Prevalence of anxiety and depressive symptoms among in patients with heart failure at Jakaya Kikwete Cardiac Institute (JKCI), Dar es salaam.

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MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DEPARTMENT OF INTERNAL MEDICINE

PREVALENCE OF ANXIETY AND DEPRESSIVE SYMPTOMS AMONG INPATIENTS WITH HEART FAILURE AT JAKAYA KIKWETE CARDIAC INSTITUTE (JKCI), DAR ES SALAAM.

By

Jude Nicholaus Tarimo, MD

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Masters of Medicine (Internal Medicine) of

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CERTIFICATION

The undersigned certify that, he/she has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled, ***"Prevalence of Anxiety and Depressive symptoms among inpatients with Heart Failure attending Jakaya Kikwete Cardiac Institute (JKCI), Dar es Salaam"***, in (partial) fulfillment of the requirement for the degree of Master of Medicine (Internal Medicine) of the Muhimbili University of Health and Allied Sciences.

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Date

DECLARATION AND COPYRIGHT

I, **Dr. Jude Nicholaus Tarimo**, declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature…… **Date……**

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I wish to express my thanks to everyone participated in different ways in the preparation of this dissertation.

First and foremost I would like to thank the Almighty GOD for the gift of life and health he has been granting me, also I thank my supervisors Dr. Reuben Mutagaywa and Dr. Ester Steven for their contribution, patience and guidance during entire time of preparation of this dissertation.

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Lastly, I would like to thank all the patients who consent for this study for their tolerance despite taking their time during interviewing.

DEDICATION

I dedicate this thesis to my wife Dr. Maria Lubuva and my son Roney Tarimo.

Abstract.

Background: Heart failure is considered a major public health problem worldwide, and the common risk factor for depression and anxiety. Several studies have acknowledged these as the commonest mental disorders which are often undiagnosed and untreated. According to WHO (2015), Depression is the single largest contributor to global disability affecting 7.5% people, and anxiety ranked 6th affecting 3.4% of people globally.

Objectives: The objective of this study was to determine the prevalence of anxiety and depressive symptoms among inpatient with heart failure at Jakaya Kikwete Cardiac Institute, Dar es Salaam.

Materials and methods: This was a cross-sectional hospital-based study involving 272 sampled patients with Heart failure admitted at Jakaya Kikwete Cardiac Institute. Anxiety and depressive symptoms were assessed using Hopkins Symptom Checklist–25 (HSCL-25). Data on demographics, clinical symptoms and medical characteristics were collected via structured questionnaire. The data was analyzed by the SPSS software version 20.0. The study duration was from July 2018 – January 2019.

Results: Among 272 patients, 57.0% were female and the mean age all patients were SD 58±1.116 years. 59.5% Females had anxiety symptoms and 85 females (54.8%) with depressive symptoms. Participants with anxiety and depressive symptoms were 40 (14.7%). Prevalence of anxiety symptoms was 133 (48.9%) and prevalence of depressive symptoms was 99 (36.4%). The multivariate regression analysis showed that the New York Heart Association (NYHA) 4 (AOR 4.54, 95% C.I. 1.959-10.518), Marital status (AOR 5.34, 95% C.I. 2.255-12.633), Unemployment (AOR 3.90, 95% C.I. 1.110-13.734), Difficulty in breathing/ Dyspnea (AOR 3.97,95% C.I 1.412-11.160), Diabetes (AOR 11.58, 95% C.I 4.695-28.569), HIV (AOR 6.67, 95% C.I 2.639-16.853) and chronic pain due to bone/joint pain (AOR 6.38, 95% C.I 1.681-24.210) were independently associated with anxiety symptoms in patient with heart failure. High BMI (AOR 3.93, 95% C.I. 1.208-12.808), Marital

status (AOR 8.75, 95% C.I. 2.491-30.755), Diabetes (AOR 44.74, 95% C.I.11.869-168.673), HIV (AOR 31.04, 95% C.I. 7.834-122.960) were independently associated with depressive symptoms in patient with Heart failure

Conclusions: The prevalence of anxiety and depressive symptoms was found to be high in this study population. The high body mass index (BMI), Marital status, Unemployed, Difficulty in breathing/ Dyspnea, Diabetes, HIV and chronic pain due to bone/joint pain were independent factors associated with anxiety and depressive symptoms among patients with Heart failure admitted at Jakaya Kikwete Cardiac Institute.

Keywords: Heart Failure, Anxiety and depressive symptoms

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List of abbreviations

ACE	ANGIOTENSIN CONVERTING ENZYME
AIDS	ACQUIRED IMMUNODEFICIENCY SYNDROME
ARB	ANGIOTENSIN RECEPTOR BLOCKER
BMI	BODY MASS INDEX
CART	COMBINATION ANTIRETROVIRAL THERAPY
CKD	CHRONIC KIDNEY DISEASE
CMD	COMMON MENTAL DISORDERS
CXR	CHEST X-RAY
DBP	DIASTOLIC BLOOD PRESSURE
DIB	DIFFICULTY IN BREATHING
DM	DIABETES MELLITUS
ECG	ELECTROCARDIOGRAM
ECHO	ECHOCARDIOGRAPHY
FHx	FAMILY HISTORY
GAD	GENERALIZED ANXIETY DISORDER
HF	HEART FAILURE
HIV	HUMAN IMMUNODEFICIENCY VIRUS
HPA	HYPOTHALAMIC PITUITARY ADRENAL AXIS
HRQOL	HEALTH-RELATED QUALITY OF LIFE
HSCL	HOPKINS SYMPTOM CHECKLIST
HTN	HYPERTENSION
JKCI	JAKAYA KIKWETE CARDIAC INSTITUTE
MNH	MUHIMBILI NATIONAL HOSPITAL
MUHAS	MUHIMBILI UNIVERSITY FOR HEALTH AND ALLIED SCIENCE
NYHA	NEW YORK HEART ASSOCIATION
PLWHA	PEOPLE LIVING WITH HIV/AIDS
PND	PAROXYSMAL NOCTURNAL DYSPNOEA
PR	PULSE RATE

RAAS	RENIN ANGIOTENSIN ALDOSTERONE SYSTEM
SBP	SYSTOLIC BLOOD PRESSURE
SOB	SHORTNESS OF BREATH
WHO	WORLD HEALTH ORGANIZATION

Definition of key terms

Heart Failure Defined as "a complex clinical syndrome resulting from any cardiac structural or functional disorder that impairs the ventricle 's ability to fill or eject blood (1)

Depression Defined as a mental health disorder characterized by persistently depressed mood or loss of interest in activities that cause significant daily impairment (2,3)

Anxiety is a general term for many disorders that cause nervousness, fear, apprehension, and worrying or defined as an unpleasant emotion of apprehension that may or may not be associated with a specific threat. (4,5)

Cardiovascular Risk Factors: These are habits, environmental conditions or genetic factors that predispose an individual to develop a cardiac disease (6)

CHAPTER ONE

1. 0 Introduction

Heart failure is a chronic or acute illness which gradually affects functional abilities, associated with a physical, psychological and behavioral pattern of an individual leading to an increased morbidity and mortality. Population studies on distribution and prevalence of heart failure have been done in various areas. It is estimated that 26 million people worldwide suffer from Heart failure (HF) (1,7,8)

In Tanzania, study done by Maro (2009) showed mortality in patient with Heart Failure was 21.6%(9,10). In Uganda (2007) mortality was 18.3%, In Ethiopia the mortality was 14.3%(10), while in the North America (2006) the magnitude of people suffers from this devastating condition was 5.7 million with an incidence of 660, 000 per year.(11)

In Europe, the prevalence of HF ranges between 1-2%, Germany (2006) 1.6% for women and men 1.8%, in Sweden (2010) 1.8% similar in both gender, Italy (2016) 1.44% a trend which was subjected to increase with advancing age.(12–14) In Asia HF ranges between 1.3% and 6.7% higher than when compared to western countries. (15) In sub-Saharan African countries, population studies are scarcely documented. (16)

Majority of the patients with anxiety and depressive symptoms are unable to carry out self-care activities that are important in managing HF symptoms and preventing the exacerbation of symptoms (17–20)

There are enormous disparities existing with regards to the prevalence of HF on the regional distribution among studies following different use definition of HF and methods used to establish its presence among researchers, as it was stated in American College of Cardiology guidelines. (3,21)

HF is a syndrome and not a disease, its diagnosis relies on a clinical examination and can be challenging (1,21,22). Epidemiologically there an increase in incidence and prevalence of HF is associated with poor outcome and a high cost of treatment. (23,24)

HF contributes to the occurrence of depression and anxiety among patients who suffer from chronic illness and often are undiagnosed and untreated.(25–27). Depression and anxiety are common mental disorders for patients with chronic illness particularly HF. (28). Unfortunately, there has been no study done in Tanzania to show prevalence of anxiety and depressive symptoms among HF patient.

1. 1 Literature review

According to (WHO) World Health Organization (2015) Depression is the single largest contributor to global disability accounting for 7.5% of all years among patients with this chronic illness; anxiety disorders ranking 6th accounts for 3.4%.(7,29).

Majority of patients suffering from heart failure (HF) develop a mental disorder that additionally makes it difficult for its management. (30). Co-morbid depression was found to impact 22% to 42% of patients with HF and creates further threats to its management. (31) When depression is merged with HF and anxiety, patients are even less able to follow recommendations, treatment plans, and self-care behaviors and length of time to treat anxiety and depression is extended. (32)

The numbers of psychosocial factors reported to contribute to this burden among patients with chronic illness, including medications used for a long period of time, restrictions to certain type of food so as to meet recommended diet, limitation to excessive fluid intake, reduced physical activities, negative body image, low self-esteem, changes in the opinion on the meaning of life, reduced level of productivity and social involvement. (33,34)

21.5% depressive symptoms were seen in among patients with HF. These depressive symptoms predispose patients to various mental related disorders (35) Meanwhile, the prevalence of anxiety was as high as 63% among HF patients.(36) As many as 40% of HF patients suffer from major anxiety, and overall anxiety levels are 60% higher than in healthy elders. When compared with other non-cardiac patient e.g. lung disease, patients with HF were found to have similarly higher or worse anxiety levels. (32)

The Depression and anxiety was common in HF outpatients in North Korea (36% Beck Depression Inventory-II z13; 45% State Trait Anxiety Inventory z40) these showed high prevalence of anxiety and confirms high depression prevalence among the outpatient population of HF. Depression and social isolation in outpatients with HF predicted mortality, regardless of demographic and clinical status. Depression is a common co morbid condition in patients with heart failure. (37–39)

In Spain, the prevalence of depression was 23.8% to 67% in 8 studies of inpatient with heart failure. (40,41)

A meta-analysis of 36 studies found that clinically significant depressive symptoms affect 21.5% of HF patients, These prevalence were similar in studies of inpatient and outpatients(4,32)

When depression is combined with HF and pain, patients are even less able to follow recommendations, treatment plans, and self-care behaviors. This results into length of time to treat chronic pain and depression is extended (32,38,42,43). The prevalence of depression in all studies of patients with heart failure is greater than the prevalence in the general population. (44) Anxiety was more than 1.5 times as frequent in HF outpatients as in the Jiang et al study of inpatients with HF. Anxiety occurred in 45% of HF outpatients participating study, 54% of the women and 43% of the men(45)

1.2 Prevalence of anxiety and depression among patients with HF

Mbakwem et al (2016) described the magnitude of depression in HF patients was 21% and it ranges from 9 to 60%. Majority affected were women with 32.7 % (range 11–67 %) of women being depressed compared to 26.1 % (7–63 %) men. (46). In relation to heart failure classified by New York Heart Association (NYHA), the prevalence was found to worsening in heart failure. (47).

In China, Shi XL et al (2016) participants with anxiety 124 (41.2%) and 177 (58.8%) with depression; 98 (32.6%) had both anxiety and depression. Socio-economic and environmental factors (those reside in the rural areas, poor family support, and have heart failure IV NYHA reported an increased prevalence of anxiety and depression. The severity of these two variables was evaluated and a correlation revealed (r=0.617, P<0.05); multivariate logistic regression models identified female gender (*OR*=2.045), class IV NYHA (*OR*=1.955), 3 or more repeated admissions for heart failure (*OR*=2.288) as predictors for anxiety and/or depression. (48)

The presence of anxiety and depressive symptoms were associated with an increased risk of several hospital visit, admission, increased health cost of treatment have also attributed to mortality.(49–51)

1.3 Associated socio-demographic factors

Several factors have been reported to be associated with anxiety and depression among patients with chronic disease, particularly Heart failure (HF). These include advancing age, being female, unemployment and low income.

In a majority of patients with heart disease, depression and anxiety symptoms are extremely common. About 20% to 40% of this population had elevated depressive symptoms, and 15% to 20% suffered from major depression disorder (29,49,52). Other study showed that Anxiety may be even more common than depression.(53) A meta- analysis study suggested that over 50% of patients with heart failure have high rates of anxiety and 13% meet anxiety disorder criteria.(53), Prevalence rates are considerably higher than in the rest of the population and emphasize the high- risk status of cardiac patients with these illnesses.

1.4 Pathophysiological mechanism that link depression and anxiety to heart failure

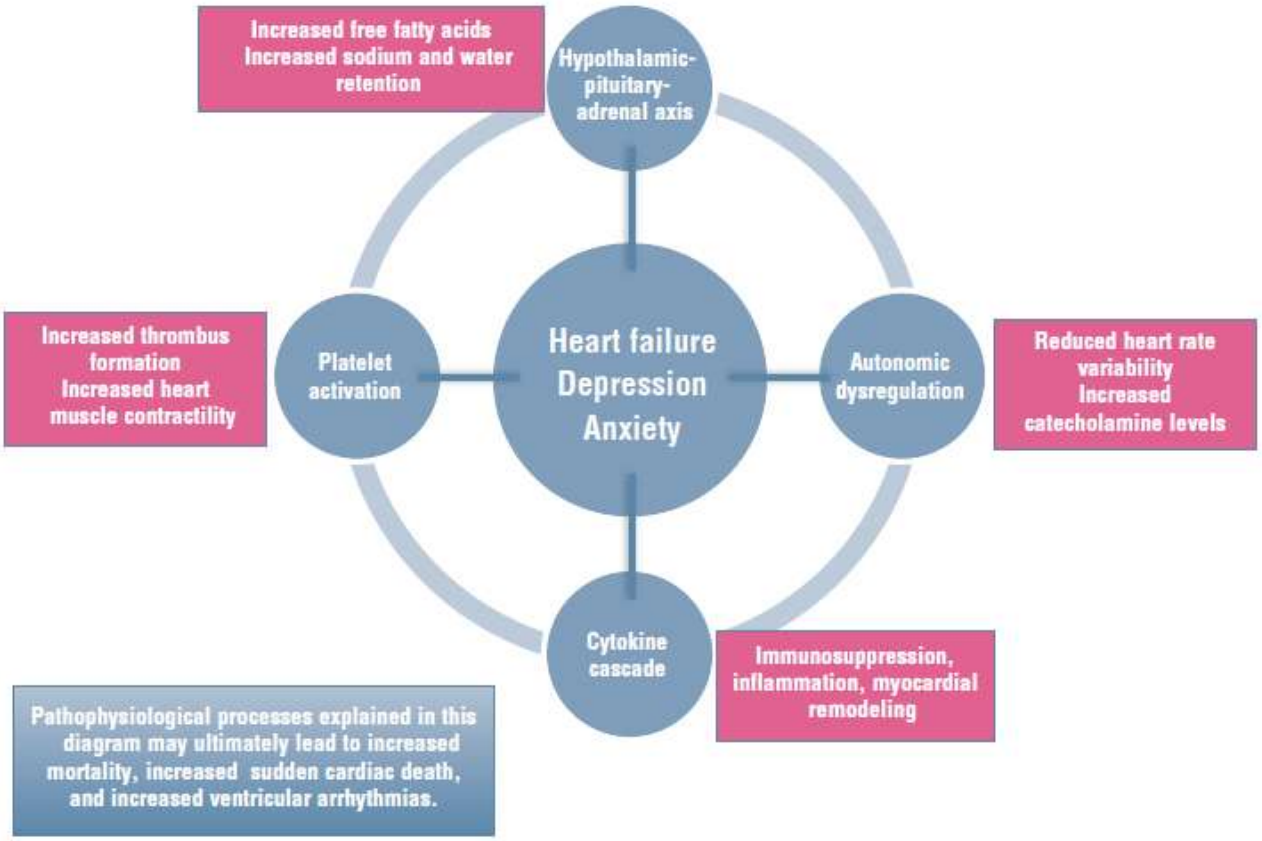

FIGURE 1: The illustration of the Pathophysiological Mechanisms That Link Depression and Anxiety to Heart Failure. Source www.ccnonline.org (Refer fig. 1)

The exaggerated activation of the hypothalamic pituitary adrenal (HPA) axis, autonomic dysregulation, activation of renin–angiotensin–aldosterone system (RAAS), and cytokine cascades occur in patients with heart failure who are depressed or anxious. As a result of the combined effects of emotional distress and heart failure, patients with heart disease who are depressed or anxious could also be at higher risk than patients who don't seem to be depressed or

anxious for progression of heart disease. The substantial analysis supporting raised mortality in depressed patients with heart disease provides no causative proof of the connection.

Activation of the HPA Axis

In response to mental and physical stress, activation of the HPA axis occurs, leading to the Hyperactivity of the HPA axis mediates hyperactivity of the sympathetic nervous system and increases circulating levels of norepinephrine and epinephrine Increased β-adrenergic sensitivity is postulated to be associated with cardiac remodeling and progression of heart failure.

Autonomic Dysregulation

The autonomic nervous system regulates cardiovascular homeostasis through sympathetic and parasympathetic nerves. Norepinephrine and epinephrine are the major catecholamines released by the autonomic nervous system, leading reduced heart rate variability and increases catecholamine level.

Activation of Cytokine Cascades

Cytokines are widely secreted peptides that mediate and regulate cellular immune function. Cytokines exert both pro-inflammatory cytokine (TNF-α, interleukin-6 (IL-6)) and anti-inflammatory control over physiological conditions, these will cause immunosuppression, inflammation and myocardial remodeling.

Platelet Activation

The biological factor of heart failure and the psychological processes of depression and anxiety increase platelet reactivity. Activated platelets interact with leukocytes to adhere to endothelial cells in the vasculature and promote thrombosis.

1.5 Conceptual framework.

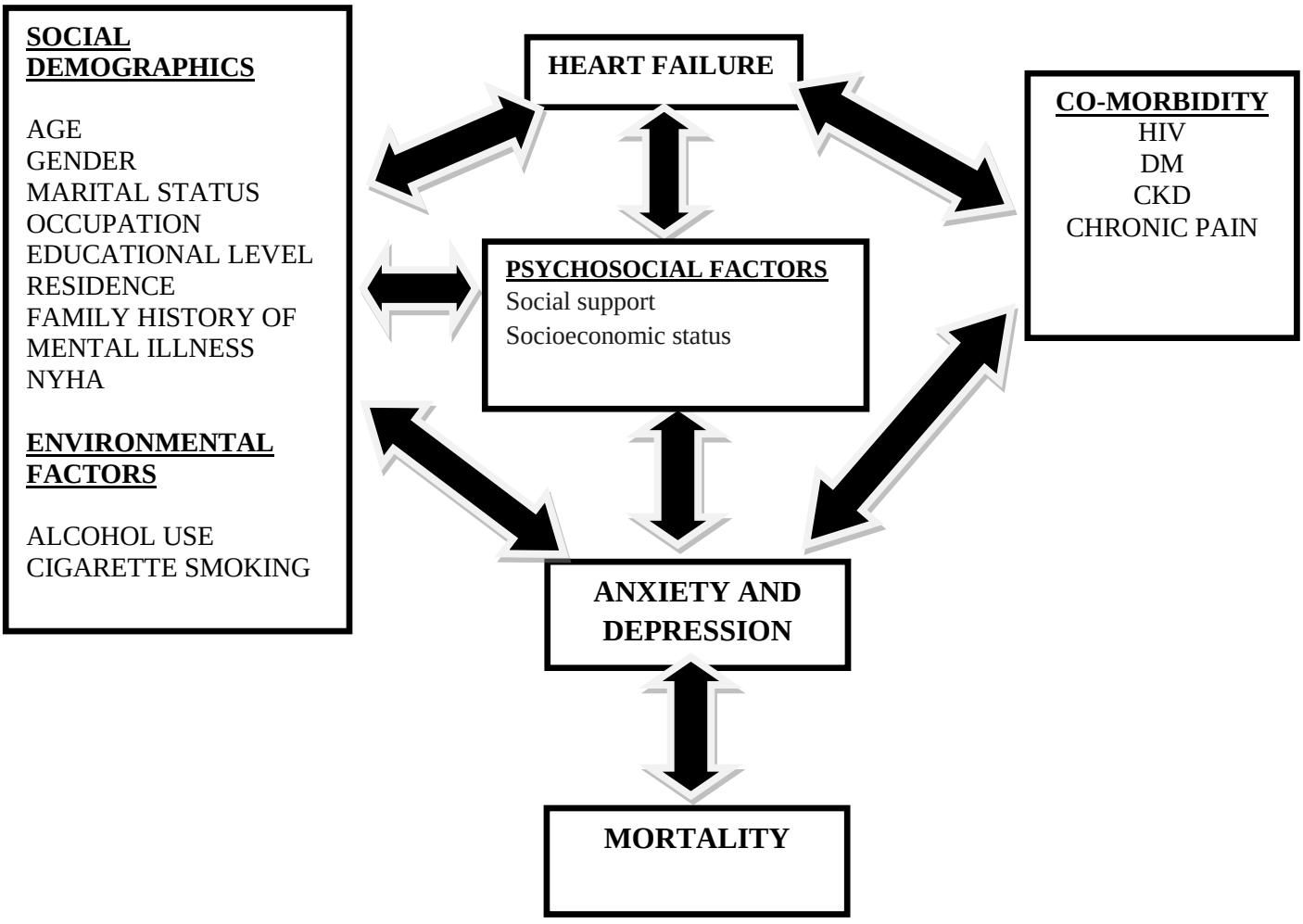

Figure 2: illustrate the conceptual framework and Biopsychosocial Holistic Model of Cardiovascular Health

The biopsychosocial holistic model includes biological, psychological, and social factors in this factors that play a role in cardiovascular health and in this case patient with heart failure are affected. (45)

Relationship between the biological and psychological factors is illustrated by increased mortality in patients with anxiety, depression and heart failure (54)

An example of the interaction between the psychological and the social realms is the independent association between increased anxiety and low social support that is predictive of readmission of heart failure patients. (48)

Anxiety and depressive symptoms are Dependent variable in this study.

Independent variables are divided into environmental-related factors (which include alcohol use, cigarette smoking, etc.), patient-related factors (which include age of the patient, gender etc.) psychosocial factors (e.g. social economic status etc.) and Co morbidities (Diabetes Mellitus (DM), Human Immuno deficiency virus (HIV), Kidney disease and chronic pain due to bone disease or joint disease)

The presence of independent factors either singular or in aggregate increases the likelihood of having anxiety and depressive symptoms as the dependent variable.

1.6 Problem statement

Heart failure is a chronic condition associated with mental disorders, the majority of which are not diagnosed and hence are neglected. Heart failure (HF) is a progressive disease which impair one's ability or Quality of life (QoL) and it affects approximately 26 million people worldwide (19,35,55,56)

Identification of these patients is becoming very challenging among medical practitioners, despite the fact that most of the patients suffering from HF have a comparable feature of depression and anxiety, Also Marion Eisele et al, (2016) observed a major knowledge gap among medical practitioners on management of depression and anxiety, with only few General practitioners (GPs) were aware of their patients' depressive symptomatology in 35% of all cases.(57) A patient with HF may present similar symptoms as that of depression and anxiety and therefore makes it harder to draw the line between the two.(58).

Many symptoms, such as fatigue, low energy, sleep disturbances, weight loss or gain, and concentration and memory problems, which are common in both HF and depression, may be diagnosed as symptomatic only of CHF(59,60)

In one study showed patients with Depression confers a 2-fold increased risk of mortality and adverse cardiac events after myocardial infarction or heart failure and has been linked to poor outcomes after cardiac surgery(61,62)

Also in a recent retrospective analysis of patients with HF showed an increase in mortality and hospital stay in those patients categorized as having depression and HF (56,57,63)

Anxiety and depression both have an increased risk of disability and mortality among patients with heart failure and other related cardiovascular condition. (32,49,54,64)

This study will enable us to know the magnitude of anxiety and depressive symptoms among patient with heart failure and therefore plan for better resource allocation and improve the survival value of patients.

1.7 Rationale of the study

There are no adequate data readily available to describe the prevalence of anxiety and depressive symptoms among patients with heart failure in Tanzania. Nevertheless, few studies have been conducted on the magnitude of mental disorders in relation to chronic illness. This study will apprise healthcare providers on identification of anxiety and depressive symptoms among patients with HF and hence improve the outcome.

The numbers of factors have been put forward to try to explain and extrapolate reasons as to why HF patients face a huge burden of Anxiety and Depression as namely hereunder.

This is among studies of its kind in cardiovascular medicine done in Tanzania assessing anxiety and depressive symptoms in heart failure patient, hence it will open door for further studies to be done.

The results from this study will inform health care professionals, stake holders and government (relevant authorities) on the magnitude of the problem, hence maximize and prioritize effort on mental health care for patients with pre-existing chronic conditions like Heart failure.

1.8 Research questions

I. What is the prevalence of anxiety and depressive symptoms among inpatient attending at JKCI?
II. What are the socio demographic and clinical characteristics of inpatient with heart failure?

1.9 Study hypothesis

Anxiety and depressive symptoms are prevalent among inpatient attending at JKCI

1.10 Study objectives

1.11 Broad objective

To explore the prevalence of anxiety and depressive symptoms and associated factors among inpatient with heart failure at JKCI, Dar es Salaam.

1.12 Specific objectives:

I. To determine the prevalence of anxiety symptoms among inpatient with heart failure at JKCI.
II. To determine the prevalence of depressive symptoms among inpatient with heart failure at JKCI.
III. To determine factors associated with anxiety symptoms among inpatient with heart failure at JKCI.
IV. To determine factors associated with depressive symptoms among inpatient with heart failure at JKCI.

CHAPTER TWO

2.0 Methodology

2.1. Study Design

Hospital-based cross sectional study to determine anxiety and depressive symptoms among inpatient with HF

2.2. Study Duration

This study was conducted over a period of 7 months from 1st July 2018 to 31st January 2019.

2.3 Study Area

The study was conducted in Jakaya Kikwete Cardiac Institute (JKCI)

JKCI is a favorable environment for internationally acclaimed cardiovascular research. It is located in Upanga west Ilala District, Dar es Salaam. Has 104 bed capacity, 4 adult and 2 pediatric self-contained private rooms, 9 Intensive care beds, 6 Coronary Care beds, Biplane Catheterization Laboratory and 3 ultra-modern operating theatres which matches the highest level of heart diseases delivery across East Africa, where cardiac services are provided to all patients categories (those exempted by policy, insurance covered, cost sharing and private).

2.4 Study Population

All inpatients with heart failure age 18 years, admitted at JKCI

2.5 Sampling Technique

A Consecutive sampling among HF patient admitted at Jakaya Kikwete Cardiac Institute (JKCI). The list of patients admitted was obtained from the nursing register and patients were invited to participate in the study. After giving consent, patients were screened for the inclusion and exclusion criteria to identify eligible individuals to be enrolled in the study.

At any point during the study procedure, the participant had the right to withdraw from the study or to refuse to answer any question

Heart failure patients were identified based on diagnosis made by cardiologist at JKCI. The diagnosis of the cardiologist was final.

2.6 Variable

Independent variable: Factors for depression and anxiety (Age, sex, gender, Marital status, residence, education level, NYHA, Family history of mental illness, medical characteristics, drugs symptoms of patients and co-morbidities)

Dependent Variables: Anxiety and depressive symptoms

2.7 Inclusion criteria

- Those who consent; aged 18 years of age. And above
- Inpatient diagnosed to have HF

2.8 Exclusion criteria

- Patients observed to be very sick or unfit for the interview
- Patients on anxiolytics drugs

2.9 Sample Size Calculation

The sample size will be calculated using the Kish-Leslie formula as shown below:

$$N = \frac{z^2 pq}{\varepsilon^2}$$

Whereby:

N = minimum sample size required

Z = standard normal deviation set at 1.96 (corresponding to confidence level of 95%)

P = Prevalence of anxiety and depression symptoms among patient with HF. Estimated prevalence of depressive and anxiety symptoms among patients with heart failure was 21.5% (Celano CM et al. 2018)

ε = marginal error to be used of 5%

q = (1-P) = proportion

Hence: **N=** $\frac{\mathbf{z^2 x p x q}}{\boldsymbol{\varepsilon}^{\mathbf{2}}}$

$= \frac{1.96^2 x\ 0.215(1-0.215)}{0.05^2}$ N= 259

Allowing 5% non-response, adjusted minimum sample size N= 272

2.10 Research tool/ instruments

English and Swahili translated Questionnaires

Hopkins Symptom Checklist–25

2.11 Data collection

Data was collected using an interviewer administered structured questionnaire. A research assistant conducted face to face interviews. Data collected included the participants' information on their socio-demographic data include residence, age, gender, marital status, level of education, occupation, clinical history (specifically duration and type of treatment for HF) and past medical history (of human immunodeficiency virus (HIV), Hypertension (HTN), Diabetes Mellitus (DM) Kidney disease and chronic pain) as well as a family history of mental illness obtained via questionnaire (see APPENDIX I). Some data (specific co-morbidities (HIV, HTN, DM and Kidney disease), their duration and the specific drug treatments were recorded. This information was obtained from the patients.

A tool HSCL-25 to obtain anxiety and depressive symptoms (see APPENDIX I).

2.11.2 Hopkins Symptom Checklist–25 (HSCL-25)

Depression and anxiety symptoms was measured using the Hopkins Symptom Checklist–25 (HSCL-25) (40) which is a structured screening tool that was developed for use in primary care settings. The HSCL-25 has ten questions for anxiety and fifteen questions for depression. The scale for each question includes four categories of response ("Not at all, "A little," "Quite a bit," "Extremely," rated 1 to 4, respectively).

Two scores were calculated: the anxiety score is the average of the 10 anxiety items, while the depression score is the average of the 15 depression items, with a cut-off score for "caseness" of 1.75.A Swahili version of the HSCL-25 has been validated and used in Tanzania by Kaaya et al., (2002); the tool showed adequate internal consistency with Cronbach's alpha of 0.93. (65)

2.11.3 Clinical Measurements

The measurements were done to all participants selected to obtain the following physical parameters: blood pressure, weight, and height.

Blood pressure measurements were done using the Omron M6 Comfort Blood Pressure which has been clinically proven to meet the European Society of Hypertension International Protocol.(66) The participant was asked to remain in a seated position with his/her left arm relaxed and supported by a table at the chest level. The feet were on the floor. The midline of the inflatable cuff was positioned over the brachial artery. Two measurements were taken and their average was calculated. Blood pressure was reported in millimeters of mercury (mmHg).

These measurements were done by the one research assistant and principal investigator. Height (m) was measured using a wall stadiometer. This consisted of a rigid vertical surface with an attached scale in centimeters and a horizontal mobile surface at right angles, which slides freely vertically along the scale.

The inferior surface should lie on the floor at the 0 of the measuring scale. The participant was asked to stand with their back to the vertical scale so that their heels, buttocks and head are in contact with it. The heels will be kept together and shoulders relaxed. The participant was asked to look forward at eye level. The mobile horizontal surface was then slid downwards to the top of the head of the participant. The reading was then taken from the vertical scale. Measurements were recorded to the nearest 0.5mm.

Those who were very sick or uncomfortable supine length measurement were done: The patient was made to lie down supine. Using a flexible measuring tape the length between the vertex of the head and the heel was measured. The measurement was taken up to one decimal point.

The weight (kg) was measured using a propert 150 kg speedometer mechanical weighing scale capable of weighing up to 150 kg. The participants were requested to measure their weight without shoes and with light clothing.

The body mass index (BMI) was calculated using the height (m) and weight (kg).

BMI = weight (kg) ÷ [height (m)]^2 expressed in kg/m^2

Table 1: Interpretation of BMI as per the WHO recommendations(67)

Classification	**BMI in Kg/m^2**
Underweight	<18.5
Normal weight	18.5 – 24.9
Overweight	25 – 29.9
Obese	≥ 30

2.12 Quality control

The principal investigator interviewed patients already diagnosed with heart failure, looking into the history, investigation and medication (anti failure) and then principal investigator filled the questionnaire.

2.13 Data management

At the end of each interview, the filled questionnaire was cross-checked for completeness and any missing entries were corrected. The quantitative data collected was coded, processed and cleaned to avoid inconsistencies and outliers. Data was analyzed by SPSS (Statistical Package for the Social Sciences) version 16 as per the specific research questions using frequencies and percentages.

The relationship between the independent variables and the dependent variable was established using Chi-square test of association and a variable with P-value of equal or less than 0.05 was considered to be statistically significant.

2.14 Ethical clearance

Ethical clearance was obtained from the Research and Publication Committee of MUHAS and Jakaya Kikwete Cardiac Institute ethics committee.

Written informed consent was obtained from all study participants prior to entry into the study. Enrolled study participants had the right to decline answering any question and to withdraw from the study at any point in time, there were no any participant forced or threatened to participate in the study

Confidentiality on patient information was maintained. Names (optional) or serial number was recorded and individual patient identification data were obtained. This information was included in the input data in the computers neither for analysis nor in the report or manuscript to maintain patient confidentiality.

2.15 Data processing and analysis

Data was cleaned for accuracy and completeness and was entered into the EPI software and checked for consistency and missing information, then imported to the SPSS version 20.0 for analysis. Continuous variables were summarized into frequencies, mean and standard deviation. Median and interquartile range (IQR) were used for variables that were not normally distributed. Proportions were expressed as percentages. Categorical variables were analyzed by chi squared test or Fisher's exact test. Odds ratio (OR) and 95% Confidence Interval (C.I.) were estimated using univariate and multivariate logistic regression analysis to identify the association between the variables.

The main outcome variable is anxiety and depressive symptoms and P value <0.05 was considered statistically significant.

2.17 Patient disposal

HF patients with anxiety and depressive symptoms were counseled and referred to the psychiatric clinic for further evaluation, follow up and management of their anxiety and depressive symptoms.

2.18 Dissemination of the study results to the patients

Study results were distributed to the department of Internal Medicine, Library and Muhimbili National Hospital. Also the study will be published.

CHAPTER THREE

3.0 Results

Social demographic characteristics of the study participants

The study involved 272 participants, all diagnosed to have heart failure and admitted at JKCI. Majority of participants were female, 155 (57.0%) with mean±SD age of 58±1.116 years, 81 (29.8%) belong to age group 60 years and above, and 113 (41.6%) were overweight. Participants residing in urban were 165 (60.7%), 152 (55.9%) were married/cohabitating, 185 (68.0%) had primary education; more than half of the participants were unemployed 195 (71.7%). Also we had patients with positive history of mental illness 30 (11.0%), 185 (68.0%) had formal education and 160 (58.8) were NYHA IV See table 2 below

Table 2 Socio-demographic characteristic of inpatient with Heart Failure at JKCI N=272.

Variable	Characteristics	Frequency (N)	Percentage (%)
Mean Age	Mean age years	58±1.116	
Age	18- 28	24	9.2
	29-38	26	9.6
	39-49	32	11.8
	50-58	41	14.7
	59-68	68	25.0
	69 and Above	81	29.8
BMI	Kilograms/meter^2 (kg/m^2)(Mean±SD)	27.79 ± 4.31	
BMI Range	Normal (18.5-24.9)	70	25.7
	Overweight (25-29.9)	113	41.6
	Obesity (30 or <)	89	32.7
Gender	Male	117	43.0
	Female	155	57.0
Marital status	Married/cohabitating	152	55.9
	Single/divorced/widow	120	44.1
Residence	Urban	165	60.7
	Rural	107	39.3
Occupation	Ever Employed	77	28.3
	Unemployed	195	71.7
Education	No formal education	87	32.0
	Formal education	185	68.0
NYHA	NYHA III	112	41.2
	NYHA IV	160	58.8
Family history of mental illness		30	11.0

Table 3 describes medical characteristics which 189 (69.5%) had systolic blood pressure (SBP) 140 mmHg and below and 222 (81.6) had diastolic blood pressure (DBP) 90 and below, 227 (83.5%), participants presented with orthopnoea/paroxysmal nocturnal dyspnoea (PND). The mostly commonly used drug was diuretics 250 (91.9%). 165 (60.7%) used alcohol, 110 (40.4%) were diabetic, HIV accounts 108 (39.7%) and kidney diseases accounts for 134(49.3%) were the most predominant chronic illnesses among the respondents.

Table 3 Medical characteristic of inpatient assessed for anxiety and depressive symptoms among admitted at JKCI N=272.

Medical characteristic and Risk factors		**Frequency (N)**	**Percentage (%)**
SBP	Mean SBP mmHg ±SD	127 ± 1.720	
	140 and below	189	69.5
	140and above	83	30.5
DBP	Mean DBP ±SD	77±0.984	
	90 and below	222	81.6
	90 and above	50	18.4
Symptoms of the patients			
Abdominal distension /Abdominal pain		196	72.1
Lower limb swelling		192	72.1
Difficulty in breathing/ Dyspnea		78	28.7
Orthopnoea/Paroxysmal nocturnal dyspnoea (PND)		227	83.5
Palpitation		145	53.3
Other symptoms (Heartburn, dizziness, headache etc.)		129	47.4
Drugs	Statins	58	21.3
	Aldosterone antagonist	179	65.8
	Antiarrhythmics	23	8.5
	Anticoagulants	92	33.8
	Antiplatelets	80	29.4
	Beta Blockers	192	70.6
	Angiotensin II receptor blockers (ARBs)	91	33.5
	Angiotensin converting enzyme inhibitors (ACE inhibitors)	114	41.9
	Diuretics	250	91.9
	Digoxin	159	58.5
	vasodilator	124	45.6
	Others (PPIs (Proton Pump Inhibitors), antibiotic, anti-histamine, paracetamol etc.)	92	33.8
Co-morbidities			
Used alcohol in the last 12 month		165	60.7
Used cigarette/tobacco in the last 12 month		53	19.5
Currently suffering from Diabetes		110	40.4
Currently suffering from HIV/AIDS		108	39.7
Current suffering from kidney disease		134	49.3
Currently suffering from Chronic pain due to bone /joint disease		33	12.1

Prevalence of Anxiety and Depressive symptoms among inpatient with heart failure

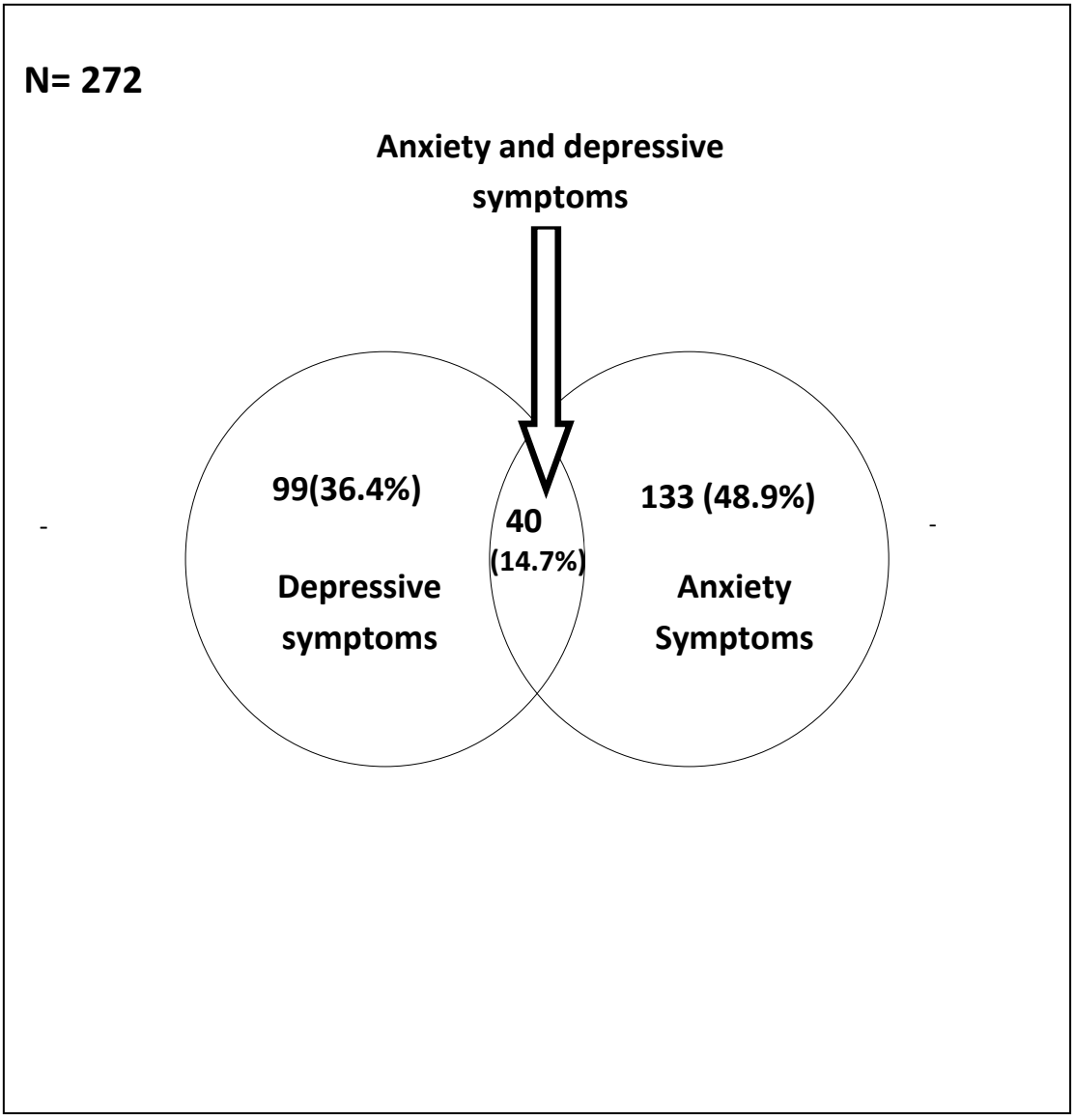

Figure 3: Illustrate prevalence of Anxiety and Depressive symptoms among inpatient with heart failure

Venn diagram showing the overlapping of anxiety and depressive symptoms among inpatient with heart failure 40 (14.7%) were screened positive for both Anxiety and Depressive symptoms. 133 (48.9%) were screened positive for Anxiety symptoms alone. 99 (36.4%) were screened positive depressive symptoms alone. (See fig 3)

Table 4: Social demographic data and medical characteristic with anxiety symptoms among patients admitted at JKCI N=272.

Variable	Characteristics	Anxiety		Total	P-value
		No	Yes		
Social demographic					
Age	≤ 60	77(64.7%)	42(35.3%)	119	<0.001
	>60	62(40.5%)	91(59.5%)	153	
Sex	Male	69(59.0%)	48(41.0%)	117	0.024
	Female	70(45.2)	85(54.8%)	155	
Marital status	Married and Cohabiting	89(58.6%)	63(41.4%)	152	0.004
	Single/Divorced/Widow	49(40.8%)	71(59.2%)	120	
BMI	Normal BMI (18.5 -- <25)	53(60.9%)	34(39.1%)	87	0.026
	High BMI (≥25)	86(46.5%)	99(53.5%)	185	
Residence	Urban	63(38.2%)	102(61.8%)	165	<0.001
	Rural	76(71.0%)	31(29.0%)	107	
Occupation	Ever Employed	52(67.5%)	25 (32.5%)	77	0.001
	Unemployed	87(44.6%)	108 (55.4%)	195	
Education	No formal education	58(66.7%)	29(33.3%)	87	<0.001
	Formal education (Primary school/Secondary College/University)	81(43.8%)	104(56.2%)	185	
SBP	≤ 140	112(59.3%)	77(40.7%)	189	<.0.001
	≥ 140	27(35.2%)	56(65.7%)	83	
DBP	≤ 90	119(53.6%)	103(46.4%)	222	0.082
	≥ 90	20(40.0%)	30(60.0%)	50	
Symptoms found in patients with heart failure					
Abdominal pain/distension		98(50.0%)	98(50.0%)	196	0.559
		41(53.9%)	35(46.1%)	76	
Lower limb swelling		97(50.5%)	95(49.5%)	192	0.766
		42(52.5%)	38(47.5%)	80	
DIB/Dyspnea		16(20.5%)	62(79.5%)	78	<0.001
		123(63.4%)	71(36.6%)	194	
Orthopnoea/PND		111(48.9%)	116(51.1%)	227	0.102
		28(62.2%)	17(37.8%)	45	
Palpitation		75(51.7%)	70(48.3%)	145	0.827
		64(50.4%)	63(49.6%)	127	
Other symptoms (heartburn, dizziness, headache etc.)		66(51.2%)	63(48.8%)	129	0.985
		73(51.0%)	70(49.0%)	143	
Medication used by patient					
Digoxin	Yes	78(49.1%)	81(50.9%)	159	0.423
	No	61(54.04%)	52(46.0%)	113	
Beta Blockers	Yes	98(51.0%)	94(49.0%)	192	0.975
	No	41(51.2%)	39 (48.8%)	80	
Statins	Yes	28(48.3%)	30(51.7%)	58	0.627
	No	111(51.9%)	103(48.1%)	214	
Aldosterone	Yes	89(49.7%)	90(50.3%)	179	0.527
	No	50(53.8%)	43(46.2%)	93	
Antiarrhythmics	Yes	14(60.9%)	9(39.1%)	23	0.327
	No	125(50.2%)	124(49.8%)	249	

Anticoagulant	Yes	52(56.5%)	40(43.5%)	92	0.201
	No	87(48.3%)	93(51.7%)	180	
Antiplatelets	Yes	38(47.5%)	42(52.5%)	80	0.443
	No	101(52.7%)	91(47.4%)	192	
ARB	Yes	50(54.9%)	41(45.1%)	91	0.369
	No	89(49.2%)	92(50.8%)	181	
ACE Inhibitors	Yes	60(52.6%)	54(47.4%)	114	0.668
	No	79(50.0%)	79(50.0%)	158	
Diuretics	Yes	126(50.4%)	124(49.6%)	250	0.434
	No	13(59.1%)	9(40.9%)	22	
Vasodilator	Yes	66(53.2%)	58(46.8%)	124	0.521
	No	73(49.3%)	75(50.7%)	148	
Other Drugs	Yes	54(58.7%)	38(41.3%)	92	0.073
	No	85(47.2%)	95(52.8%)	180	
NYHA	NYHA 3	79(70.5%)	33(29.5%)	112	<0.001
	NYHA 4	60(37.5%)	100(62.5%)	160	

Table 4 describes association of socio-demographic and medical characteristics with anxiety symptoms:

Majority respondent 60 yrs. and above accounts for 91 (59.5%) had higher number of anxiety symptoms compared to those age 60 yrs. and below 42 (35.3%). 85 (54.8%) were females. Single/divorced/ widows were more than 71(59.2%). Those with High BMI had high anxiety symptoms 99 (53.5%).

Those living in urban, unemployed, formal education, SBP ≥ 140, DIB/Dyspnea and those who had NYHA had higher number of Anxiety symptoms (102(49%)), (108(55.4%)), (104(56.2%)), (56(65.7%)) (62(79.5%)) and (100(62.5%)) respectively.

The participants presented with symptoms of abdominal distension/abdominal pain, lower limb swelling, palpitation and other symptoms had higher number of anxiety symptoms with p-value >0.2; (98 (50.0%)), (95 (49.5%)), (63 (49.6%)), (70 (49.0%),).

The medication used by participants and there corresponding anxiety symptoms (digoxin 81(50.9%); Beta blocker 94 (49.0%); Statin 30 (51.7%); Aldosterone 90 (50.3%); Antiarrhythmics 43 (46.2%); Anticoagulant 93 (51.7%); Antiplatelets 42 (52.5%); ARB 92 (50.8%)); ACE inhibitors 79 (50.0%); Diuretics 124 (49.6%); Vasodilator 75 (50.7%); Other Drugs(Paracetamol, antibiotics, PPI, etc.) 95 (52.8%).

Table 5: Social demographic data and medical characteristics with depressive symptoms among admitted patients at JKCI N=272.

Variable	Characteristics	Depression			P-value
		No	Yes	N	
Social demographic		N (%)	N (%)		
Age	≤ 60	77(64.7%)	42(35.3%)	119	<0.002
	> 60	62(40.5%)	91(59.5%)	153	
Sex	Male	69(59.0%)	48(41.0%)	117	0.024
	Female	70(42.2%)	85(54.8%)	155	
Marital status	Married and Cohabiting	96(61.9%)	59(38.1%)	155	<0.001
	Single/Divorced/Widow	43(36.8%)	74(63.2%)	117	
BMI	Normal BMI (18.5 - <25)	53(60.9%)	34(39.1%)	87	0.026
	High BMI (25 to >30)	86(46.5%)	99(53.5%)	185	
Residence	Urban	63(38.2%)	102(61.8%)	165	<0.001
	Rural	76(71.0%)	31(29.0%)	107	
Occupation	Ever Employed	52(67.5%)	25(32.5%)	77	0.001
	Unemployed	87(44.6%)	108(55.4%)	195	
Education	No formal education	58(66.7%)	29(33.3%)	87	<0.001
	Formal education(Primary/ Secondary/College/University)	81(43.8%)	104(56.2%)	185	
SBP	≤ 140	110(58.2%)	79(41.8%)	189	<0.001
	≥ 140	28(33.7%)	55(66.3%)	83	
DBP	≤ 90	117(52.7%)	105(47.3%)	222	0.171
	≥ 90	21(42.0%)	29(58.0%)	50	
Symptoms found in patients with heart failure					
Abdominal pain/distension		96(49.0%)	100(51.0%)	196	0.352
		42(55.3%)	34(44.7%)	76	
Lower limb swelling		95(49.5%)	97(50.5%)	192	0.521
		43(53.8%)	37(46.2%)	80	
DIB/Dyspnea		7(9.0%)	71(91.0%)	78	<0.001
		131(67.5%)	63(32.5%)	194	
Orthopnoea/PND		109(48.0%)	118(52.0%)	227	0.044
		29(64.4%)	16(35.6%)	45	
Palpitation		75(51.7%)	70(48.3%)	145	0.727
		63(49.6%)	64(50.4%)	127	
Other symptoms (heart burn, dizziness, headache etc.)		66(51.2%)	63(48.8%)	129	0.893
		72(50.3%)	71(49.7%)	143	
Drug used by patients					
Digoxin	Yes	82(51.6%)	77(48.4%)	159	0.743
	No	56(49.6%)	57(50.4%)	113	
Beta Blockers	Yes	100(52.1%)	92(47.9%)	192	0.491
	No	38(47.5%)	42(52.5%)	80	
Statins	Yes	26(44.8%)	32(52.2%)	58	0.310
	No	112(52.3%)	102(47.7%)	214	
Aldosterone	Yes	88(49.2%)	91(50.8%)	179	0.472
	No	50(53.8%)	43(46.2%)	93	
Antiarrhythmics	Yes	14(60.9%)	9(39.1%)	23	0.310
	No	124(49.8%)	125(50.2%)	249	
Anticoagulant	Yes	51(55.4%)	41(44.6%)	92	0.268

	No	87(48.3%)	93(51.7%)	272	
Antiplatelets	Yes	34(42.5%)	46(57.5%)	80	0.079
	No	104(54.2%)	88(45.8%)	192	
ARB	Yes	45(49.5%)	46(50.5%)	91	0.764
	No	93(51.4%)	88(48.6%)	181	
ACE Inhibitors	Yes	61(53.5%)	53(46.5%)	114	0.437
	No	77(48.7%)	81(51.3%)	158	
Diuretics	Yes	125(50.0%)	125(50.0%)	250	0.414
	No	13(59.1%)	9(40.9%)	22	
Vasodilator	Yes	68(54.8%)	56(45.2%)	124	0.215
	No	70(47.3%)	78(52.7%)	148	
Other Drugs	Yes	52(56.5%)	40(43.5%)	92	0.172
	No	86(47.8%)	94(52.2%)	180	
NYHA	NYHA 3	72(64.3%)	40(35.7%)	112	< 0.001
	NYHA 4	66(41.2%)	94(58.8%)	160	

Table 5 describes socio-demographic factors, medical characteristics with depressive symptoms. Among the 272 participants majority 91 (59.5%) age 60 years and above had higher number of depressive symptoms; 85 (54.8%) female with had higher number depressive symptoms compared to male. The single/divorced/widow 74 (63.2%) had higher number depressive symptoms.

It was also observed majority with depressive symptoms 104(56.2%) who had attained formal education, 71 (91.0%) had DIB/dyspnea, 94 (58.8%) were NYHA 4. Unemployed 108 (55.4%) had depressive symptoms were. 118 (52.0%) with Orthopnoea had depressive symptoms.

The participants presented with abdominal distension/abdominal pain, lower limb swelling, palpitation and other symptoms were assessed for depressive symptoms (100 (51.0%)), (97 (50.5%)), (70 (48.3%)), (71 (49.7%)).

Antiplatelets 46 (57.5%), p-0.079) had higher proportion of depressive symptoms, all medication used by participants for heart failure, Antiplatelets had higher number depressive symptoms

Associated factors with anxiety symptoms among inpatient with heart failure

A total of thirty five (35) variables were entered in the binary logistic regression univariate analysis model. Sixteen (16) variables were found to increase the probability of anxiety symptoms as shown in Table 6 below.

Table 6: Univariate logistic regression analysis of anxiety symptoms among inpatients with heart failure at JKCI N=272.

Variable		Frequency (%)	Crude Odds Ratio (95% C.I)	P-value
Age*	≤ 60	42(35.3%)	**Ref**	**<0.001**
	>60	91(59.5%)	**2.691(1.639-4.417)**	
Gender*	Male	48(41.0%)	**Ref**	**0.025**
	Female	85(54.8%)	**1.746 (1.074-2.837)**	
BMI*	Normal BMI (18.5 -<25)	34(39.1%)	**Ref**	**0.027**
	High BMI (≥ 25)	99(53.5%)	**1.794(1.068-3.014)**	
NYHA*	NYHA 3	33(29.5%)	**Ref**	**<0.001**
	NYHA 4	100(62.5%)	**3.990(2.379-6.692)**	
Marital status*	Married and Cohabiting	63(41.4%)	**Ref**	**<0.001**
	Single/Divorced/Widow	71(59.2%)	**2.800(1.705-4.600)**	
Residence*	Urban	102(61.8%)	**3.969(2.354-6.694)**	**<0.001**
	Rural	31(29.0%)	**Ref**	
Education level*	No formal education	29(33.3%)	**Ref**	**0.001**
	Formal education(Primary /Secondary/College/University)	104(56.2%)	**2.568 (1.508-4.372)**	
Employment status*	Ever Employed	25 (32.5%)	**Ref**	**0.001**
	Unemployed	108 (55.4%)	**2.582(1.483-4.495)**	
FHx of mental illness*	Yes	20(66.7%)	**2.283(1.026-5.081)**	**0.043**
	No	113(46.7%)	**Ref**	
Alcohol use*	Yes	89(53.9%)	**1.677(1.025-2.742)**	**0.039**
	No	44(41.1%)	**Ref**	
Cigarette use	Yes	26(49.1%)	1.008(0.553-1.837)	0.979
	No	107(48.9%)	Ref	
Diabetes*	Yes	89(80.9%)	**11.366(6.312-20.466)**	**<0.001**
	No	44(27.2%)	Ref	
HIV*	Yes	82(75.9%)	**6.988(4.027-12.127)**	**<0.001**
	No	51(31.1%)	**Ref**	
Kidney disease*	Yes	79(55.6%)	**1.765(1.091-2.855)**	**1.121**
	No	54(41.5%)	**Ref**	
Chronic pain	Yes	12(36.4%)	Ref	0.128
	No	121(50.6%)	1.794(0.845-3.811)	
Digoxin	Yes	81(50.9%)	1.218(0.751-1.975)	0.423
	No	52(46.0%)	Ref	
Statin	Yes	30(51.7%)	1.155(0.646-2.064)	0.627
	No	103(48.1%)	Ref	
Aldosterone	Yes	90(50.3%)	Ref	0.527
	No	43(46.2%)	1.176(0.712-1.975)	
Antiarrhythmics	Yes	9(39.1%)	Ref	0.330
	No	124(49.8%)	1.543(0.644-3.696)	

Anticoagulants	Yes	40(43.5%)	**Ref**	**0.202**
	No	93(51.7%)	**0.720(0.434-1.943)**	
Antiplatelets	Yes	42(52.5%)	1.227(0.728-2.068)	0.443
	No	91(47.4%)	Ref	
Beta blockers	Yes	94(49.0%)	1.008(0.598-1.699)	0.975
	No	39 (48.8%)	Ref	
ARB	Yes	41(45.1%)	Ref	0.369
	No	92(50.8%)	1.261(0.760-2.090)	
ACE	Yes	54(47.4%)	Ref	0.668
	No	79(50.0%)	1.111(0.686-1.799)	
Diuretics	Yes	124(49.6%)	1.422(0.586-3.445)	0.436
	No	9(40.9%)	Ref	
Vasodilators	Yes	58(46.8%)	Ref	0.522
	No	75(50.7%)	1.169(0.725-1.885)	
Other Drugs	Yes	38(41.3%)	**Ref**	**0.074**
	No	95(52.8%)	**1.588(0.956-2.639)**	
SBP*	≤ 140	77(40.7%)	**Ref**	**<0.001**
	≥ 140	56(65.7%)	**2.735(1.595-4.689)**	
DBP	≤ 90	103(46.4%)	Ref	0.173
	≥ 90	30(60.0%)	1.539(0.828-2.861)	
Abdominal pain/distension	Yes	98(50.0%)	1.287(0.756-2.190)	0.353
	No	35(46.1%)	Ref	
Lower limb swelling	Yes	95(49.5%)	1.187(0.704-2.001)	0.521
	No	38(47.5%)	Ref	
DIB/Dyspnea*	Yes	62(79.5%)	**21.091(9.173-48.493)**	**<0.001**
	No	71(36.6%)	**Ref**	
Orthopnoea/PND*	Yes	116(51.1%)	**1.962(1.011-3.810)**	**0.046**
	No	17(37.8%)	**Ref**	
Palpitation	Yes	70(48.3%)	Ref	0.727
	No	63(49.6%)	1.088(0.676-1.753)	
Other symptoms (heartburn, dizziness, headache etc.)	Yes	63(48.8%)	Ref	0.893
	No	70(49.0%)	1.033(0.642-1.663)	

In multivariate analysis all sixteen variables were included and after controlling for other factors ,NYHA 4 (AOR 4.54, 95% C.I. 1.959-10.518),being Single/Divorced/ Widow (AOR 5.34, 95% C.I. 2.255-12.633), Unemployment (AOR 3.90, 95% C.I. 1.110-13.734), DIB/Dyspnea(AOR 3.97,95% C.I. 1.412-11.160), Diabetes (AOR 11.58, 95% C.I. 4.695-28.569), HIV (AOR 6.67, 95% C.I. 2.639-16.853), chronic pain due to bone/joint pain (AOR 6.38, 95% C.I. 1.681-24.210) were independently associated anxiety symptoms among patient with heart failure. See table 7 below.

Table 7: Multivariate logistic regression of anxiety symptoms among inpatients with heart failure after at JKCI N=272

Variable		Frequency (%)	Adjusted Odds Ratio (95% C.I)	P-value
Age	≤ 60	42(35.3%)	Ref	0.194
	>60	91(59.5%)	1.700(0.763-3.787)	
Gender	Male	48(41.0%)	Ref	0.678
	Female	85(54.8%)	1.179(0.543-2.559)	
SBP	≤ 140	77(40.7%)	Ref	0.345
	≥ 140	56(65.7%)	1.597(0.604-4.221)	
DBP	≤ 90	103(46.4%)	Ref	0.941
	≥ 90	30(60.0%)	0.959(0.320-2.877)	
BMI	Normal BMI (18.5 -<25)	63(41.4%)	Ref	0.923
	High BMI (25 to >30)	71(59.2%)	1.043(0.447-2.434)	
NYHA*	NYHA 3	33(29.5%)	**Ref**	**<0.001**
	NYHA 4	100(62.5%)	**4.539(1.959-10.518)**	
Marital status	Married and Cohabiting	63(41.4%)	Ref	<0.001
	Single/Divorced/Widow	71(59.2%)	5.337(2.255--12.633)	
Residence	Urban	102(61.8%)	1.969(0.878-4.413)	0.100
	Rural	31(29.0%)	Ref	
Education level	No formal education	29(33.3%	Ref	0.946
	Formal education(Primary/ Secondary College/University)	104(56.2%)	0.961(0.299-3.088)	
Employment status*	Ever Employed	25 (32.5%)	**Ref**	**0.034**
	Unemployed	108 (55.4%)	**3.904(1.110-13.734)**	
Orthopnoea/PND	Yes	116(51.1%)	2.639(0.902-7.724)	0.077
	No	17(37.8%)	Ref	
DIB/Dyspnea*	Yes	62(79.5%)	**3.969(1.412-11.160)**	**0.009**
	No	71(36.6%)	**Ref**	
FHx Mental illness	Yes	20(66.7%)	0.440(0.110-1.760)	0.246
	No	113(46.7%)	Ref	
Alcohol use	Yes	89(53.9%)	0.626(0.267-1.470)	0.282
	No	44(41.1%)	Ref	
Diabetes*	Yes	89(80.9%)	**11.582(4.695-28.569)**	**<0.001**
	No	44(27.2%)	**Ref**	
HIV/AIDS*	Yes	82(75.9%)	**6.670(2.639-16.853)**	**<0.001**
	No	51(31.1%)	**Ref**	

Chronic Pain due* to Bone/joint disease	Yes	12(36.4%)	**6.379(1.681-24.210)**	**0.006**
	No	121(50.6%)	**Ref**	
Kidney Disease	Yes	79(55.6%)	1.274(0.563-2.885)	0.561
	No	54(41.5%)	Ref	
Others drugs	Yes	38(41.3%)	Ref	0.324
	No	95(52.8%)	1.530(0.657-3.559)	

A total of thirty five (35) variables were entered in the binary logistic regression univariate analysis model. Sixteen (15) variables were found to increase the probability of depressive symptoms as shown in Table 8 below.

Table 8: Univariate logistic regression analysis of depressive symptoms among inpatients with heart failure at JKCI N=272.

Variable		Frequency (%)	Crude Odds Ratio (95% C.I)	p-value
Age*	**≤ 60**	**42(35.3%)**	**Ref**	**<0.001**
	> 60	**91(59.5%)**	**2.594(1.583-4.252)**	
Gender	Male	48(41.0%)	Ref	0.104
	Female	85(54.8%)	1.492(0.920-2.418)	
BMI*	**Normal BMI (18.5 -<25)**	**34(39.1%)**	**Ref**	**0.002**
	High BMI (25 to >30)	**99(53.5%)**	**2.269(1.341-3.840)**	
NYHA*	**NYHA 3**	**40(35.7%)**	**Ref**	**<0.001**
	NYHA 4	**94(58.8%)**	**2.564(1.557-4.220)**	
Marital status*	**Married and Cohabiting**	**59(38.1%)**	**2.118(1.299-3.452)**	**0.003**
	Single/Divorced/Widow	**74(63.2%)**	**Ref**	
Residence*	**Urban**	**102(61.8%)**	**4.707(2.767-8.007)**	**<0.001**
	Rural	**31(29.0%)**	**Ref**	
Education level*	**No formal education**	**29(33.3%)**	**Ref**	**<0.001**
	Formal education(Primary/ Secondary/College/University)	**104(56.2%)**	**3.291(1.910-5.671)**	
Employment status*	**Ever Employed**	**25(32.5%)**	**Ref**	**0.002**
	Unemployed	**108(55.4%)**	**2.435(1.405-4.222)**	
FHx of mental illness*	**Yes**	**26(86.7%)**	**8.065(2.731-23.814)**	**<0.001**
	No	**108(44.6%)**	**Ref**	
Alcohol use*	**Yes**	**94(57.0%)**	**2.218(1.347-3.650)**	**0.002**
	No	**40(37.4%)**	**Ref**	
Cigarette use	Yes	31(58.5%)	1.587(0.865-2.913)	0.136
	No	103(47.0%)	Ref	
Diabetes*	**Yes**	**95(86.4%)**	**19.974(10.397-38.372)**	**<0.001**
	No	**39(24.1%)**	Ref	
HIV*	**Yes**	**90(83.3%)**	**13.636(7.389-25.165)**	**<0.001**
	No	**44(26.8%)**	**Ref**	
Kidney disease*	**Yes**	**82(57.7%)**	**2.050(1.264-3.325**	**0.004**
	No	**52(40.0%)**	**Ref**	
Chronic pain	Yes	17(51.5)	1.108(0.535-2.295)	0.783
	No	117(49.0%)	Ref	
Digoxin	Yes	77(48.4%)	Ref	0.743
	No	57(50.4%)	0.923(0.569-1.495)	
Statin	Yes	32(52.2%)	1.351(0.754-2.421)	0.311
	No	102(47.7%)	Ref	
Aldosterone	Yes	91(50.8%)	1.202(0.728-1.986)	0.472
	No	43(46.2%)	Ref	
Antiarrhythmics	Yes	9(39.1%)	Ref	0.313
	No	125(50.2%)	1.568(0.655-3.756)	
Anticoagulants	Yes	41(44.6%)	Ref	0.268

	No	93(51.7%)	1.330(0.803-2.202)	
Antiplatelets	Yes	46(57.5%)	1.599(0.945-2.707)	0.081
	No	88(45.8%)	Ref	
Beta blockers	Yes	92(47.9%)	Ref	0.491
	No	42(52.5%)	1.261(0.713-2.025)	
ARB	Yes	46(50.5%)	1.080(0.653-1.788)	0.764
	No	88(48.6%)	Ref	
ACE	Yes	53(46.5%)	Ref	0.437
	No	81(51.3%)	1.211(0.747-1.961)	
Diuretics	Yes	125(50.0%)	1.444(0.596-3.501)	0.416
	No	9(40.9%)	Ref	
Vasodilators	Yes	56(45.2%)	Ref	0.216
	No	78(52.7%)	1.353(0.838-2.184)	
Other Drugs	Yes	40(43.5%)	Ref	0.173
	No	94(52.2%)	1.421(0.857-2.355)	
SBP*	**≤ 140**	**79(41.8%)**	**Ref**	**<0.001**
	≥ 140	**55(66.3%)**	**2.735(1.595-4.689)**	
DBP	≤ 90	105(47.3%)	Ref	0.173
	≥ 90	29(58.0%)	1.539(0.828-2.861)	
Abdominal pain/Distension	Yes	100(51.0%)	1.287(0.756-2.190)	0.353
	No	34(44.7%)	Ref	
Lower limb swelling	Yes	97(50.5%)	1.187(0.704-2.001)	0.521
	No	37(46.2%)	Ref	
DIB/Dyspnea*	**Yes**	**71(91.0%)**	**21.091(9.173-48.493)**	**<0.001**
	No	**63(32.5%)**	**Ref**	
Orthopnoea/PND*	**Yes**	**118(52.0%)**	**1.962(1.011-3.810)**	**0.046**
	No	**16(35.6%)**	**Ref**	
Palpitation	Yes	70(48.3%)	Ref	0.727
	No	64(50.4%)	0.919(0.570-1.480)	
Other symptoms (heartburn, dizziness, headache)	Yes	63(48.8%)	Ref	0.893
	No	71(49.7%)	1.033(0.642-1.663)	

In multivariate analysis all fifteen variables were included and after controlling for other factors, high BMI 25 to > 30 (AOR 3.93, 95% C.I. 1.208-12.808), Single/Divorced/Widow (AOR 8.75, 95% C.I. 2.491-30.755), Diabetes (AOR 44.74, 95% C.I. 11.869-168.673), and HIV (AOR 31.04, 95% C.I. 7.834-122.960), were independently associated with depressive symptoms among patient with heart failure. See table 9 below

Table 9: Multivariate logistic regression analysis of depressive symptoms among inpatients with heart failure at JKCI N=272.

Variable		Frequency (%)	Adjusted Odds Ratio (95% C.I)	p-value
Age	≤ 60	42(35.3%)	Ref	0.830
	> 60	91(59.5%)	1.127(0.378-3.364)	
Gender	Male	48(41.0%)	Ref	0.458
	Female	85(54.8%)	0.671 (0.234-1.925)	
BMI*	**Normal BMI (18.5 -<25)**	**34(39.1%)**	**Ref**	**0.023**
	High BMI (≥25)	**99(53.5%)**	**3.933 (1.208-12.808)**	
NYHA	NYHA 3	40(35.7%)	Ref	0.318
	NYHA 4	94(58.8%)	1.772 (0.576-5.448)	
Marital status*	**Married and Cohabiting**	**59(38.1%)**	**Ref**	**0.001**
	Single/Divorced/Widow	**74(63.2%)**	**8.752 (2.491-30.755)**	
Residence	Urban	102(61.8%)	2.319 (0.794-6.770)	0.124
	Rural	31(29.0%)	Ref	
Education level*	No formal education	29(33.3%)	Ref	**0.031**
	Formal education(Primary /Secondary/College/University)	**104(56.2%)**	**8.011 (1.212-52.928)**	
Employment	Ever Employed	25(32.5%)	Ref	0.313
	Unemployed	108(55.4%)	2.670 (0.397-17.957)	
FHx of Mental illness	Yes	26(86.7%)	3.050 (0.317-29.330)	0.334
	No	108(44.6%)	Ref	
Alcohol	Yes	94(57.0%)	0.632 (0.202-1.974)	0.430
	No	40(37.4%)	Ref	
Cigarette	Yes	31(58.5%)	0.627 (0.176-2.235)	0.472
	No	103(47.0%)		
Diabetes*	**Yes**	**95(86.4%)**	**44.744 (11.869-168.673)**	**<0.001**
	No	**39(24.1%)**	**Ref**	
HIV/AIDS*	**Yes**	**90(83.3%)**	**31.037(7.834-122.960)**	**<0.001**
	No	**44(26.8%)**	**Ref**	
Chronic Pain Bone /Joint disease	Yes	17(51.5)	0.206(0.035-1.223)	0.082
	No	117(49.0%)	Ref	
Kidney Disease	Yes	82(57.7%)	1.496(0.511-1.223)	0.462
	No	52(40.0%)	Ref	
Antiplatelets	Yes	46(57.5%)	1.529(0.494-4.737)	0.461
	No	88(45.8%)		

Others Drugs	Yes	40(43.5%)	1.045(0.341- 3.203)	0.938
	No	94(52.2%)		
SBP	≤ 140	79(41.8%)	Ref	0.325
	≥ 140	55(66.3%)	0.481(0.112-2.065)	
DBP	≤ 90	105(47.3%)	Ref	0.616
	≥ 90	29(58.0%)	0.514(0.299-7.671)	
DIB/Dyspnea*	**Yes**	**71(91.0%)**	**0.032(0.007-0.152)**	**<0.001**
	No	**63(32.5%)**	**Ref**	
Orthopnoea/PND	Yes	118(52.0%)	2.512(0.682-9.252	0.166
	No	16(35.6%)	Ref	

CHAPTER FOUR

4.0 Discussion:

Major findings in this study:

- The mean age of participant was found to be 58yrs
- Majority of participant 57% were female
- 59.5% female had anxiety symptoms and 54.8% had depressive symptoms
- The prevalence of anxiety and depressive symptoms was 11.0%
- The prevalence of anxiety and depressive symptoms was 48.9% and 36.4% respectively.
- The NYHA 4 Marital status, Unemployment, DIB/Dyspnea, Diabetes, HIV and chronic pain due to bone/joint pain were independently associated with anxiety symptoms in patient with heart failure.
- The BMI, Marital status, Diabetes , HIV were independently associated with depressive symptoms among inpatient with Heart failure

This was hospital based cross sectional study involving 272 participants admitted with heart failure at Jakaya Kikwete Cardiac Institute (JKCI). The study was mainly looking at anxiety and depressive symptoms and factors independently associated with these symptoms among inpatient with heart failure.

However, this study was not attempting to give diagnosis of anxiety or depression or categorize patient in different subtype of anxiety and depression.

Prevalence of anxiety and depressive symptoms among in patient with heart failure:

In this study the prevalence of anxiety and depressive symptoms among inpatient with heart failure was 14.7%. Of the 272 participants 48.9% were screened positive for anxiety symptoms alone and 36.4% were screened positive depressive symptoms.

These prevalence was comparable to prevalence seen in Japan, depression and anxiety were found to be 37% and 37% respectively(68). In Nigeria depressive, anxiety symptoms and associated factors among postnatal women, the prevalence was 34.6% and 33.3% respectively(41,69) . Similar findings in Sweden showed prevalence of anxiety and depressive symptoms to be 27% and 35%(70). These finding were consistent with this study. Also the

prevalence of depressive symptoms in meta-analysis was 27.0% (71). In study done in Australia, anxiety prevalence ranged between 10%–50%(72).
In another meta-analysis, prevalence and measurement of anxiety in samples of patients with Heart Failure was found to be 55.5% had symptoms of anxiety(36) .

The high level of anxiety and depressive symptoms could be explained by the difference in tool used to assess anxiety in these two studies done in England and Australia, also the difference in the prevalence of depression obtained in Meta-analysis could be explained by geographic difference.(36,73)

Factors associated with anxiety symptoms among inpatient with heart failure

The NYHA 4, Single/Divorced/widow, Unemployed, DIB / Dyspnoea, Diabetes, HIV and chronic pain due to bone/joint pain were found to be independently associated with Anxiety symptoms.
The NYHA was shown to be significantly associated with anxiety symptoms in our study. This finding was in keeping with studies done in England and Jordan (58,74)

The anxiety symptoms in NYHA 4 present with increased functional disability resulting in reduced activity, social contact and reduce time to dwell on health conditions and increased feelings of helplessness and loneliness. Also the increase of NYHA classification was associated with decrease in quality of life.(75,76)

The lack of companion i.e. being single/divorced/widow was independently associated with anxiety. This was consistent with many studies that showed absence of partner carried a risk for anxiety. Also the lack of social support during and after treatment could explain the presence of anxiety in these patients (77,78).

Those who were unemployed were independently associated with anxiety symptoms. This was supported by study done by S.M Montgomery et al, which showed unemployment was independently associated with psychological symptoms.(79). Furthermore a study done on effects of unemployment on mental and physical health, showed after unemployment the symptoms of somatisation, low esteem, depression, and anxiety were significantly greater in the unemployed participants compared to employed.(80,81)

In a study done in China, anxiety symptoms seen in 55.4 % of unemployed participants(25), in Michigan (USA) 48% of unemployed participant were found to have anxiety symptoms, also it was found that unemployment was associated with financial difficulty which attributed to stress.(81–83)

Having difficulty in breathing /dyspnoea was independently associated with anxiety symptoms. The patient with difficulty in breathing or dyspnoea mainly presented with lack of sleep due to fear of dying, perception of weakness, being anxious and also this discomfort may provoke behaviour responses.(84–90)

In this study, the chronic illnesses (Diabetes, HIV, Kidney disease and chronic pain) were independent predictor of anxiety symptoms among patient with heart failure. The emotional effects of living with chronic illness, will cause fear of diagnosis or that it can't be fixed, fear of the physical pain I am in, that it could get worse before it gets better or that the pain cannot be taken away, fear of treatment (example surgery and tests can be painful,), fear of the diagnosis (will this be long-term, permanent, constant or will it even just cause you regular problems forever(28,91–93)

In this study, diabetes was independently associated with anxiety symptoms. 80.9% diabetic patient had anxiety symptoms. Also anxiety symptoms among diabetes was found to be 58% Qatar, 15.4% Netherlands, 19.9% UK, 9.2% Germany and 49.2% USA(39,94–102). This was supported by Smith, Beland, Clyde et al. that diabetes is associated with an increased likelihood of having anxiety disorders and elevated anxiety symptoms(39)

In this study 75.9% of HIV patient had anxiety symptoms, another study done in Italy on HIV-positive individuals using combination antiretroviral therapy (cART) showed high level of anxiety symptoms 47%(103). In France one study showed anxiety symptoms were associated with nonadherence to cART in men (OR = 1.5)(104). Also it was shown that anxiety symptoms among adults living with HIV and AIDS are common early psychiatric manifestation and they do contribute to negative impact on life functioning.(104)

In London study done among 161 HIV+ patient showed high anxiety symptoms and insomnia which were significant related to negative life events, employment, depression, and handedness(105).

Yates et al (2013) showed high prevalence of anxiety symptoms among HIV patient with mild cognitive impairment.

In Tanzania (Muheza) study done by Kaaya et al, showed that mixed anxiety was identified in 15.5% in outpatient HIV patient(106). The difference in prevalence could be due to the fact Muheza is a rural area while our study was done in urban centre; our study was limited to symptoms compared to kaaya studies which was looking into diagnosis.

Chronic pain was associated with anxiety symptoms and this was supported by study done in USA (2015-2017) arthritis 22.5% reported symptoms of anxiety, Chronic stress can increase pain sensitivity so much that one can experience persistent, and even intense pain, merely due to stress and not because of an injury or medical problem, presenting itself as episode of nervousness, anxiety, fear, and elevated stress, or fear for no apparent reason. also many chronic pain disorders are common in people with anxiety disorders, chronic pain can be both a cause and consequence of anxiety(107–112)

Factors associated with depressive symptoms among inpatient with heart failure

In this study BMI, being single/divorced/widow, diabetes and HIV were independently associated with depressive symptoms.

Those with BMI ≥25 kg/m^2 were independently associated with depressive symptoms, this was also supported by a study done in Netherlands which showed significant association between high BMI and depressive symptoms. In Korea, study done by de Wit L (2015), the depressive symptoms in the underweight and severely obese groups were highest.(113–115)

The high level of depressive symptoms could be explained by weight gain that is influenced by reduced physical activities and increased intake of calorie-dense food and negative body image which is the result of obesity could explain the high level of depressive symptoms were are seen(116–120)

In study done in China showed no relationships between obesity and depressive symptoms, this could be explained as Chinese perceive overweigh as fortune, as becoming fat during middle age is perceived as acquiring good fortune in traditional Chinese culture.(26,27)

Marital status was independently associated with depressive symptoms. In this study being single or divorced or widowed was strongly associated with depressive symptoms. This was supported by study done in USA by Tracey A. Lapierreet et al showed never married individuals demonstrated significant depressive symptoms than those who were married.(121)
These findings were also supported by study done in USA which showed that married or cohabitating persons had a later age of onset of first psychotic episode/symptoms or hospitalization than those who were single (age, 29.35 vs. 24.21)(122,123).

It was demonstrated by study done by Kim and McKenry(2002); Simon(2002), being divorced or widow are part of stressful life events that are associated with a significant increase in depressive symptoms.(124,125).

In Brazil, 77% of widow, 73% of single and 62 % of divorced had depressive symptoms(126). In Canada , study showed proportions of men with depressive symptoms were: 20.6% for never married; 19.2% for separated or divorced; 17.3% for widowed; 7.3% for married (satisfied)(123). In Mexico, study showed widowed or divorced had significant score on depression scale than men and married persons(127). In study done in USA, showed high level of distress and depressive symptoms among separated (single/divorced)(128)

In this study, 86.4% diabetic patient had depressive symptoms, this was supported by study done in USA by Pankilas et al showed diabetic patient had higher mean Beck Depression Inventory total, somatic subscale, and affective subscale scores than normal men and women and individuals with newly diagnosed diabetes.(129). Also similar study done in USA showed there was high level of depressive symptoms among diabetic patient compared to general population.(39,97,130,131).

World Health Survey (2002), involving 47 countries showed diabetes was associated with increased prevalence of an episode of depressive symptoms(132).

In another study done in Europe involving more than fifteen countries, having diabetes was associated with only a 3% relative increase in depressive symptoms (95% CI 1.00–1.05)(133). Also it was observed individuals with higher level of depressive symptoms had a 63% increased risk of developing diabetes compared with those with lowest depressive symptoms. (relative hazard [RH] 1.63, 95% CI 1.31–2.02).(134).

Also in study done USA, in Latino population with diabetes showed depressive symptoms was 89.9% and there was strong association between depressive symptoms and diabetes (135). These findings were similar with our study.

Ireland, 22.4% of Diabetic patients had depressive symptoms(131); Turkey found that 29.2% of patients with DM had depression symptoms(136). These two studies had lower proportion of depressive symptoms compared with our study; this could be attributed by different tool used in assessing depressive symptoms and different in ethnicity, different financial levels and back ground.

In study done in Brazil (2019), there was an association between depressive symptoms and diabetes mellitus, with higher severity of depressive symptoms were associated with the use of insulin and with coma, limb amputation, circulatory problems, infarction, diabetic foot, and kidney problems.(137)

In our study 83.3% HIV patient had depressive symptoms; similar findings in the study done China on people living with HIV/AIDS (PLHA) 85.6% had depressive symptoms.(138) this was consistent with study done in Tanzania by Antelman G et al (2007) showed more than half of the participants had depressive symptoms, also in Uganda study done by kaharuza et al (2006) showed elevated symptoms of depression, In south Africa prevalence of depression among was high (Rochat et al). (73,139–142)

In a study done in Cameroon, high prevalence of depressive symptoms among HIV positive patients was observed, 63% had depressive symptoms(143). These results were similar with our study.

In Tanzania, study done by Lwindiko et al in association between HIV status and depressive symptoms among children and adolescents in southern highlands showed prevalence of depressive symptoms to be 12.9%,(144). Similar study done in Ethiopia HIV-Positive Youth Attending ART Follow-Up in Addis Ababa 35.5% had depressive symptoms(145). These prevalences were low compared to our study due to age difference. In our study majority were age above 58yrs compared to youth and adolescent in these two studies.

In USA high prevalence of depressive symptoms was also seen in Injection Drug Users and Young Men Who Have Sex With Men(146)

50.6% of chronic pain patients had depressive symptoms. This was consistent with the recent study that showed 30% to 60% co-occurrence rate for pain and depression. In study done in Australia showed patient with chronic pain had depressive symptoms (51,147–152)

In Brazil, study on elderly, 30.6% had depressive symptoms. This high depressive symptom was also observed in this study.(153).

The World Health Organization (WHO) reported more than 30% of patients suffering pain met criteria for depressive symptoms.(154).In a study done in USA, patient with chronic musculoskeletal pain and depressive symptoms, 16.4% of the subjects with chronic pain had depressive symptoms compared with 5.7% among those with no chronic pain(155).

The relationship between insomnia and depression is far from simple, insomnia was typically seen as a symptom of depression in some studies, however recently study have shown insomnia and depression are two distinct but overlapping disorders. When depressed people suffer from insomnia, their risk of recurring depression is greater than that of patients who don’t have insomnia(156,157)

Sleeping studies have shown that patients with depression may experience any of the abnormal sleep patterns like increased time to sleep onset, reduction of total sleep time, increased sleep fragmentation with increases in wake time after sleep onset, decreased slow-wave sleep associated with shortened rapid eye movement (REM) sleep latency, and increased REM sleep time during the early part of the night in the most severely depressed patients. (158–163)

The relationship between insomnia and depression can be considered according to the timing of the appearance of each disorder's symptoms.(164)

The high levels of depressive symptoms in patient with chronic pain could be explained by pain disrupting sleep causing insomnia.(165–168).

4.1 Study strengths

To the best of my knowledge this is the first study to be done to address the prevalence of anxiety and depressive symptoms among inpatient with heart failure in Tanzania.

It also addresses the mental health of patients with Heart Failure which is often not emphasized in clinical practice. What is evident from this study is that a proportion of individuals with a diagnosis of HF are experiencing symptoms of anxiety and depression that may impair their health and well-being. If identified, these patients may benefit from clinical interventions (55,74,75)

Also the HSCL-25 had good sensitivity in picking the patient with anxiety and depressive symptoms.

4.2 Study limitations

This study design was a cross-sectional description and thus follow up over time of the patients who were found with depressive and anxiety symptoms was not possible. It would be of benefit for these patients to have follow-up of their anxiety and depressive symptoms to identify the progression and outcome. Secondly based on nature of the study design, it only provides information on significant associations between socio demographic factors and depressive symptoms among inpatients with heart failure. It cannot be used to conclude the causality of these events, which would require clinical trials and longitudinal studies.

CHAPTER FIVE

5.0 Conclusions

The depressive and anxiety symptoms are prevalent among patient with heart failure. The BMI, Marital status, Unemployed, DIB/Dyspnea, Diabetes, HIV and chronic pain due to bone/joint pain were independent factors associated with anxiety and depressive symptoms among patient with Heart failure admitted at Jakaya Kikwete Cardiac institute.

This study assessed depressive and anxiety symptoms and associated factors among in patient with heart failure. The study results provided a basic understanding of associated factors of depressive and anxiety symptoms in patient with Heart failure.

5.0 Recommendations

At JKCI patient with anxiety or depression or both are treated for their physical disease first, and then referred the patient for mental health care, or vice but we recommend for integrated Models of care where psychiatrists and psychologist to be involved.

We recommend future studies in the area of outcomes for heart failure patients with anxiety and depressive symptoms using longitudinal designs will be able to address the issues of exposure and outcome.

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Appendices

Appendix I – Questionnaire (English Version)

I. GENERAL INFORMATION

Name of Interviewer (optional): ..... Hospital File No: .....

Age: _____ Sex: M ☐ F ☐

Height: ____ m Weight: _____ kg → BMI: _____ kg/m^2

Previous Symptoms

☐ Abdominal distension ☐ DIB/Dyspnea ☐ Orthopnoea/PND ☐ Palpitations ☐ Lower limb swelling ☐ others symptoms

Vitals

SBP: ____mmHg DBP: ____mmHg PR: ___ b/min

NYHA CLASS ☐

1. What is your marital status?

a) Married b) Single c) Divorced/separated d) Widow e) Cohabiting

2. .Where do you reside? …….
   a) Urban b) Rural

3. . What is your highest level of education?

   a) No formal education b) Primary school c) Secondary school d) College/University.

4. What is your employment status?

   a) Employed b) Unemployed c) Self-employed

5. Have you ever been treated /are you currently on treatment for mental illness?

   a) Yes b) No

6. Is there a history of mental illness in your family members?

   a) Yes b) No

7. In relation to drug use, have you in the past twelve months used (put more than one response where applicable?)

   (i) Yes (ii) No

   a) Alcohol b) Cannabis c) Cigarette d) Opiates, e.g. Heroin
   e) Cocaine f) Khat g) Valium h) Solvents e.g. petrol, glue

8. Do you have/are you currently on treatment for chronic illness (put more than one response where applicable)

   (i) Yes

   a) Diabetes b) HIV / AIDS e) Chronic pain due to bone /joint disease f) kidney disease

   (ii) No

9. Current Drugs

☐ Ionotropes/Digoxin ☐ Statins ☐ Aldosterone antagonist. ☐ Diuretics
☐ Antiarrhythmics ☐ β- blockers ☐ Antiplatelets ☐ Anticoagulants
☐ ARB ☐ ACE inhibitors ☐ Vasodilators ☐ others_____

Symptoms of depression and anxiety
John Hopkins symptom checklist

The following are symptoms which might be bothering you in the past days, highlight Symptoms according to their severity.

1.Being suddenly scared for no apparent reason	Not at all=1	A little=2	Quite a bit=3	Extremely=4
2.Feeling fearful	Not at all=1	A little=2	Quite a bit=3	Extremely=4
3. Feeling fearful, faintness, dizziness, or weakness	Not at all=1	A little=2	Quite a bit=3	Extremely=4
4. Nervousness or shakiness inside	Not at all=1	A little=2	Quite a bit=3	Extremely=4
5. Heart pounding or racing	Not at all=1	A little=2	Quite a bit=3	Extremely=4
6. Trembling	Not at all=1	A little=2	Quite a bit=3	Extremely=4
7. Feeling tense or keyed up	Not at all=1	A little=2	Quite a bit=3	Extremely=4
8. Headaches	Not at all=1	A little=2	Quite a bit=3	Extremely=4
9. Spells of terror or panic	Not at all=1	A little=2	Quite a bit=3	Extremely=4
10. Feeling restless, not being able to sit still	Not at all=1	A little=2	Quite a bit=3	Extremely=4
11. Feeling low in energy, slowed down	Not at all=1	A little=2	Quite a bit=3	Extremely=4
12. Blaming oneself for things	Not at all=1	A little=2	Quite a bit=3	Extremely=4

13. Crying easily	Not at all=1	A little=2	Quite a bit=3	Extremely=4
14. Loss of sexual interest or staying asleep	Not at all=1	A little=2	Quite a bit=3	Extremely=4
15. Poor appetite	Not at all=1	A little=2	Quite a bit=3	Extremely=4
16. Difficulty falling asleep or staying asleep	Not at all=1	A little=2	Quite a bit=3	Extremely=4
17. Feeling hopeless about the future	Not at all=1	A little=2	Quite a bit=3	Extremely=4
18. Feeling blue	Not at all=1	A little=2	Quite a bit=3	Extremely=4
19. Feeling lonely	Not at all=1	A little=2	Quite a bit=3	Extremely=4
20. Thoughts of ending one's life	Not at all=1	A little=2	Quite a bit=3	Extremely=4
21. Feeling trapped or caught	Not at all=1	A little=2	Quite a bit=3	Extremely=4
22. Worrying too much about things	Not at all=1	A little=2	Quite a bit=3	Extremely=4
23. Feeling no interest on things	Not at all=1	A little=2	Quite a bit=3	Extremely=4
24. Feeling everything is an effort	Not at all=1	A little=2	Quite a bit=3	Extremely=4
25. Feelings of worthlessness	Not at all=1	A little=2	Quite a bit=3	Extremely=4

Appendix II- Questionnaire- Kiswahili Version

Dodoso la utafiti

Tafadhali jaza / tiki jibu ambalo unaona ni sahihi kwako.

I. MAELEZO YA AWALI
Jina la msahili: .....Namba ya kadi ya hospitali…….

II. MAELEZO BINAFSI

Umri: _____ Sex: M ☐ F ☐
Urefu: ____ m Uzito: _____ kg → BMI: _____ kg/m^2

Symptoms
☐ Tumbo kuuma ☐ Kupumua kwa shida ☐ kizunguzungu ☐ mapigo ya moyo kwenda kwa kasi ☐ Miguu kuvimba ☐ dalili nyingine

Vitals
SBP: ____mmHg DBP: ____mmHg PR: ___ b/min

UGONJWA/UTAMBUZI ☐ NYHA DARAJA ☐

1. Nini hali yako ya ndoa
a) Nimeoa / Nimeolewa b) Sijaoa / Sijaolewa c) Tumehachana / Tumetengana d) Mjane e) Naishi na mwanamke / bwana

2. Wewe una ishi wapi? …….
   a) Mjini b) kijijini

3. . Je una kiwango gani cha elimu?
a) Sijasoma b) Elimu ya msingi c) Elimu ya sekondari d) Elimu ya chuo/chuo kikuu

4. Ningependa unieleze hali ya ajira yako
a) Nimeajiriwa b) Sina ajira c) Nimejiajiri mwenyewe

5. . Je umewahi kutibiwa au hivi sasa upo kwenye tiba ya magonjwa ya akili?
a) Ndiyo b) Hapana

6. Je katika familia unayotoka, kuna mtu amewahi kuugua au yupo kwenye tiba ya Magonjwa ya akili?
a) Ndiyo b) Hapana

7. Kuhusu matumizi ya vilevi, Je miezi kumi na mbili iliyopita umetumia vile vifuatavyo? (weka jibu zaidi ya moja inapohitajika)

a) Pombe b) Bangi c) Sigara/tumbaku d) opiodi (heroini) e) kokeni f) Mirungi g) Valiumu h) Vinuswa, kama petroli, gundi
i) Hapana

8. Je, hivi sasa una ugonjwa sugu au upo kwenye tiba ya magonjwa sugu kama (weka jibu zaidi ya moja inapo hitajika)

a) Kisukari b) VVU c) Shinikizo la damu na moyo d) Maumivu ya mifupa na nyonga e) Ini

g) Hapana

9. Current Drugs

☐ Ionotropes/Digoxin ☐ Statins ☐ Aldosterone antagonist.
☐ Antiarrhythmics ☐ β- blockers ☐ Antiplatelets ☐ Anticoagulants
☐ ARB ☐ ACE inhibitors ☐ Vasodilators ☐ nyinginezo_____

John Hopkins symptom checklist-25:

(Swahili version for Anxiety and Depression Scale)

MAELEKEZO: Orodha iliyo hapa chini, ina dalili ambazo watu wanaweza kuwa nazo wakati mwingine. Tafadhali sikiliza kwa umakini dalili zilizopo, na uamue ni zipi kati ya dalili zilizotajwa zimekusumbua, au kukufadhaisha, katika wiki iliyopita hadi leo

Anxiety Sub-Scale

1) Kushituka ghafla bila sababu maalum	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
2) Kuwa na uwoga	1=Hamna hatakidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
3) Kujisikia kutaka kuzirai, kizunguzungu au kukosanguvu	1=Hamna hatakidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
4) Kujisikia kuwa na wasiwasi	1=Hamna hata kidogo	2=Kidogo	3=Ipokiasi	4=Iposana
5) Moyo kwenda kasi au kudunda sana kuliko kawaida.	1=Hamna hata kidogo	2=Kidogo	3=Ipokiasi	4=Iposana
6) Kutetemeka.	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
7) Kujihisi kuwa na msongo wa mawazo	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
8) Kuumwa kichwa	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
9) Kuwa na vipindi vya hofu au mshituko mkubwa	1=Hamna hata kidogo	2=Kidogo	3=Ipokiasi	4=Ipo sana
10) Kujisikia hali ya kuhangaika hadi huwezi kukaa mahali umetulia.	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana

Depression sub scale

1) Kujisikia kukosa nguvu, na kujiona unafanya shughuli pole pole	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
2) Kujilaumu kwa matukio yanayotokea yanayokuhusu wewe na wengine wanaokuhusu.	1=Hamna hata kidogo	2=Kidogo	3=Ipokiasi	4=Ipo sana
3) Kulia kirahisi.	1=Hamna hata kidogo	2=Kidogo	3=Ipokiasi	4=Iposana
4) Kutokua na hamu ya kukutana kimwili (Kujamiana)au kupendezwa na shughuli zinazohusiana	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Iposana
5) Kukosa hamu ya kula chakula.	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
6) Wakati unapolala, unashindwa kupata usingizi, au kulala moja kwa moja hadi asubuhi.	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
7) Kujisikia kuwa umekata tamaa katika siku za usoni	1=Hamna hata kidogo	2=Kidogo	3=Ipokiasi	4=Ipo sana
8) Kujisikia kukosa raha	1=Hamna hata kidogo	2=Kidogo	3=Ipokiasi	4=Ipo sana
9) Kujisikia mpweke.	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
10) Kuwa na mawazo ya kutaka ujiua.	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
11)Kujisikia hauna uwezekano wakujitoa katika matatizo uliyonayo	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
12)kuwana hali ya wasiwasi kupita kiasi	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
13)kujisikia kutokuwa na hamu ya kitu chochote(vitu ambavyo ni muhimu kwako	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
14)Kujisikia hali ya kujilazimisha ili kuweza kufanya kitu chochote	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana
15)Kujisikia huna umuhimu/Maana	1=Hamna hata kidogo	2=Kidogo	3=Ipo kiasi	4=Ipo sana

Appendix 2: informed consent
Muhimbili University of Health and Allied Sciences

Consent to participate on study "prevalence of anxiety and depression symptoms among inpatient with heart failure at JKCI Dar-es-salaam. I hereby request your participation"

Dear Sir/Madam,

Dr. Jude Nicholaus Tarimo; I am pursuing a master's degree in Internal Medicine at the Muhimbili University of Health and Allied Sciences (MUHAS). I am carrying out a study on prevalence of anxiety and depression symptoms among inpatient with heart failure at JKCI Dar-es-salaam. I hereby request your participation.

Purpose of the study:

The aim of this study is to explore prevalence of anxiety and depression symptoms among inpatient with heart failure at JKCI Dar-es-salaam. I hereby request your participation.

How to participate:

Participants who are willing to participate in this study will have to sign a consent form.

Short interview will be done and no invasive procedures such as drawing blood will be involved.

Confidentiality:

Information obtained from you will be kept confidential and shall be very helpful in this study as well as promoting better health of patient with anxiety and depression

Costs:

You will not be required to pay any amount for your participation in this study.

Voluntary participation and the right to withdraw from the study:

Your participation is voluntary and you have the right to withdraw from participating in this study at any time. Whatever your decision may be, it will have no effect in any way to your rights to care and treatment

Risks:

There is no risk for participating in this study.

Benefits:

There will be no direct benefits to you. However, the overall study will be of benefit to provide information that can be used to develop interventions aimed at early recognition comprehensive care for persons with depression and anxiety.

Contact persons:

If you have any inquiries about this study, please do not hesitate to contact:

Dr. Jude N. Tarimo
Principal Investigator
Muhimbili University of Health and Allied Sciences (MUHAS)
Department of Internal Medicine
P.O. Box 65001 Dar es Salaam.
Tel. 0715221215

OR

DR REUBEN MUTAGAYWA
Supervisor for this research.
Muhimbili University of Health and Allied Sciences (MUHAS)
Department of Internal Medicine
P.O. Box 65001 Dar es Salaam.

OR

DR. ESTER STEVEN
Co-Supervisor for this research.
Muhimbili University of Health and Allied Sciences (MUHAS)
P.O. Box 65001 Dar es Salaam.
Department of Psychiatric and Mental health

In case of any information about your rights as a participant in this study please contact:

The Chairperson of Research and Publication Committee

Muhimbili University of Health and Allied Sciences (MUHAS)

P.O. Box 65001 Dar es Salaam

Tel. 022-2152489

I will be grateful if you willingly agree to participate in this study.

I have understood the above information and my questions have been answered by the investigator to my satisfaction. I am willingly to take part in this research.

Name of the participant: _____

Signature of the participant: _____ Date: _____

Signature of Investigator: _____ Date: _____

Appendix 3: Fomu ya ridhaa kushiriki kwenye utafiti

Ridhaa ya kushiriki katika utafiti kuhusu kiwango na vitu vinavyoathiri uwepo wasonona na wasiwasi/mashaka katika wagonjwa matatizo ya moyo katika cliniki JKCI, Dar es salaam

Kwa Bibi/Bwana,

Jina langu Dr. Jude Nicholaus Tarimo, nafanya utafiti kuhusu kiwango na vitu vinavyoathiri uwepo wasonona na wasiwasi/mashaka katika wagonjwa matatizo ya moyo katika cliniki JKCI, Dar es salaam

Naomba ushiriki wako katika utafiti huu.

Lengo la utafiti huu ni kuangalia kiwango na vitu vinavyoathiri uwepo wasonona na wasiwasi/mashaka katika wagonjwa matatizo ya moyo katika cliniki JKCI, Dar es salaam

Jinsi ya kushiriki katika utafiti huu:
Unaweza kushiriki katika utafiti kwa kujaza kwa hiyari yako fomu ya kuridhia kushiriki.
Utafiti huu utakuwa na mahojiano kwa kutumia dodoso na hautausisha utowaji wowote wa damu au vipimo.

Utunzaji wa siri:
Taarifa zote zitakazochukuliwa katika utafiti huu zitakuwa ni siri na zitatunzwa kwa usiri na zitatumika katika utafiti huu ili ziweze kusaidia katika kuboresha huduma kwa wagonjwa wenye sonona na wasiwasi/mashaka.

Gharama za ushiriki:

Ushiriki katika utafiti huu ni bure yaani hakuna gharama yeyote kwa mshiriki.
Hiyari ya kushiriki na kujitoa katika utafiti huu.
Ushiriki katika utafiti huu ni wa hiyari na pia ni haki yako kujitoa katika utafiti huu muda wowote unapohisi kufanya hivyo. Maamuzi yako ya kuamua kutoshiriki au kujitoa katika utafiti huu hayataathiri haki yako ya kupata huduma na matibabu.

Madhara ya kushiriki utafiti:

Hakuna madhara yeyote yatakayompata mshiriki wa utafiti huu

Manufaa ya kushiriki utafiti huu:

Ushiriki wako katika utafiti huu utakuwa na faida kwako kwa kuweza kujua kama una ugonjwa wa ugonjwa wa sonona au wasiwasi. Pia, matokeo ya tafiti hii yata saidia wagonjwa wengine kupata matibabu na uchunguzi

Mawasiliano kwa wahusika:
Kwa maswali au maoni kuhusiana na utafiti huu tafadhali wasiliana na wafuatao:

Dr. Jude N. Tarimo
Mtafiti mkuu
Muhimbili University of Health and Allied Sciences (MUHAS)
Department of Internal Medicine
P.O. Box 65001 Dar es Salaam
Tel.0715221215

AU

DR REUBEN MUTAGAYWA
Msimamizi mkuu wa utafiti huu.
Muhimbili University of Health and Allied Sciences (MUHAS)
Department of Internal Medicine
P.O. Box 65001 Dar es Salaam.
Tanzania.

AU

Dr. Ester Steven
Msimamizi msaidizi wa utafiti huu.
Muhimbili University of Health and Allied Sciences (MUHAS)
Department of Psychiatric and Mental healthy
P.O. Box 65001 Dar es Salaam.
Tanzania.

Kwa mawasiliano zaidi kuhusiana na haki zako kwenye utafiti huu kama mshiriki, tafadhali wasiliana na :

Mwenyekiti wa tume ya tafiti na uchapishaji wa tafiti.
Muhimbili University of Health and Allied Sciences (MUHAS)
P.O. Box 65001 Dar es Salaam
Tel. 022-2152489

Nitashukuru sana kama kwa hiyari yako utaamua kushiriki katika utafiti huu.
Nimeelewa taarifa zote nilizoelezwa na mtafiti hapo juu na pia amenijibu na kunielewesha zaidi maswali niliyomuuliza. Na kwa hiyari yangu nimeridhia kushiriki katika utafiti huu.
Jina la mshiriki: _____
Sahihi au alama ya dole gumba ya mshiriki: _____ Tarehe: _____
Sahihi ya mtafiti: _____ Tarehe: _____