciable role in engendering anxiety. Situational factors such as melancholy, societal withdrawal, paucity of communal support and fiscal strain are all contributing variables to both genesis and chronic manifestation of anxious symptoms (Tully et al., 2015; Huffman et al., 2013).

In addition to these influences recognisable associations exist between certain demographic groups who experience elevated levels of anxiety within those with cardiac diseases - women demonstrate more susceptibility towards feelings of worry than men among this population adaptive groupings basis (Kamphuis et al., 2014). The age parameter presents another intriguing factor where older cohorts exhibit a diminished prevalence rate for anxious state compared against their younger counterparts (Tully et.al , 2015).

2.3 General Risk Factors for Anxiety in Cardiac Patients

Psychosocial Factors

Aspects that pertain to psychosocial dynamics contribute pivotally in the escalation of apprehension among individuals afflicted with heart ailments. Depression, a frequent co-occurring disorder, has been marked out as an important peril element for anxiety (Tully et al., 2015). The concurrent presence of depression and anxiety can orchestrate a detrimental cycle; wherein one ailment exacerbates the other – culminating in elevated distress levels and deteriorated cardiac wellbeing. Social segregation along with scant social support have concomitantly emerged linked to amplified anxieties within patients suffering from heart conditions (Huffman et al., 2013). Sensations devoid of emotional backing married to sparse social associations could bolster susceptibilities leading towards escalated degrees of anxiousness.

Cognitive Factors

The cognitive processes that underlie anxiety among cardiac patients are complex. Catastrophic thinking, which involves anticipating the worst possible outcomes, is a cognitive distortion commonly observed in this population (Tully et al., 2020). Individuals may catastrophize the significance of their cardiac condition, thereby exacerbating their anxiety levels. Additionally, cognitive biases, such as selectively attending to threatening cardiac symptoms, can perpetuate anxiety responses. Cognitive-behavioral interventions aimed at identifying and challenging these cognitive distortions can empower patients to reframe their thoughts, thereby contributing to anxiety reduction and improved psychological well-being.

Personality Traits

Psychological factors, specifically personality traits, play a significant role in the susceptibility to anxiety among cardiac patients. Research conducted by Roest et al. (2017) suggests that individuals with certain personality traits, such as neuroticism and introversion, are more prone to experiencing elevated levels of anxiety in response to their cardiac condition. Neuroticism, characterized by a tendency for negative emotions and excessive worrying, has the potential to intensify anxiety responses to perceived threats related to cardiovascular health. Introverted individuals may find the social adjustments and interactions that come with cardiac treatment particularly challenging, potentially contributing to increased anxiety. Recognizing these personality traits can assist clinicians in customizing interventions that effectively address patients' emotional responses and coping mechanisms.

Individuals with high levels of neuroticism, which is characterized by a tendency to experience negative emotions, may be more prone to anxiety (Frasure-Smith et al., 2000). Neuroticism is associated with heightened emotional reactivity, excessive thinking about negative experiences, and imagining the worst possible outcomes, which can contribute to increased anxiety levels in response to heart symptoms or events.

Illness-related Factors

Several illness-related factors contribute to anxiety in individuals with heart conditions. The severity and duration of the cardiac condition can impact anxiety levels. Individuals with more severe heart disease or those who have experienced previous heart events are at a higher risk of developing anxiety symptoms (Frasure-Smith et al., 2000). How individuals perceive the progression of their condition, fear of experiencing heart events again, and uncertainty about the future can all contribute to heightened anxiety levels.

The strategies individuals utilize to manage stress and adversity significantly impact their anxiety levels. Ineffective coping mechanisms, like rumination and avoidance, have been linked to higher levels of anxiety among cardiac patients (Lau-Walker, 2013). Rumination, characterized by persistent dwelling on negative thoughts, has the potential to amplify anxiety by magnifying concerns about health and prognosis. Conversely, avoidance may hinder patients from participating in necessary medical appointments and treatments due to anxiety-driven reluctance. Healthcare professionals should work collaboratively with patients to identify and cultivate adaptive coping mechanisms, enhancing their ability to manage anxiety in the face of cardiac challenges.

Furthermore, certain cardiac symptoms can trigger anxiety in patients. Chest pain, palpitations, and difficulty breathing are common symptoms experienced by individuals with heart conditions and can be distressing. The fear of these symptoms and interpreting them as signs of a worsening heart condition can lead to increased anxiety (Albus et al., 2013).

The way individuals perceive their cardiac condition can also significantly impact their anxiety levels. Patients who perceive their cardiac condition as unpredictable and uncontrollable may experience heightened anxiety due to the perceived lack of control over their health (Lau-Walker, 2013). Conversely, those who possess a coherent understanding of their condition and its management may experience lower anxiety levels. Healthcare professionals play a vital role in addressing patients' misconceptions, providing accurate information, and fostering a sense of control over their cardiac health.

Treatment-related Factors

The medical procedures and treatments received by individuals with heart conditions can also contribute to anxiety. For example, cardiac surgery is a major source of stress that can cause anxiety in patients (Tully et al., 2015). Anxiety before surgery, concerns about the outcome, potential complications, and recovery after surgery can all contribute to increased anxiety levels. Additionally, some individuals may experience worsened anxiety symptoms due to side effects of cardiac medications, such as beta-blockers (Frasure-Smith et al., 2000).

2.4 Demographic Factors

Demographic factors, such as age and gender, have been discovered to impact anxiety levels in patients with heart conditions. Being younger has been linked to a greater likelihood of experiencing anxiety (Tully et al., 2015). Younger individuals may face more emotional distress, struggle with adapting to the diagnosis and necessary lifestyle changes, and encounter additional sources of stress related to occupation, family, and social obligations.

Distinctions based on gender have also been observed, as women tend to display higher levels of anxiety compared to men among those with heart conditions (Kamphuis et al., 2014). Various sociocultural factors, biological variations, and disparities in seeking support may contribute to this divergence.

2.5 Sociodemographic factors related to anxiety in cardiac patients

Koivula et al. (2001) aimed to ascertain the prevalence of anxiety in participants scheduled for CABG in Iran. In this study, 207 participants were enrolled and anxiety levels were assessed using the Bypass Grafting Fear Scale. Results showed that 25% of the participants recorded high levels of anxiety, with elevated levels found to be more prevalent among female participants without formal academic qualifications. Delewi et al. (2017) performed a prospective study to explore the levels of anxiety in patients receiving percutaneous coronary intervention in the Netherlands. A total of 2604 patients undergoing the procedure over a one-year period were enrolled and anxiety levels were determined utilizing the VAS

of Anxiety. Females recorded higher anxiety scores compared to males. Additionally, younger age (below 65 years), lower levels of academic qualifications, and an acute cardiac event were noted as being linked to elevated anxiety.

The role of gender in the prevalence of anxiety among cardiac patients is substantial. Ongoing research consistently shows that female cardiac patients are more prone to experiencing heightened levels of anxiety compared to their male counterparts (Smolderen et al., 2018). This difference can be attributed to various factors, including distinct experiences of cardiac symptoms, psychosocial stressors, and coping mechanisms. Female cardiac patients often encounter unique challenges related to hormonal changes, social roles, and caregiving responsibilities, which contribute to elevated anxiety levels. It is crucial to address the specific psychological needs of each gender and tailor interventions accordingly to enhance anxiety management in both male and female cardiac patients.

Age influences the prevalence of anxiety among cardiac patients. Older adults, in particular, may experience anxiety due to concerns about functional limitations, mortality, and dependence on others (Shen et al., 2018). The aging process brings about changes in physical health, social support structures, and lifestyle, all of which contribute to the psychological burden experienced by older cardiac patients. Additionally, younger cardiac patients may face unique challenges, such as managing their condition while juggling family and career responsibilities. Recognizing these age-related factors is crucial for tailoring interventions to address the specific needs and anxieties of different age groups within the cardiac patient population.

The dimension of social support is a vital determinant of anxiety among cardiac patients. Inadequate social support is consistently linked to increased levels of anxiety (Tully et al., 2020). Having a supportive network can buffer the psychological impact of cardiac events and interventions, providing emotional validation and practical assistance. On the contrary, limited social support can exacerbate feelings of isolation and anxiety, impeding patients' ability to effectively cope with their cardiac journey. Healthcare professionals should assess patients' social support structures and implement strategies to strengthen these networks, whether through support groups, counseling, or involving family members in the treatment process.

Cultural and socio-economic factors also play a significant role in shaping the prevalence of anxiety among cardiac patients. Cultural norms, beliefs, and stigma associated with mental health can influence individuals' willingness to seek help for anxiety. Additionally, individuals from lower socio-economic backgrounds may face additional stressors related to financial strain and limited access to healthcare resources.

Allabadi et al. (2019) performed a cross-sectional study in Palestine over an eight-month period to assess anxiety levels among patients with cardiovascular conditions. The Depression Anxiety Stress Scale was used for screening, and of those with a confirmed diagnosis of a cardiovascular condition, 1053 were enrolled. Results showed that 19.2% of participants surpassed the threshold for moderate to severe anxiety, with higher prevalence noted among women and those with lower academic qualifications.

Chen et al. (2019) carried out a study in China to investigate the prevalence of anxiety post-diagnosis and follow-up treatment for CAD. Results showed that 38% of the target population recorded anxiety, with low academic qualifications and a protracted duration of the cardiac condition noted to be contributing features to the occurrence of anxiety.

Reiner et al. (2020) did a study in Germany which showed a direct association linking chronic anxiety to the development of new onset cardiac conditions. This relationship was established in women coupled with low socio-economic status as a risk factor.

In conclusion, these studies highlight the increased prevalence of anxiety in cardiac patients undergoing various treatments and the risk factors related to elevated anxiety levels, such as gender, age, academic qualifications, and duration of the cardiac condition. Extensive research is required to identify effective interventions to manage anxiety in this population.

Physio-social Factors

Individuals with more advanced stages of the disease often experience heightened anxiety levels. The fear of potential complications, disease progression, and uncertain prognosis can contribute to this heightened anxiety. Additionally, anxiety can also exacerbate perceptions of disease severity, creating a vicious cycle. Healthcare professionals should recognize that addressing anxiety can not only improve psychological well-being but also positively impact patients' perception of their cardiac condition.

Another important contributor to anxiety among cardiac patients is the presence of distressing cardiac symptoms. Chest pain, palpitations, and shortness of breath, which are commonly experienced by these patients, can trigger anxiety responses. The unpredictability and discomfort associated with these symptoms can lead to increased vigilance and anxiety about potential adverse events. Effective management of these symptoms and providing patient education regarding their nature and expected course can potentially reduce anxiety by giving patients a sense of control and predictability.

The autonomic nervous system, responsible for regulating physiological processes like heart rate and blood pressure, plays a crucial role in the relationship between cardiovascular health and anxiety. Cardiac patients often exhibit autonomic dysregulation, which is characterized by an imbalance between the sympathetic and parasympathetic branches of the nervous system. This dysregulation contributes to heightened anxiety levels. Increased sympathetic activation, commonly seen in cardiac patients, can lead to heightened arousal and hypervigilance, which contribute to the development and maintenance of anxiety. Interventions focused on targeting autonomic dysregulation, such as relaxation techniques and mindfulness, may provide potential avenues for managing anxiety.

Emerging research suggests a bidirectional relationship between inflammation and anxiety in cardiac patients. Inflammatory markers, like C-reactive protein, have been associated with both cardiac disease progression and anxiety symptoms. Inflammatory processes may activate pathways within the central nervous system that influence mood and anxiety regulation. Therefore, interventions aimed at addressing inflammation, such as lifestyle

modifications and medication, may not only improve cardiovascular health but also alleviate anxiety symptoms.

2.6 Conceptual framework

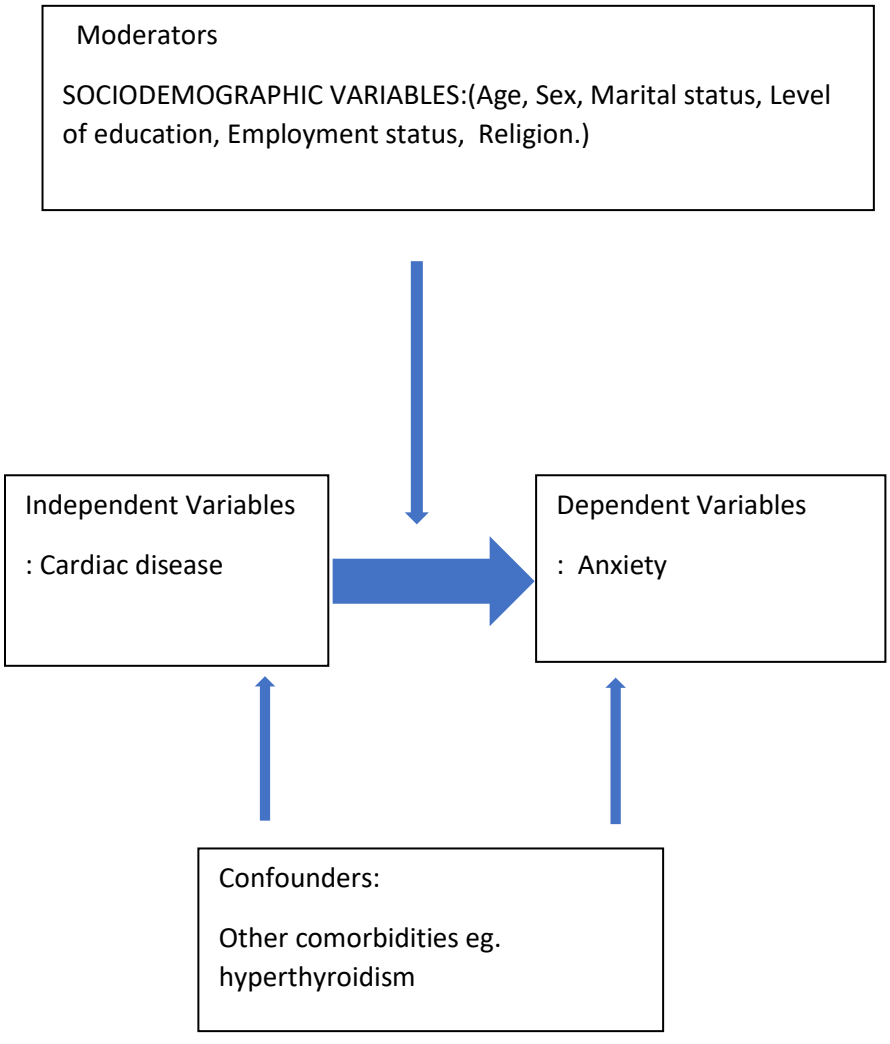

Figure 1: Anxiety among Cardiac Patients

2. 7 Theoretical Frameworks for Understanding Anxiety in Cardiac Patients

It is important to comprehend the underlying theories that explain anxiety in individuals with heart problems. This literature review section provides a thorough analysis of the theories used to understand anxiety among cardiac patients. By studying these theories, we can gain a deeper understanding of the psychological factors that contribute to anxiety in this group.

Cognitive-Behavioral Theory:

The cognitive-behavioral theory provides a detailed framework for understanding anxiety in individuals with heart conditions. This theory underscores the significance of thoughts and beliefs that are not helpful in the development and continuation of anxiety symptoms. According to this theory, those with heart conditions may have irrational beliefs or extreme thoughts about their health, potential outcomes, and the impact of their condition (Doering et al., 2010). These distorted thoughts can intensify anxiety and contribute to the misunderstanding of heart symptoms, resulting in increased distress.

In individuals with heart conditions, maladaptive thought patterns can involve overestimating the likelihood and seriousness of negative results, engaging in excessive negative thinking, and adopting a pessimistic view of the world (Roest et al., 2010). For instance, someone with a heart condition may amplify their symptoms and interpret chest pain as a clear sign of an imminent heart attack, leading to heightened anxiety and panic.

Cognitive-behavioral interventions, based on the principles of this theory, aim to address and modify these maladaptive thought patterns. Interventions commonly employ cognitive restructuring techniques to challenge and modify irrational beliefs and replace

them with more helpful and realistic thoughts (Doering et al., 2010). By identifying and correcting distorted thoughts, individuals with heart conditions can improve their understanding of their symptoms and reduce anxiety levels.

Alongside cognitive restructuring, cognitive-behavioral interventions also concentrate on behavioral techniques. Patients are encouraged to gradually confront situations or stimuli that provoke anxiety in exposure exercises. To illustrate, a cardiac patient who fears physical activity may be guided through a step-by-step exercise program to challenge their fear and alleviate anxiety related to exertion (Frasure-Smith et al., 2000).

Furthermore, cognitive-behavioral interventions prioritize the development of coping skills. Patients learn strategies to handle stress, control their emotions, and challenge negative thoughts and assumptions. These coping skills may involve relaxation methods, mindfulness practices, and problem-solving approaches (Lavie et al., 2016). By improving their capacity to cope with anxiety-inducing situations, cardiac patients can acquire a sense of mastery and diminish their anxiety levels.

Scientific research has proven that cognitive-behavioral interventions can effectively lessen anxiety in people with heart problems. To illustrate, Frasure-Smith et al. (2000) discovered that a group therapy program based on cognitive-behavioral techniques significantly reduced anxiety symptoms in patients who had experienced a heart attack. Similarly, Lavie et al. (2016) found that a stress management program using cognitive-behavioral strategies effectively reduced anxiety and enhanced the quality of life for individuals with heart conditions.

A key advantage of the cognitive-behavioral framework is that it directly addresses the harmful cognitive thinking patterns and actions that contribute to anxiety symptoms in heart patients. By altering irrational beliefs, promoting behavioral changes, and teaching effective coping skills, cognitive-behavioral interventions empower heart patients to take control of their anxiety and enhance their overall well-being.

The biopsychosocial model

The biopsychosocial model presents a comprehensive framework for understanding anxiety in individuals with heart problems by considering the interplay between biological, psychological, and social factors. This model recognizes that anxiety arises from a complex interaction between bodily processes, thoughts and feelings, and the person's social environment. From a biological standpoint, several physiological factors can contribute to anxiety symptoms in individuals with heart problems. Dysregulation of the body's autonomic nervous system, including increased sympathetic activity, has been linked to heightened anxiety. These individuals may also experience increased heart rate and blood pressure, which can trigger or worsen anxiety. Moreover, imbalances in certain neurotransmitters, such as serotonin and norepinephrine, have been implicated in the development of anxiety. Genetic factors may also influence the likelihood of developing anxiety in individuals with heart problems. Psychologically, the biopsychosocial model highlights the role of cognitive processes, emotional responses, and coping strategies in anxiety among individuals with heart problems. The model acknowledges that individuals may interpret their symptoms and experiences in light of their psychological state and coping mechanisms. For instance, those with high levels of anxiety may engage in catastrophic thinking, perceiving their symptoms as signs of a life-threatening event.

Negative cognitive biases, such as selectively attending to threatening stimuli and distorting interpretations of ambiguous information, can further contribute to anxiety symptoms.

The various emotions experienced by patients with heart problems, including fear, worry, and uncertainty, are known to have a significant impact on anxiety. Going through a heart-related event or having a chronic illness can intensify emotional distress and anxiety. Patients may feel scared about their health, have concerns about future heart issues, or experience anxiety when thinking about medical procedures (Frasure-Smith et al., 2000).

Along with biological and psychological factors, social factors also strongly influence anxiety levels in cardiac patients. The social environment in which these patients live can greatly affect their anxiety. Emotional support from loved ones and friends, for instance, has been found to help prevent anxiety symptoms (Huffman et al., 2013). On the other hand, a lack of social support or strained relationships can contribute to heightened anxiety.

Cultural factors are also influential in anxiety among cardiac patients. Cultural beliefs, values, and practices shape how individuals perceive and deal with anxiety. Lane et al. (2015) emphasized that cultural influences can impact how anxiety symptoms are experienced and expressed. For instance, in certain cultures, seeking mental health support may carry a stigma, resulting in the underreporting and undertreatment of anxiety in cardiac patients.

Furthermore, factors related to one's financial situation can have an impact on the levels of anxiety experienced by individuals with heart conditions. Stressors related to money, limited access to healthcare services, and disparities based on socioeconomic status can all contribute to an increase in anxiety. Patients who are facing economic difficulties may feel more anxious due to worries about the expenses associated with medical care or the ability to maintain their prescribed treatment plan (Tully et al., 2015).

The biopsychosocial model recognizes the interconnected nature of these biological, psychological, and social factors and their influence on anxiety in cardiac patients. By taking into account the complex nature of anxiety, interventions based on the biopsychosocial model can address the diverse needs of individuals with heart conditions. These interventions often involve a collaborative approach that includes medical management, psychological interventions, and support systems from the social environment (Huffman et al., 2013).

Transactional Model of Stress and Coping

This model proposed by Lazarus and Folkman (1984) provides a framework for understanding anxiety in the context of cardiac patients' experiences of stress. According to this model, stress occurs when an individual appraises an event as demanding or exceeding their resources. Appraisals involve evaluating the significance of the stressor and the individual's ability to cope with it. In the context of cardiac patients, stressors can include the diagnosis of a cardiac condition, experiencing cardiac symptoms, medical procedures, and lifestyle changes. Cardiac patients appraise these stressors based on their understanding, beliefs, and previous experiences. The appraisal process influences emotional responses, such as anxiety, and coping strategies used by individuals. Primary

appraisal involves evaluating the significance of the stressor. Cardiac patients may perceive their condition and symptoms as stressors that pose threats to their health. They may also appraise their symptoms as indicators of a potential heart attack or a worsening of their cardiac condition. This initial appraisal can trigger anxiety as individuals feel a sense of threat or vulnerability (Doering et al., 2010).

When it comes to dealing with stress, cardiac patients evaluate their own ability to cope, the support they receive from their social networks, and the resources available to them. If they feel like their resources are inadequate to handle the stress, it can lead to increased anxiety. Coping is a continuous process that is influenced by the ongoing interaction between the person and their environment. There are two main types of coping strategies: problem-focused coping and emotion-focused coping. Problem-focused coping involves taking action and finding solutions to the root cause of stress, while emotion-focused coping focuses on managing the emotional distress that comes with it. Cardiac patients may use problem-focused coping strategies by following their treatment plans, adopting a healthier lifestyle, and seeking medical advice and support. These actions can help them feel more in control and reduce their anxiety levels. On the other hand, emotion-focused coping strategies may involve seeking emotional support from loved ones, practicing relaxation techniques, or using mindfulness to manage anxiety symptoms.

The transactional model recognizes that different people and situations can affect coping strategies. Coping efforts can change based on personal traits, past experiences, and belief in the effectiveness of different strategies. For instance, someone who has coped well with heart issues in the past may feel more confident and use problem-solving strategies.

The transactional model also emphasizes how feedback and adjustment play a role in stress and coping. Coping efforts can shape how we evaluate and react emotionally. Successful coping and reduced anxiety can boost confidence in managing future stress, creating a positive cycle. On the other hand, ineffective coping and ongoing anxiety can sustain stress and make us more vulnerable to future stressors.

Interventions rooted in the transactional model aim to improve how we assess and cope. Psychoeducation can help cardiac patients better understand their symptoms and condition. Cognitive-behavioral interventions can assist in changing unhelpful evaluations and developing more effective coping strategies. Additionally, support groups and peer interventions offer a chance to share experiences and learn from others' coping approaches (Lavie et al., 2016).

Theoretical frameworks offer valuable insights into how anxiety manifests in cardiac patients. Cognitive-behavioral theory emphasizes the impact of thoughts and unhelpful beliefs on anxiety symptoms. The biopsychosocial model looks at how biological, psychological, and social factors influence anxiety levels in cardiac patients. The transactional model of stress and coping focuses on how individuals evaluate stress and cope with it.

By utilizing these frameworks, healthcare professionals can gain a deeper understanding of the psychological processes and mechanisms behind anxiety in cardiac patients. This knowledge can guide the development of targeted interventions and treatment strategies to decrease anxiety levels and enhance overall well-being in this population.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains the approach used in the investigation, including how the study was planned, the techniques employed, and the steps followed to determine the data sources, the size of the sample, the method of data collection, the tools used, and the ethical concerns taken into account.

3.2 Study Design

A cross-sectional descriptive study was adopted. Data was collected using a data collection sheet. The sheets were administered with a confirmed diagnosis of cardiac condition.

A cross-sectional study design was selected because data would be collected at one point in time. The patients were not followed up (not a cohort study). There were no controls (not a case-control). A cross-sectional study was preferred as it allowed the comparison of different variables at the same time in a timely, cost-effective manner.

3.2 Study Site

The study was carried out at Kenyatta National Hospital Kenya's largest Teaching and referral hospital. It serves both Kenya and the broader East African region providing rehabilitative, curative as well as promotive services.

Cardiology clinics, are held in clinic number 17, on Tuesday and Wednesday from 8.00 am to 2.00 pm. It caters to approximately 50 patients each day (inclusive of previously

diagnosed and new cases). It is run by roughly 3 consultants and 5 internal medicine registrars.

3.3 Study population

Study participants were individuals diagnosed with cardiac conditions who were above 18 years and were on follow-up. Based on the average number of 25 patients seen during each clinic, 100 patients are seen per month at Kenyatta National Hospital cardiology outpatient clinic translating to 200 patients over two months of the data collection period.

3.3.1 Inclusion Criteria

In order to guarantee the study's accuracy, relevance, and ethical soundness, a meticulously constructed set of inclusion criteria has been implemented. These criteria have been carefully designed to identify a group of participants whose experiences and insights can provide valuable knowledge about the prevalence and factors associated with anxiety in the context of cardiovascular conditions.

To meet the first criterion, individuals must be of age 18 years or older. This age requirement ensures that the study involves individuals who possess the necessary maturity and cognitive development to participate in comprehensive assessments and provide meaningful responses. Additionally, this criterion aligns with ethical considerations, as individuals below the age of 18 may require specific ethical safeguards and considerations in research.

Additionally, it is imperative that participants give their informed consent – a pivotal aspect of ethical research practices. This requirement guarantees that individuals possess a comprehensive grasp of the study's objectives, procedures, potential hazards, and potential benefits prior to making a voluntary decision to partake. Informed consent acts as a protective measure, assuring that participants engage freely in the study, without any form of coercion.

Moreover, the inclusion criteria emphasize the importance of having a documented diagnosis of a cardiovascular condition. This criterion serves as the framework for the study's target population, encompassing individuals with various heart-related health

concerns such as coronary artery disease, heart failure, arrhythmias, valvular heart ailments, and others. By exclusively focusing on individuals with a confirmed cardiovascular diagnosis, the study aims to unravel the intricate connection between cardiac health and psychological well-being.

Importantly, the criteria also require that participants are actively receiving regular care for heart conditions at the outpatient department of Kenyatta National Hospital in Nairobi. This requirement ensures that the study includes individuals who are actively involved in ongoing treatment, interventions, or follow-up appointments, thus providing a glimpse into the challenges and psychological dynamics associated with long-term cardiac care. By conducting the study in an outpatient setting, we can explore the intersection of medical treatment and psychological experiences from a unique perspective.

Furthermore, the study emphasizes geographical relevance by specifically selecting participants who attend the cardiology outpatient clinic at Kenyatta National Hospital. This choice anchors the study within the specific healthcare context of Nairobi, Kenya. By considering the local context, we can delve into the contextual nuances and cultural influences on anxiety and cardiovascular conditions, leading to more profound insights in the study's findings.

The inclusion criteria also highlight the significance of participants' residence, requiring them to be located in a way that allows them to consistently attend the heart conditions outpatient department at Kenyatta National Hospital. This criterion recognizes the challenges that may arise from geographical disparities and transportation limitations, ensuring that participants can actively participate without facing excessive burdens.

Moreover, participants are expected to possess effective communication skills in a language understood by the research team. This criterion ensures that participants can meaningfully engage in interviews, assessments, and interactions with the research team, facilitating accurate data collection and interpretation.

The cognitive and mental capacity of participants is also a key aspect of the inclusion criteria. This criterion is established to ensure that participants have the ability to understand and respond thoughtfully to the study's assessments, interviews, and

questionnaires regarding anxiety and its associated factors. By involving participants with the cognitive ability to provide reliable information, the study aims to uphold the quality and validity of its findings.

Furthermore, it is imperative that participants are open to allowing the researcher to access their medical records pertaining to their cardiovascular condition. This condition solidifies the study's dedication to methodological thoroughness, enabling the research team to verify diagnoses and treatment histories. Consequently, this reinforces the trustworthiness of the study's findings.

Significantly, participants must possess a genuine desire to partake in the study. This willingness encompasses being prepared to partake in a variety of activities, including completing questionnaires, participating in interviews, and adhering to study protocols. This requirement is pivotal in maintaining the dedication of participants and ensuring the success of the study.

Lastly, it is crucial that participants do not have any documented history of major mental health disorders that might compromise their ability to provide accurate information or fully engage in the study activities. Upholding this criterion safeguards the quality of the data collected, minimizing potential factors that could confound the results and enhancing the internal validity of the study.

3.3.2 Exclusion Criteria

While the inclusion criteria lay the groundwork for identifying participants whose experiences are vital to the investigation, a set of exclusion criteria has been established to uphold the integrity and validity of the study's findings. These criteria outline specific circumstances under which individuals may be excluded from participating in the research, ensuring that the group of participants remains representative of the target population and that the data collected is reliable and relevant.

To begin with, individuals who are considered too unwell to complete the study's questionnaires are excluded. This criterion acknowledges that certain individuals with severe medical conditions may be physically compromised to an extent that prevents active participation in the study's assessments. Since comprehensive responses to questionnaires and interviews are crucial to the research, this criterion protects the accuracy of the collected data.

At the same time, individuals who are unable to comprehend English or Kiswahili are excluded from the study. Effective communication is essential for engaging participants in meaningful interactions and data collection. Because the study is being conducted in Nairobi, Kenya, and these two languages are widely spoken, utilizing them ensures that participants can provide accurate information, thus maintaining the validity of the findings. This criterion is rooted in the practical reality of conducting research within a specific linguistic and cultural context.

3.4 Sample Size

A sample was selected from the target population.

The Sample size was calculated using Cochran's formula:

$$n = \frac{Z^2 p(1-p)}{d^2}$$

Where: p = prevalence is taken from a similar study performed by (Easton et al., 2016) where the prevalence rate was reported at 13% (0.13)

n = sample size

d= degree of precision set at 0.05(5%)

$Z^2 = 1.96$

On inputting the figures as shown;

$$No = \frac{1.96^2 \text{ X } 0.13(0.87)}{0.05^2}$$

no= 174

Therefore, the sample size for this study composed of 174 cardiac patients attending their cardiology clinic at Kenyatta National Hospital on an outpatient basis.

3.5 Sampling method

Sample Style

The study adopted a convenience sampling method to recruit patients who fit the inclusion criteria and attend the cardiology clinic at the period the study was conducted.

Convenience sampling was preferred as it provided the right number of participants needed for the study. Probability sampling would have provided fewer number of participants and this would have significantly reduced the power of the study.

The researcher conveniently selected only adult patients with diagnosed cardiac conditions on follow up at KNH cardiology clinic on two weekdays (Tuesday -Wednesday from 8A.M-2PM) weekly, who were not only suitable but also willing to participate in the study until the required 174 patients were attained.

Patients were assigned serial numbers on arrival at the clinic and screened for eligibility criteria and those who meet the inclusion criteria were recruited into the survey. Covid-19 protocols were observed.

Routinely on a clinic day, patients were registered on arrival after which their medical records were arranged. They then gathered at the waiting area where one at a time

proceeded for triaging and had their vitals taken. Thereafter, they were directed to the clinician.

Sample method Justification

The choice of convenience sampling method was made based on the need to get participants as quickly as possible, especially those who met the inclusion criteria and were readily available during the period of study. While other sampling methods such as a stratified and simple random sampling would have provided a sample that is more representative, they might have consumed a lot of time which was a limited resource during the timeframe of this study.

The patients selected as part of the study population attended the clinic on two different weekdays, that is on Tuesdays and Wednesdays between 8:00 AM in the morning and 2:00 PM in the afternoon. Given that there are four weeks in a month, the clinic operates for 8 days monthly which then translates to 96 days per year. The 174 patients that were sampled were signed up over a period of 8 weeks, which amounts to 16 days of operations. This is such that I recruited between 8 to 15 participants each days of the clinic's operation from an average of 45 who attend the clinic each day.

3.6 Data collection procedures

3.6.1 Study instruments

Socio-demographic questionnaire

A socio-demographic questionnaire was created by the researcher to gather information on the participant's demographic details, including their gender, age, educational level, marital status, employment status, and religious affiliation.

With the assistance of the hospital administration, clinical information of patients participating in the study was collected on the clinical day since it was the same day

interviews were conducted. The diagnosed cardiac condition of each patient was captured as well.

Anxiety Disorder Inventory

My method employed the usage of Generalized Anxiety Disorder's evaluation instrument (GAD-7) as a benchmark for anxiety detection. The GAD-7 constitutes a self-administered psychoanalytical tool, devised to study an individual's mental well-being during the course of two weeks employing seven analytical parameters; this has proven its worth in primary care patients and general populace screening along with being recognized as bona fide medium measuring severity.

The credit for devising such instrumental diagnostic equipment goes to Spitzer et al., whose work received further validation through successful application within not just patient examination at ground base level health centers but also while involving larger demography encompassing varied social strata (Spitzer, Kroenke, Williams & Löwe, 2006).

It probes into various behavioral aspects surrounding fear and nervous anticipation by assessing how intensely subjects have been disturbed due behavioral issues including: feeling on edge or overly anxious; struggling with managing their worries or stopping them--have they worried intensively over variable topics? Finding it arduous maintaining calmness against uneasiness leading towards restlessness is another aspect it gauges alongside volatile irritability followed by fearful apprehension anticipating unfortunate events occurrence. When scored between "0" ("Not at all"), "1"("Several days), "2"("More than half"), "3"("Nearly every day") qualitative degrees are defined from mild unspecific worry upscaling towards constant feelings foreboding doom."

3.7 Recruitment and Data Collection Procedure

Data Collection and Quality Control

Study participants were recruited at the cardiology outpatient clinic at KNH following approval to conduct this study. All eligible participants both new and those on follow-ups were assessed to determine if they met the inclusion criteria. The participants who were unqualified were thanked and excluded. For those who qualified, the researcher on an individual level communicated, answered and clarified study details. A consent form was presented to those who consented, by signing the consent sheet they were thanked and directed to a room with the data collection tools for the interview. Upon consenting, the investigator proceeded to interview the participants on their socio-demographic characteristics and anxiety using the Generalized Anxiety disorder (GAD-7) guided by a formulated questionnaire tailored for this study.

The interviews occurred and questionnaires were filled after triage before review by the cardiac physician.

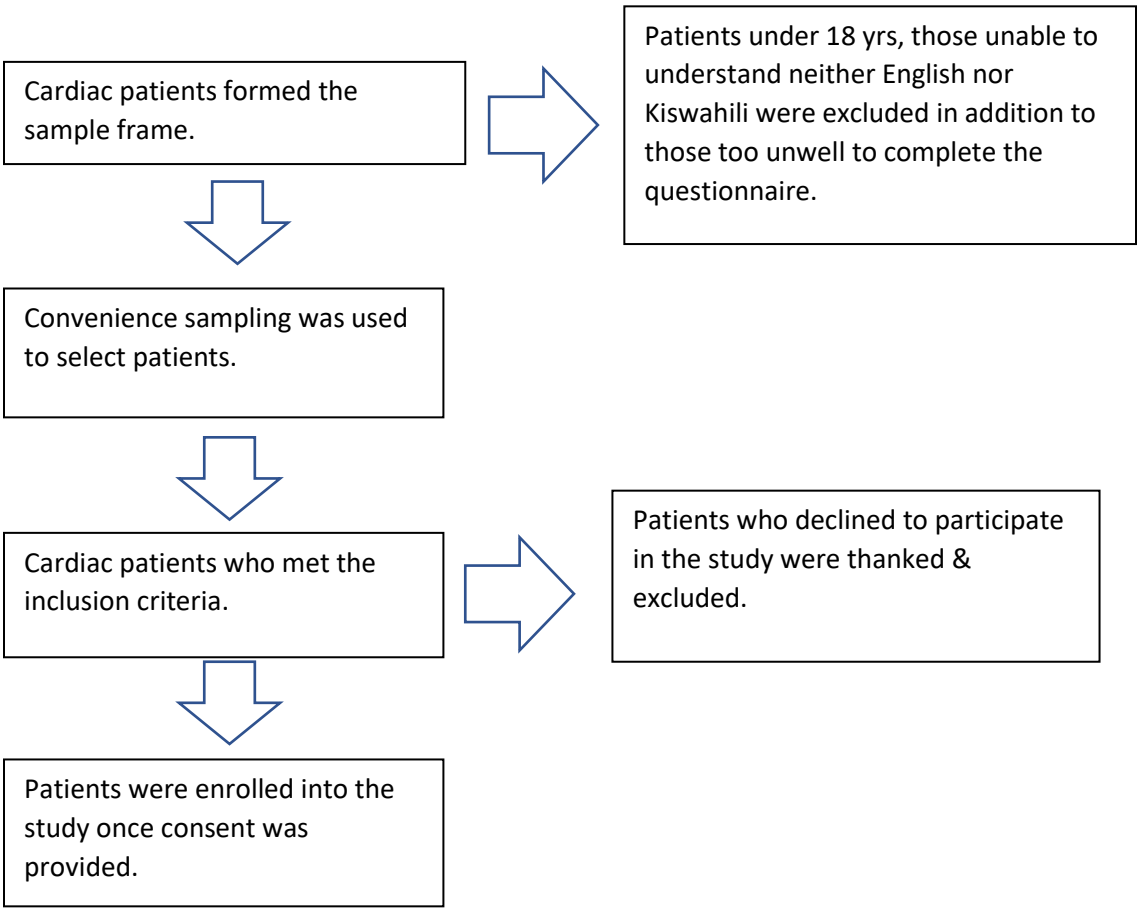

Figure 1 Flow chart of patient recruitment

3.7.1 Quality Assurance

The researcher ensured the participants grasped and understood the core aspects of the study. This was done by elaborating its purpose and objectives. The data collection procedures were also be explained in addition to potential risks and benefits of the study. The researcher was also be responsible for administering questionnaires to consenting participants. Ethical approval was sought prior to the collection of the data. All the questionnaires used in the study had serial numbers and didn't have features that were capable of identifying the patients such as their names. This was to maintain confidentiality. The completed questionnaires were kept in a secure cabinet subsequent to the management of data. For the duration of the entry of data and its analysis, safeguards in form of password protection were adopted for security purposes. Patients who had moderate and severe anxiety were referred to the mental health department for management.

3.8 Data Management and Analysis

On the questionnaires being filled, they were placed in a secure cabinet accessible only to the key researcher. Following completion of the data collection exercise, data was captured numerically and analyzed using SPSS version 22.

Collected data was evaluated and presented utilizing descriptive and inferential statistics in form of tables and charts looking at frequencies, proportions and percentages. Statistical significant differences based on age and gender were assessed using ANOVA and independent T tests respectively. P values of ≤ 0.05 were considered statistically significant at 95% confidence interval. This was in line with establishing the prevalence of anxiety among cardiac patients on follow up at the outpatient cardiology clinics at KNH, Nairobi in addition to exploring socio-demographic factors associated with comorbid anxiety among this population.

3.9 Ethical considerations

The research process commenced by seeking authorization from the psychiatry department (University of Nairobi), Kenyatta National Hospital Research and Ethics Committee prior to the collection of data. The researcher expounded on the intention of the research to the participants. Thereafter written informed consent was obtained.

The potential benefits of the study were explained. Data obtained may assist both clinicians and patients to understand the prevalence of anxiety and its associated factors among adults diagnosed with cardiac conditions. This in turn may improve management via appropriate screening. Referral systems and treatment modules may be streamlined to enhance better outcomes.

Potential risks were discussed. The participants were informed that no physical harm was anticipated in the study. The participants were encouraged to inform the researcher if a particular line of questioning distressed them.

The participants were informed that their participation in the study was voluntary. They had the option to deny involvement in the study. Research protocols guided this study having the patient's confidentiality in mind. The patient's confidential information was preserved and questionnaires allotted codes. Individuals who were unable to read/write were aided by the principal researcher towards gathering reliable data. Patients with comorbid anxiety were directed to the mental health department for psychiatric assessment and treatment.

COVID – 19 disease transmission prevention

To prevent against covid-19 transmission, the covid-19 prevention protocol were adhered to in detail. A distance of 2 meters was kept at all times when interacting and interviewing patients. Similarly, hand sanitizer was used non-sparingly and a mask was always worn by the principal investigator as well as the research participants.

CHAPTER FOUR: RESULTS AND DATA ANALYSIS

4.1 Sociodemographic characteristics of respondents

The study enrolled a total of 174 individuals who were carefully selected from the cardiac outpatient clinic at Kenyatta National Hospital (KNH). The researchers thoroughly analyzed the sociodemographic characteristics of all the participants, and the findings are succinctly presented in Table 4.1.

Age: Upon examining the distribution of age, it was found that the average age of the participants was 54.8 years, with ages ranging from 18 to 85 years. A notable trend emerged, revealing a substantial number of participants falling into the age group of 50 years and older. This distribution highlights the prevalence of cardiovascular conditions among the older population.

Sex: The distribution of gender indicated that 34.4% of the participants were male (n=60), while the majority, comprising 65.5%, were females (n=114). This distribution emphasizes the higher occurrence of cardiac conditions among females, which aligns with existing epidemiological patterns.

Marital Status: Among the 174 participants, 10.3% were found to be single (n=18). A significant proportion of the cohort were married, accounting for 34.4% (n=60), while 6.32% reported being separated (n=11). The study also revealed that 10.92% had experienced divorce (n=19), and a substantial 37.9% were widowed (n=66). These findings regarding marital status provide valuable insights into the potential psychosocial factors that may influence the experiences of the participants.

Education Level: The participants had diverse levels of education. It is worth noting that 32.7% of them had primary education (n=57), and 29.3% had no formal education (n=51). Additionally, 21% had completed secondary education (n=37), while 16.6% had achieved tertiary education (n=29). These findings underscore the importance of considering the impact of education on health literacy and treatment adherence.

Occupation: The participants had various occupations. A small percentage, 5.75%, identified themselves as students (n=10). Formal employment was reported by 10.34% (n=18), while informal employment accounted for 19.5% (n=34). A significant portion, 13.7%, identified as businesspersons (n=24), and a substantial 50.5% reported being unemployed (n=88). These occupation categories provide insights into the potential economic pressures that may be associated with their cardiovascular conditions.

Monthly Income: Among participants engaged in income-generating activities, the distribution of monthly earnings was evident. Notably, 66.6% earned less than 10,000 Kenyan Shillings per month (n=116). A substantial 22.4% fell within the range of 10,000 to 20,000 Kenyan Shillings per month (n=39), while 8.62% reported earnings between 20,000 and 40,000 Kenyan Shillings monthly (n=15). A small fraction of 2.3% reported an income ranging from 40,000 to 100,000 Kenyan Shillings per month (n=4). None of the participants reported a monthly income exceeding 100,000 Kenyan Shillings. These income distributions emphasize the range of socioeconomic circumstances participants face concerning their cardiac health.

Religion: Examining the religious affiliations of participants, the majority, 63.2%, identified as Protestants (n=110), while 25.2% identified as Catholic (n=44). A smaller proportion, 4.02%, identified as Muslims (n=7), and 7.4% reported other religious

affiliations (n=13). These religious affiliations provide insight into potential sources of social support and coping mechanisms.

Table 4.1. Sociodemographic profile

Variable	Category	n	Percentage
Gender	Male	60	34.48%
	Female	114	65.52%
	Total	**174**	**100.00%**
Marital Status	Single	18	10.34%
	Married	60	34.48%
	Separated	11	6.32%
	Divorced	19	10.92%
	Widowed	66	37.93%
	Cohabiting	0	0.00%
	Total	**174**	**100.00%**
Education	No Formal Education	51	29.31%
	Primary	57	32.76%
	Secondary	37	21.26%
	Tertiary	29	16.67%
	Total	**174**	**100.00%**
Occupation	Student	10	5.75%
	Formal Employment	18	10.34%
	Informal Employment	34	19.54%
	Businessperson	24	13.79%
	Unemployed	88	50.57%
	More than One Category	0	0.00%
	Total	**174**	**100.00%**
Income	Less than 10000	116	66.67%
	10000-20000	39	22.41%
	20000-40000	15	8.62%
	40000-100000	4	2.30%
	More than 100000	0	0.00%
	Total	**174**	**100.00%**
Religion	Catholic	44	25.29%
	Protestant	110	63.22%
	Muslim	7	4.02%
	Others	13	7.47%

	Total	**174**	**100.00%**

4.2 Prevalence of Cardiovascular diseases

Table 4.2 cardiovascular diseases

Diagnosis	n	Percentage
Aortic Aneurysm	1	0.6%
Arrythmia	1	0.6%
Atrial Septal Defect	2	1.1%
Coronary Artery Disease	4	2.3%
Congestive Cardiac Failure	1	0.6%
Coronary Heart Disease	2	1.1%
Congestive Heart Failure	2	1.1%
Congenital Heart Disease	3	1.7%
Cor Pulmonale	7	4.0%
Dilated Cardiomyopathy	37	21.3%
Ebstein Anomaly	1	0.6%
Heart Block	6	3.4%
Hypertensive Cardiomyopathy	3	1.7%
Heart Failure	2	1.1%
Hypertensive Heart Disease	52	29.9%
Infective Endocarditis	1	0.6%
Ischemic Heart Disease	12	6.9%
Myocardial Infarction	1	0.6%
Mitral Regurgitation	1	0.6%
Post Partum Cardiomyopathy	5	2.9%
Pericardial Effusion	2	1.1%
Rheumatic Heart Disease	25	14.4%
Stable Angina	1	0.6%
Severe Mitral Stenosis	1	0.6%
TB Pericarditis	1	0.6%
Total	**174**	**100.0%**

Among the different cardiac diagnoses, Hypertensive Heart Disease emerges as the most prevalent, making up a staggering 29.9% of cases. This observation aligns with the global burden of hypertension, a well-known risk factor for heart diseases, emphasizing the significance of this finding. The substantial prevalence of Hypertensive Heart Disease highlights the urgent need for effective hypertension management strategies to mitigate its potential devastating consequences.

Dilated Cardiomyopathy closely follows as a contender in terms of prevalence, accounting for 21.3% of the observed cases. This finding aligns with existing literature that highlights the significant prevalence of cardiomyopathies across populations. However, the high prevalence prompts us to question whether there is a shared underlying cause or if it indicates an area for further investigation into contributing factors.

Intriguingly, the study identifies other conditions with notably lower prevalence rates, each constituting merely 1% of the total cases. These conditions include TB Pericarditis, Aortic Aneurysm, IHD, Mitral Regurgitation, Stable Angina, Ebstein Anomaly, Congestive Cardiac Failure, and Severe Mitral Stenosis. While their prevalence within the studied cohort may seem small, it is crucial to include them in the analysis to capture a comprehensive understanding of cardiac health variability. The presence of such conditions introduces diversity within the cohort, challenging assumptions and potentially warranting exploration into rare cardiac conditions.

However, the relatively lower prevalence of these conditions within the cohort raises questions about potential limitations in participant selection or diagnostic accuracy. Given the rarity of these conditions, misclassification or underdiagnosis may have played a role. The impact of such limitations on the overall validity of prevalence rates emphasizes the critical importance of robust diagnostic criteria and meticulous participant recruitment.

Despite the meticulous nature of the investigation, it is crucial to take into account the potential impact of selection bias. Utilizing convenience sampling, while efficient, may result in an overrepresentation of specific cardiac ailments within the study's participant pool. Consequently, it is plausible that conditions commonly handled in outpatient settings, such as hypertensive heart disease and dilated cardiomyopathy, might have a higher likelihood of being included compared to conditions necessitating specialized care or hospitalization.

In addition, caution should be exercised when interpreting the prevalence rates due to the study's cross-sectional design. The prevalence rates observed could be influenced by temporal variations and shifts in disease patterns. Therefore, longitudinal studies would be more appropriate for investigating trends and potential fluctuations in the prevalence of these cardiac conditions over time. This is summarized in **table 4.2**

4.3 Prevalence of anxiety

Table 4.3 Prevalence of anxiety

Anxiety Level	n	Percentage (%)
None (0)	57	32.76
Mild (1-9)	44	25.29
Moderate Anxiety (10-14)	26	14.94
Severe Anxiety (15+)	47	27.01
Total	174	100.00

The investigation on anxiety levels among the study participants offers a comprehensive understanding of the psychosocial aspects related to cardiovascular health. Analyzing anxiety levels is crucial in this study, requiring careful examination and a critical perspective to understand the implications of the findings.

Interestingly, the prevalence of anxiety levels in the group is a significant 67%. This statistic highlights the substantial psychological burden faced by individuals with cardiovascular conditions. Such a high prevalence prompts a deeper exploration of the complex relationship between physical health, mental wellbeing, and the potential bidirectional connection between cardiac health and anxiety.

Examining the distribution of anxiety levels is fundamental to this analysis. Among the participants surveyed, a notable 32.76% displayed no signs of anxiety according to the General Anxiety Disorder 7 (GAD-7) scale. This observation introduces variability within the group, indicating that a significant portion of individuals with cardiovascular conditions may not show obvious signs of anxiety. This diversity raises questions about potential protective factors that may mitigate anxiety in some individuals, highlighting the need for further research to identify these factors and understand their implications for comprehensive patient care.

In contrast, a notable percentage of participants (25.2%) revealed mild anxiety, while a smaller percentage (14.9%) experienced moderate anxiety. These figures shed light on the different levels of anxiety observed within the group and highlight the various ways it

manifests among individuals with cardiac conditions. The prevalence of mild and moderate anxiety emphasizes the importance of tailor-made interventions that address different levels of distress and prioritize both psychological well-being and cardiac health management.

What stands out is the fact that a significant portion (27%) of the participants reported severe anxiety, underscoring the severity of psychological distress among them. This finding aligns with previous research that emphasizes the heightened vulnerability of individuals with chronic illnesses to more pronounced levels of anxiety. The high prevalence of severe anxiety raises concerns about its potential impact on treatment adherence, quality of life, and overall health outcomes.

However, it is essential to acknowledge that the cross-sectional design of this study limits the establishment of causal relationships between cardiovascular conditions and anxiety. While the presence of anxiety within the group is clear, it is crucial to consider the bidirectional nature of the relationship, where cardiac health may exacerbate anxiety, but heightened anxiety may also potentially impact cardiac outcomes. Longitudinal studies would be necessary to unravel these complex dynamics.

Moreover, the utilization of the GAD-7 scale, although widely recognized and validated, has certain limitations. The scale provides a snapshot of anxiety symptoms, but it may not fully capture the complexity of individual experiences with anxiety. Additionally, cultural and contextual factors may influence the interpretation of the scale. Therefore, while the prevalence rates offer valuable insights, it is important to approach their interpretation with an understanding of the inherent limitations of the assessment tool.

Table 4.4: Association between sociodemographic factors and level of anxiety.

		None (0)	Percentages	Mild (1-9)		Moderate Anxiety (10-14)		Severe Anxiety (15+)		P value
Age	<25	20	11.49%	11	6%	0	0.00%	12	7%	
	25-34	1	0.57%	2	1%	9	5.17%	13	7%	
	35-44	8	4.60%	0	0%	3	1.72%	12	7%	0.024
	45-54	7	4.02%	8	5%	7	4.02%	9	5%	
	55-64	8	4.60%	10	6%	3	1.72%	2	1%	
	65+	13	7.47%	13	7%	4	2.30%	3	2%	
Gender	Male	19	10.92%	22	13%	5	2.87%	14	8%	0.009
	Female	38	21.84%	26	15%	13	7.47%	37	21%	
Marital Status	Single	4	2.30%	2	1%	1	0.57%	11	6%	
	Married	26	14.94%	14	8%	4	2.30%	16	9%	
	Seprated	3	1.72%	5	3%	1	0.57%	2	1%	0.006
	Divorced	3	1.72%	7	4%	3	1.72%	6	3%	
	Widowed	21	12.07%	20	11%	9	5.17%	16	9%	
	Cohabitting	0	0.00%	0	0%	0	0.00%	0	0%	
Education	No Formal Education	21	12.07%	13	7%	5	2.87%	12	7%	
	Primary	21	12.07%	19	11%	7	4.02%	10	6%	0.023
	Secondary	8	4.60%	13	7%	4	2.30%	11	6%	
	Tertiary	7	4.02%	2	1%	2	1.15%	18	10%	
Occupation	Student	3	1.72%	3	2%	0	0.00%	4	2%	
	Formal Employment	5	2.87%	1	1%	3	1.72%	9	5%	
	Informal Employment	9	5.17%	13	7%	4	2.30%	8	5%	0.027
	Businessperson	5	2.87%	5	3%	3	1.72%	11	6%	
	Unemployed	35	20.11%	26	15%	8	4.60%	19	11%	
	More than One Category	0	0.00%	0	0%	0	0.00%	0	0%	
Income	Less than 10000	39	22.41%	41	24%	11	6.32%	25	14%	
	10000-20000	13	7.47%	5	3%	4	2.30%	17	10%	
	20000-40000	5	2.87%	2	1%	2	1.15%	6	3%	0.014
	40000-100000	0	0.00%	0	0%	1	0.57%	3	2%	
	More than 100000	0	0.00%	0	0%	0	0.00%	0	0%	
Religion	Catholic	15	8.62%	12	7%	8	4.60%	9	5%	
	Protestant	37	21.26%	30	17%	9	5.17%	34	20%	0.062
	Muslim	2	1.15%	2	1%	0	0.00%	3	2%	
	Others	3	1.72%	4	2%	1	0.57%	5	3%	

Table 4.4 summarizes the association between sociodemographic characteristics of the participants and the level of anxiety. There was a statistically significant association between the two. From the table we can deduce the highest proportion of those with anxiety were aged 34 years and below 25 (26%) were female (43 %) and were widowed (25%). The anxious were also more likely to have had only a primary school education

(21%) were unemployed (30%) or had income levels less than 10,000(44%). In terms of religion those that were protestants were noted to have a higher level of anxiety at (42%) compared to Catholics at (16%) while (3%) of Muslims had an element of anxiety.

Table 4.5: Association between Cardiac disease and level of anxiety.

Diagnosis	None (0)	Mild (1-9)	Moderate (10-14)	Severe Anxiety (15+)	P Value
Aortic Aneurysm	0	0	1	0	0.000
Arrythmia	0	0	0	1	0.000
Atrial Septal Defect	0	1	1	0	0.000
Coronary Artery Disease	2	2	0	0	0.000
Congestive Cardiac Failure	0	0	0	1	0.000
Coronary Heart Disease	0	0	1	1	0.000
Congestive Heart Failure	0	0	0	2	0.000
Congenital Heart Disease	0	0	1	1	0.000
Cor Pulmonale	3	1	1	2	0.001
Dilated Cardiomyopathy	11	15	4	8	0.064
Ebstein Anomaly	0	0	0	1	0.000
Heart Block	1	1	1	1	0.000
Hypertensive Cardiomyopathy	3	0	0	0	0.000
Heart Failure	0	1	0	0	0.000
Hypertensive Heart Disease	19	15	5	12	0.038
Infective Endocarditis	1	0	0	0	0.000
Ischemic Heart Disease	4	5	1	1	0.09
Myocardial Infarction	1	0	0	0	0.000
Mitral Regurgitation	0	0	0	1	0.000
Post Partum Cardiomyopathy	1	0	0	3	0.000
Pericardial Effusion	1	1	0	0	0.000
Rheumatic Heart Disease	6	5	3	13	0.056
Stable Angina	1	0	0	0	0.000
Severe Mitral Stenosis	0	0	0	1	0.000
TB Pericarditis	0	0	0	1	0.000
Total	54	47	19	50	

P is significant when < 0.05

As shown in **table 4.5** Hypertensive Heart disease was the only cardiac condition showing statistical significance in association with level of anxiety. (p value 0.038)

CHAPTER 5: DISCUSSION

Cardiovascular ailments affect the entire age spectrum. In this particular study the youngest patient was 18 years old with a median age of 58 years. The distribution pattern was negatively skewed which is a reflection of the generally older population attending the clinic. The male to female ratio was 0.6:1. This gender ratio revealed a bias with more female patients represented. The researcher speculates that this could be due to an increase access to medical care in addition to better healthcare seeking behavior among women in overall as compared to men.

In terms of literacy levels, the majority of individuals had primary level education, representing 32% of the population. Additionally, 16.9% had achieved tertiary level education. This aligns with a UNICEF report, which states that adult literacy rate in Kenya is 87% and primary school enrollment is 83%. The researcher suggests that this may be due to the government's increased focus on education, particularly with the implementation of free primary education.

The study population mainly consisted of unemployed individuals and those working in informal employment. This can be attributed to the fact that the facility primarily caters to individuals from the middle and lower socioeconomic classes.

Christianity was the predominant religion among the sampled population, representing 87% of the participants. This reflects the religious distribution within the general population. All study participants were native black Africans.

The most commonly observed cardiac conditions included Hypertensive heart disease, Dilated Cardiomyopathy, and Rheumatic heart disease. On the other hand, TB Pericarditis, Aortic aneurysm, Mitral regurgitation, and stenosis were the least prevalent conditions.

5.1Association between Cardiac disease and level of anxiety

There was a statistically significant relationship between having Hypertensive Heart Disease and the probability of having anxiety with a p value of < 0.038. The other cardiac conditions didn’t show a significant association with anxiety in this study. The researcher came across other studies showing positive association between hypertension, anxiety and predisposition to cardiac disease.

An extensive evaluation and statistical breakdown of the correlation between anxiety states and high blood pressure encompassing 13 varied cross-analysis studies. Proposed a connection linking anxious state to heightened possibility of hypertension predispositions (Pan et al., 2015).

In their probing analysis, Heather et al (2019) rigorously examined a number of parallel-evaluation researches -To unearth any comorbidity ties involving nervosity phenomena & High Blood Pressure. The discovery hinted at an increasing substantiation supporting simultaneous occurrence case for unsettled mental states with elevated blood pressure levels.

Marco along his team members in the year subsequent after two-decade's start conducted meticulous reviews combined by meta-analytic scrutiny across substantial collection numbering as much as four thousand one hundred forty-three hypervariable investigations which aimed primarily on determining summative correlations presence amidst distress conditions culminating hypertensive factors. A statistically stronger affirmative relation was discerned prevailing strongly within expressions distressed emotionally meanwhile bespeaking prolonged surge arterial pressures trends steadily upward over time; this inference according to Marco et.al during latest yearly denotation numbered Twenty-Twenty One.

5.2 Sociodemographic characteristics of respondents related to anxiety.

This research indicates that the incidence of anxiety was elevated among those who are young (45 years and below) relative to the elderly (>45 years). The disparity registered a statistical significance at a p value < 0.024. Nonetheless, these insights were in dissent with Jankowski et al 2013 whose studies discovered an interrelation between advanced age and escalated levels of anxiousness. It has been postulated by our researcher that

fewer incidences of apprehension amongst elders within this study may emanate from their acquisition of superior management abilities for stress through more effective coping skills.

In terms of gender, females had a higher prevalence compared to males (43% to 23%) which was also statistically significant (p=0.009). These findings were in keeping with Jankowski et al 2013 who found a positive association between female sex and more frequent bouts of anxiety. Sharma et al 2018 noted a significant association with level of anxiety of the CAD patients where females had higher level of anxiety than males. Shibeshi et al 2007 examined the effect of anxiety on mortality and nonfatal myocardial infarction (MI) in patients with coronary artery disease (CAD). The findings showed higher level of anxiety in female CAD patients. Barbara et al 2000 in a study to determine whether gender differences exist in anxiety after acute myocardial infarction with women having notably higher anxiety in comparison to men. Some theories postulate that the gender differences may arise from the manner in which different genders cope with stress with women more prone to rumination thus predisposing them to anxiety.

In terms of marital status, in this study a significant association was found at (p=0.006). The highest prevalence of anxiety noted among the widowed (25%). This finding mirrored that of Sharma et al 2018 who found the level of anxiety of CAD patients living alone to be higher than the patients living with a spouse. Shen et al 2022 also found the prevalence of anxiety to be higher in single, divorced and widowed cardiac patients. Rozanski et al 1999 noted that low levels of perceived emotional support conferred an increased risk for future cardiac events. Especially in patients who were either unmarried or had no confidants. Barbara et al 2000 to the contrary found that married women with CAD had higher anxiety than did single and widowed women. The researcher speculates the higher levels of anxiety among the widowed to be as a result of reduced social support.

This study found a statistically significant association between occupation(p=0.027), income level (p=0.014), level of education(p=0.023) and the level of anxiety. This was in line with other studies which showed a link between education, occupation and income

level in relation to anxiety. Sharma et al 2018 found similar findings in which lower annual family income and occupation status were associated with higher levels of anxiety in CAD patients. Kaplan et al 1993 likewise noted that low socioeconomic status was a significant contributor to increased risk in healthy persons and a contributor toward poor prognosis in patients with established CAD. Barbara et al 2000 found that women with lower income had more anxiety than women with higher income among the cardiac patients in her study. Similar findings were noted by Jankowski et al with a higher prevalence of anxiety markedly observed among respondents with lower educational attainment. Shen et al 2022 had findings that corresponded with our study showing an association between higher levels of anxiety and low income in addition to lower academic qualifications among cardiac patients. The researcher speculates that lower levels of education translate to diminished employment opportunities and thus resultant increasing anxiety.

In terms of religious affiliation, no statistical difference was found in relation to anxiety($p=0.062$). This finding was in contrary to Hughes et al 2004 in which religiosity was significantly associated with lower levels of anxiety and acted as a coping mechanism.

5.3 Prevalence of anxiety among cardiac patients.

The prevalence of anxiety among cardiac patients in this study was 67%, this compares to other studies which have shown a prevalence of between 40 to 68%. Johnson et al., 2020 conducted a study on the prevalence of PTSD and anxiety among Spontaneous Coronary Artery Dissection survivors in the United States. The findings were lower than this study with the prevalence of anxiety at 41% and that of PTSD at 28%.

Mal et al. (2019) sought to determine the association between myocardial infarction (MI) and anxiety. The findings were lower than this study with the prevalence of anxiety at 52.8% a fortnight prior to the occurrence of an MI.

Tarimo (2019) performed a cross-sectional study to determine the prevalence of anxiety in participants managed for heart failure in Dar es Salaam. The findings were lower than this study with the prevalence of anxiety was 49%.

Arfasa et al. (2022) conducted a cross-sectional study in Ethiopia to assess the levels of anxiety among patients undergoing cardiac catheterization. The findings were higher than this study with the prevalence of anxiety at 70.4%. The researcher speculates the higher prevalence of anxiety among cardiac patients noted in third world countries to be as a result of lack of routine screening, delayed diagnosis and untimely management in these low resource settings.

5.4 Conclusion

The study concluded that patients already diagnosed with cardiovascular conditions present with symptoms of anxiety.

There was a 67 % prevalence warranting need for routine screening and management of anxiety in cardiovascular patients.

Age, marital status and socioeconomic status of the participants seemed to have an impact on the presence or absence of anxiety.

Hypertensive heart disease showed a significant association with anxiety.

5.5 Recommendations

1)Healthcare professionals need to be continuously educated on the importance of screening for anxiety among cardiac patients.

2)Integrate mental health services in cardiac clinics to enhance early detection, referral to the Mental Health Department for management of anxiety.

3)Holistic approach to management of cardiovascular conditions with consideration of physical and mental aspects of the disease should be implemented in cardiology clinics.

5.6 Limitations

The findings in this study cannot be generalized since the study was conducted on a specific population group. This study was conducted at the KNH cardiology outpatient clinic which is a public health facility and therefore the study and the results cannot be generalized to private health facilities and the general population. The study was cross sectional, with potential for residual confounding.

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CHAPTER 5: APPENDICES

Appendix 1: Informed Consent (English)

Study topic:

PREVALENCE OF ANXIETY AND ITS ASSOCIATED FACTORS AMONG CARDIAC PATIENTS ON FOLLOW UP AT THE CARDIOLOGY CLINIC AT KENYATTA NATIONAL HOSPITAL IN NAIROBI, KENYA.

Principal Investigator: Franz Owano Ombija

Institution: Department of Psychiatry, School of Medicine, University of Nairobi
Supervisors:

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Dr. Pius Kigamwa – Telephone number: 0722 521 261, Email: kigamwa@uonbi.ac.ke

Introduction

My name is Dr. Franz Owano Ombija. I am a student at the University of Nairobi pursuing master of medicine in Psychiatry. I would like to invite you to participate in a study entitled:

Prevalence of anxiety and its associated factors among cardiac patients on follow up at the cardiology clinic at Kenyatta National Hospital, Nairobi, Kenya.

What is this study about?

The aim of the study is to determine the prevalence of anxiety and its associated socio-demographic factors among adult cardiac patients. The findings will help in providing interventions for those affected and formulate preventive measures.

Your participation will be purely voluntary and you have the right to withdraw from the study at free will. Participation will only occur after you have understood about the study and you have consented. Questionnaires will be administered to you in succession and you will read, tick and complete the blank spaces taking into consideration what correctly reflects your situation. There will be no monetary gains associated with the study.

In case you have anxiety, you will receive professional help and referred to the mental health department for further patient support.

Are there any risks, harms discomforts associated with this study?

Risks of information leaking out is averted from happening by maintaining confidentiality and keeping the records under lock and key and your name will not be used in the study. Names can be used in case of referral for further patient support.

Are there any benefits being in this study?

The information you provide will help us better understand burden of anxiety among cardiac patients in our set up and audit the treatment outcomes of the patients we manage in our facility.

It will also increase understanding and establish the best management for our patients.

Will being in the study cost anything? NO….

Will you get refund for any money spent as part of this study?

……YES (NO COSTS EXPECTED TO BE INCURRED BY YOU)

What if you have questions in future?

If you have further questions or concerns about participating in this study, please call or send a text message to the study staff at the number provided at the bottom of this page. For more information about your rights as a research participant you may contact the Secretary/ Chairperson, Kenyatta National Hospital-University of Nairobi Ethics and Research Committee Telephone No. 2726300 Ext. 44102 email uonknh_erc@uonbi.ac.ke. The study staff will pay you back for your charges to these numbers if the call is for study-related communication.

What are your other choices?

Your decision to participate in research is voluntary. You are free to decline participation in the study and you can withdraw from the study at any time without injustice or loss of any benefits.

You are free to ask any questions by calling the researcher's Mobile no. 0726311659. Thank you.

CONSENT FORM (STATEMENT OF CONSENT)

Participant's statement

I have read this consent form or had the information read to me. I have had the chance to discuss this research study with a study counsellor. I have had my questions answered in a language that I understand. The risks and benefits have been explained to me. I understand that my participation in this study is voluntary and that I may choose to withdraw any time. I freely agree to participate in this research study. I understand that all efforts will be made to keep information regarding my personal identity confidential.

By signing this consent form, I have not given up any of the legal rights that I have as a participant in a research study. (Tick appropriate choice)

I agree to participate in this research study: Yes No

I agree to have (define specimen) preserved for later study: Yes No

I agree to provide contact information for follow-up: Yes No

Participant Name: _____

Participant signature / Thumb stamp _____

Date _____

Researcher's statement

I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and has willingly and freely given his/her consent.

Researcher's Name: ___DR. FRANZ OWANO_____

Date: _____Signature ___

Role in the study _____

Witness Printed Name (If witness is necessary, a witness is a person mutually acceptable to both the researcher and participant)

Name _____

Contact information _____

Signature /Thumb stamp: _____

Date; _____

Appendix 2: Informed Consent (Kiswahili)

KUENEA NA MAMBO YANAYOHUSIANA NA WASIWASI KATI YA WAGONJWA WAZIMA WENYE UGONJWA WA MOYO KATIKA HOSPITALI KUU LA KENYATTA, NAIROBI, KENYA

Mchunguzi: Dkt. Franz Owano Ombija, Chuo kikuu ya Nairobi

Walimu wasimamizi wa Chuo kikuu cha Nairobi:

Dkt. John Mburu- Nambari ya Simu: 0722 245 177, Barua Pepe :jmaina@uonbi.ac.ke

Dkt. Pius Kigamwa- Nambari ya Simu: 0722 521 261, Barua Pepe: kigamwa@uonbi.ac.ke

Idhini

Karatasi ya habari

Naitwa **Dkt Franz Owano Ombija**. Mimi ni mwanafunzi katika Chuo Kikuu cha Nairobi nikitafuta taaluma ya tiba katika Psychiatry. Ningependa kukualika ushiriki katika utafiti uitwao:

Kuenea na mambo yanayohusiana na wasisiwasi kati ya wagonjwa wazima wenye ugonjwa wa moyo katika, Hospital kuu la Kenyatta, Nairobi, Kenya. Lengo la utafiti ni kuamua kuenea kwa wasiwasi kati ya wagonjwa wazima wenye ugonjwa wa moyo. Matokeo yatasaidia katika kutoa hatua kwa wale walioathiriwa na hatua za kuzuia.

Ushiriki wako utakuwa wa hiari tu na unayo haki ya kujiondoa kutoka kwa utafiti kwa hiari. Ushiriki utatokea tu baada ya kuelewa juu ya utafiti na umekubali. Maswali yatapewa wewe mfululizo na utasoma, weka alama na ukamilishe nafasi tupu ukizingatia

kile kinachoonyesha hali yako kwa usahihi. Hakutakuwa na faida yoyote ya kifedha inayohusishwa na utafiti.

Ikiwa una wasiwasi, utapokea msaada wa kitaalam na utaelekezwa kwa idara ya afya ya akili kwa msaada zaidi wa mgonjwa.

Hatari ya habari inayovuja huzuiwa kutokea kwa kudumisha usiri na kuweka rekodi chini ya kufuli na ufunguo na jina lako halitatumika katika utafiti. Majina yanaweza kutumiwa katika kesi ya rufaa kwa msaada zaidi wa mgonjwa.

Uko huru kuuliza maswali yoyote kwa kumpigia simu mtafiti Simu ya. 0726311659. Asante.

Kwaa Habari Zaidi juu ya haki zako kama mshiriki wa utafiti unaweza kuwasiliana na Katibu/Mwenyekiti Barua pepe uonherc@uonbi.ac.ke au nambari ya simu 2726300 ext 44102.

Fomu ya idhini

Mimi .....(Nambari ya msimbo) ninatoa idhini ya kushiriki kwa hiari katika utafiti uliopewa jina: Kuenea kwa wasiwasi kati ya wagonjwa wazima wenye ugonjwa wa moyo wanaohudhuria zahanati ya magonjwa ya moyo KNH huko Nairobi, Kenya.

Nimeelezwa kuwa mradi huo unatimiza sehemu ya Mwalimu wa Tiba katika Saikolojia katika idara ya Psychiatry katika Chuo Kikuu cha Nairobi. Madhumuni ya utafiti huu nimeelezewa na ninaelewa kuwa nina haki ya kujiondoa kushiriki kwenye utafiti huo wakati wowote.

Ninaelewa kuwa kitambulisho changu kitawekwa bila kujulikana kila wakati. Ninaelewa kuwa baada ya mradi kuandikwa vifaa vyote vilivyotumiwa vitaharibiwa ili kuhakikisha usiri.

Ninajua kuwa mtafiti anaweza kusaidia kitaalam ikiwa habari nyeti zilizojazwa kwenye dodoso zinaunda hitaji kama hilo.

Saini: Mshiriki ……. Tarehe ……

Saini: Mtafiti …… .. Tarehe …….

Appendix 3. Questionnaires

Prevalence of anxiety and its associated factors among cardiac patients on follow up at the Cardiology clinic at Kenyatta National Hospital in Nairobi, Kenya.

Serial number…….

Date……

Instructions

Please answer the following questions by ticking the response that applies to you or by filling in the blank spaces. Do not enter your name anywhere in the questionnaire.

SOCIODEMOGRAPHIC QUESTIONARE

Date:

Serial Number: Inpatient/Outpatient number:

1.	Age	
2.	Sex	Male ☐ Female ☐

3.	Marital status	Single ☐ Married ☐ Separated ☐ Divorced ☐ Widowed ☐ Cohabiting ☐
4.	Highest Level of education	No formal education ☐ Primary ☐ Secondary ☐ Tertiary ☐
5.	Occupation	Student ☐ Formal employment ☐ Informal employment ☐ Businessperson ☐ Unemployed ☐ More than one category ☐
6.	Estimated income per month (kshs)	Less than 10,000 ☐ 10,000-20,000 ☐ 20,000-40,000 ☐ 40,0000-100,000 ☐ >100,000 ☐
7.	Religion	Catholic ☐ Protestant ☐ Muslim ☐ Others (Specify) ☐
8	Patient diagnosis (From file)	

Generalized Anxiety Disorder 7-item (GAD-7) scale

Over the last 2 weeks, how often have you been bothered by the following problems?	Not at all sure	Several days	Over half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it's hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3
Add the score for each column	+	+	+	
Total Score *(add your column scores)* =				

If you checked off any problems, how difficult have these made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all _____
Somewhat difficult _____
Very difficult _____
Extremely difficult _____

Source: Spitzer RL, Kroenke K, Williams JBW, Lowe B. A brief measure for assessing generalized anxiety disorder. *Arch Inern Med.* 2006;166:1092-1097.

SWALI LA KIJAMII

Tarehe:

Nambari ya fululizo: Namba ya wangonjwa wa kulazwa na wa kuja:

1.	Umri	
2.	Jinsia	Kiume ☐ Kike ☐
3.	Hali ya ndoa	Mtu mmoja ☐ Ndoa ☐ Imetenganishwa ☐ Kutalikiana ☐ Mjane ☐ Kuishi pamoja ☐
4.	Kiwango cha juu cha elimu	I Hakuna elimu rasmi ☐ ii Msingi ☐ iii Secondari ☐ iv Elimu ya juu ☐
5.	Kazi	i Mwanafunzi ☐ ii Ajira rasmi ☐ iii Ajira isio rasmi ☐ iv Mfanyabiashara ☐

		v Wasio na ajira ☐ vi Zaidi ya kategoria moja ☐
6.	Kadirio la mapato kwa mwezi (kshs)	i Chini ya 10,000 ☐ ii 10,000-20,000 ☐ iii 20,000-40,000 ☐ iv 40,0000-100,000 ☐ v >100,000 ☐
7.	Dini	i Katoliki ☐ ii Kiprotestanti ☐ iii Muislamu ☐ iv Nyingine (Bainisha) ☐
8	Utambuzi wa mgonjwa (Kutoka kwa faili)	

Kiwango cha jumla cha shida ya wasiwasi 7- vipengee (GAD-7

Juu ya kazi za mwisho ni mara ngapi umekuwa ukisumbuliwa na shida ifuatayo	Si uhakika wote	Siku kadhaa	Zaidi ya nusu siku	Karibi kila siku
1. Kuhisi woga,wasiwasi au makali	0	1	2	3
2. Kutokuwa na uwezo wakudhibiti wasiwasi	0	1	2	3
3. Kuhofia sana juu ya vitu tofauti	0	1	2	3
4. Shida kupumzika	0	1	2	3
5. Kuwa na wasiwasi sana kwamba ni ngumu kukaa kimya	0	1	2	3
6. Kukasirika au kukasirika kwa urahisi	0	1	2	3
7. Kuhisi hofu kama jambo	0	1	2	3
Zidisha alama za kila safu	+	+	+	

JUMLA =_____

Kama ulitia alama matatizo yoyote, matatizo hayo yamefanya iwe vigumu kivipi kwako kufanya kazi yako, kushughulikia vitu nyumbani, au kutangamana na watu wengine?

Sio ngumu hata kidogo _____

Ni ngumu sana _____

Ngumu sana _____

Ngumu kupindukia _____

Appendix 4: Study timelines

S/No	**Activity**		**Sept-Nov 2022**	**Dec-Feb 2023**	**March-April 2023**	**May 2023**	**June 2023**
1.1	**Research proposal and submission**						
1.2	**Approval by Kenyatta National Hospital Ethics Committee**						
1.3	**Data Collection**						
1.4	**Data analysis and report writing**						
1.5	**Results presentation and submission of report**						

Appendix 5 : BUDGET

BUDGET

Item	**Total cost**
Research fee-KNH/ERC	3,000
Binding and printing	25,000
Photocopy	10,000
Stationary	30,000
Airtime/communicating	10,000
Statistician Fee	40,000
Binding	10,000
Transport	10,000
Internet	3,000
Contingency	10,000
TOTAL	151,000

Budget justification and funding

The above items are the bare minimum for the proposed study and have been quoted as per the current market value.

Sources of funds will be from personal savings which are currently adequate.

Franz Owano
H58/11487/2018

PREVALENCE OF ANXIETY AND ITS ASSOCIATED FACTORS AMONG CARDIAC PATIENTS ON FOLLOW-UP IN THE CARDIOLOGY CLINIC AT KENYATTA NATIONAL HOSPITAL IN NAIROBI,KENYA

RRRR

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UNIVERSITY OF NAIROBI
DEPARTMENT OF PSYCHIATRY
P. O. BOX 19676 - 00202
TEL: 2726300 EXT: 43062

Prof. Anne Obondo 26/10/2023
Chair, Dept. of Psychiatry

08:26

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Registration Number H58/11487/2018

College HEALTH SCIENCES

Faculty/School/Institute MEDICINE

Department PSYCHIATRY

Course Name HPS 700

Title of the work

PREVALENCE OF ANXIETY & ITS ASSOCIATED FACTORS AMONG PATIENTS ON FOLLOW UP AT CARDIOLOGY CLINIC AT KENYATTA NATIONAL HOSPITAL

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