PREVALENCE OF DEPRESSION AMONG CARDIAC PATIENTS AT KENYATTA NATIONAL HOSPITAL

NAIROBI

A DISSERTATION SUBMITTED TO THE UNIVERSITY OF NAIROBI IN PART FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTERS OF MEDICINE IN PSYCHIATRY.
UNIVERSITY OF NA[1ROB]J

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JULY, 201[2]

DECLARATION

I, Dr. Edgar N. Munga hereby declare that this dissertation is my original work and that I have not presented the same to any other university for the award of a degree.

Signed. _____

Date. _____

APPROVAL

This dissertation is submitted for evaluation with our approval as University Supervisors

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ACKNOWLEDGEMENT

I acknowledge the invaluable advice and support given to me by my supervisors, Dr. Kuria and Dr. Mathai who patiently went through countless copies of my work in the development of this study and my wife Faith and children, Calvin and Jeremy for always being there for me.

A.

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A*

List of abbreviations

RDI Beck Depression Inventory

^ ^ Coronary Artery Disease

CA.BG Coronary Artery By-pass Graft

CES„D Centre for Epidemiologic Studies Depression scale

CHD Coronary Heart Disease

Cardiovascular Disease

DIS Diagnostic Interview Schedule

DSM ,v Diagnostic and Statistic Manual IV

ECG Electro Cardipgram

HTN/HHD Hypertension/Hypertensive Heart Disease

KNH Kenyatta National Hbspital

KNBS Kenya National Bureau of Statistics

MD Major Depression

MI Myocardial Infarction

MDD Major Depressive Disorder

PHQ Patient Health Questionnaire

SADS Schedule for Affective Disorders and Schizophrenia

SD Standard deviation

SDs Self Rating Depression Scale

SPSS Statistical Package for Social Sciences

WH0 Health Organization

YLD f Years Lost due to Disability

Depression is a common condition in patients with cardiovascular disease and is associated with increased cardiovascular morbidity and mortality leading to poor health related quality of life. Studies done globally have shown that early diagnosis and intervention of depression in cardiac disease reduces mortality from cardiac disease. In Kenya however, data pertaining to the relationship between depression and cardiac disease is limited.

Aim: To determine the prevalence of depression among cardiac patients (in and out-patients) at KNH, Nairobi

Study Design: A cross sectional descriptive study using cardiac patients at Kenyatta National Hospital.

Setting: The study was conducted in KNH cardiac clinic and the medical and surgical wards.

Methods: The study comprised 207 cardiac patients who were either attending the cardiac outpatient clinic or admitted to the medical or surgical wards and who met the inclusion criteria. They were interviewed using a researcher designed socio demographic questionnaire and the Beck Depression Inventory II. Descriptive and inferential analysis was done using the Statistical Package for Social Sciences (SPSS) version 20 and the results presented in narratives, tables and charts.

Results: The study enrolled 207 participants who were outpatient, 67.6% or inpatient 32.4% cardiac patients at KNH. Of the study population, 47.8% were male and 50.7% were female. The median age was 41 years. Most (72.9%) of the 207 participants were married. Majority of the participants, 43% (n=89) had attained a secondary education. In terms of occupation, 39.1% (n=81) were unemployed. Of the participants involved in income generating activities, 39.4% (n=43) had an income of between Ksh 10,000-39,999. 64.3% of the participants were Protestants, 32.9% were Catholic and three participants were Muslims. The most prevalent cardiovascular condition seen was hypertension/hypertensive heart disease. The prevalence of depression in the study was 24.7% and was seen mostly in the inpatients as compared to the outpatients ($p=0.001$). The type of cardiac condition was also significant in the prevalence of depression ($p<0.001$). Age, gender, marital status and socio economic status were not found to be significant factors in the development of depression in cardiac disease.

CONCLUSIONS

As evidenced by this study, the prevalence of depression is higher among patients with cardiac disease as compared to the general population.

Age, marital status and the socio economic status of the participants did not seem to have an impact on the presence or absence of depression in them.

In- patients with cardiac disease had a higher prevalence of depression as compared to the out-patients

RECOMMENDATIONS

Patients with cardiac disease need to be routinely screened for depression as studies have shown that they are more susceptible to have depression compared to the general public and also that depression has been shown to increase the rates of mortality in cardiac patients.

Further studies examining the role of somatic symptoms in cardiac disease and depression and the impact of duration a patient has had cardiac disease to the probability of getting depression need to be conducted.

1. INTRODUCTION

Cardiovascular disease has been increasing in importance as one of the leading causes of morbidity and mortality worldwide. It is estimated that in 1990, 14 million people died of cardiovascular disease and this was projected to rise to about 25 million people by 2020.[3]

According to a WHO report, cardiovascular disease was the leading cause of death globally by all ages in 2004, with ischaemic heart disease leading followed closely by cerebrovascular disease.[24] In still another report WHO reported that 80% of chronic disease deaths occur in low and middle income countries and that cardiovascular disease alone will kill five times as many people as HIV/AIDS in these countries.[20]

In a local study to evaluate the emerging problem of coronary heart disease in Kenya, Jablonski-Cohen et al. (2003) reviewed literature on coronary h^art disease and its electrocardiogram (ECG) manifestations in Eastern Africa, the researchers concluded that CHD and its risk factors were increasing in prevalence and that recognition of CHD anjd its ECG manifestation was one way of decreasing cardiac morbidity and mortality.[1]^

Still on the effect of cardiac disease in the developing world, a study published in 2004 showed that the rates of CVD have risen greatly in low and middle income countries with these countries shouldering about 80% of the burden.-[10]

Cardiovascular diseases account for 7 to 10% of all medical admissions to African hospitals and heart failure contributes to 3-7% of the admissions.[30]

The issue of cardiovascular disease is further compounded by the fact that it has been noted to occur in concurrence with depression. Keller et al. (1992) noted that at any one time 6% of the population met the criteria for MDD or dysthymia.[5] Depression is predictive of developing cardiac disease and also predictive of adverse events in cardiac patients.[11,9]

Depression has been noted to increase health care costs^[1] and also to have dramatic consequences for the quality of life of the patients and their families.[32,33]

Rosengen et al. in a study to determine the association of psychosocial risk factors to [m]Vocardial infarction studied 11,119 patients with a first episode Ml and 13,648 controls. The researchers found out that-people with Ml reported higher prevalence of stress factors (these deluded, stress at work and at home, financial stress and major life events in the past year), [th]ey concluded that psychosocial stressors are associated with increased risk of acute Ml.[7]

For long, depression has been thought of just as a concern for Psychiatrists but due to its prevalence, effects on the patients' families and its potential for interfering and even decreasing other treatments for cardiac patients, it takes more significance than merely being a psychiatric issue/[4]

Diagnosis of depression in medically ill patients is usually a challenge and cardiac patients are no exception, [35] it has also been noted that cardiac patients' reports of depressive symptoms are usually less direct and less typical.[36]

1.1 BACKGROUND

Psychiatric conditions have been documented to occur in the medically ill,[37] Ndetei and Muhangi (1979) in a study of 140 patients at a suburban clinic found a prevalence of 20% for psychiatric conditions with the most prevalent conditions being anxiety and depressive states.[38]

Dhadphale et al. (1983) found a prevalence of psychiatric morbidity of 29% among 388 patients sampled in a general hospital outpatient in a rural ancja semi urban area of Kenya. The psychiatric conditions with the most diagnosis were anxiety and depression.[3""]

In a study on the psychiatric morbidity among gynaecology patients at KNH, Nato (1992) found a point prevalence of psychiatric morbidity of 19.5% with depressive disorders leading with 6%.[40]An almost similar study on diabetic patients found a prevalence of 6.2%.[41]

The intimate relationship of depression and cardiac disease has been known for a long time, Malzberg (1937) studied a group of patients with "involution melachonlia" and discovered that the mortality rates in the group was 6 times higher in males and 6.8 times higher in females compared to the general population and that cardiac disease was responsible for 40% of the deaths, a figure which was 8 times the figure for the general population.[28]

Depression in cardiac patients is rarely diagnosed by general practitioners or cardiologists.[8]despite the fact that early diagnosis and management of the depression could be beneficial as depression has been noted to adversely affect compliance with medical therapy.'' It has been postulated that by the year 2020 depression will be the second leading cause of death in the developed world.[1]

A !994 report by the WHO showed that unipolar depressive disorders were the leading causes °f Years Lost due to Disability (YLD) in both sexes thereby impacting negatively on the economy.[24]

Cardiovascular disease is abroad term describing a disease that affects the heart or blood ess els. Some of the common cardiovascular conditions seen locally include; arteriosclerosis, c°ronary artery disease, valvular heart disease, arrhythmias, arterial (systemic) hypertension,

endocarditis, congenital heart disease and heart failure. Common symptoms of cardiovascular disease include chest pain or discomfort, dyspnoea, palpitations, dizziness, syncope and weakness/ fatigue.

The WHO describes depression as a common mental disorder that presents with a depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, loss of energy and poor concentration.[2]

Major depression according to the DSM- IV TR[42]is diagnosed after at least five of the following symptoms are present in a two week period (including either depressed mood or anhedonia).

1) Depressed mood

II) Loss of pleasure or interest(anhedonia)

III) Insomnia or hypersomnia

IV) Agitation or retardation < » ..

V) fatigue, loss of energy

VI) Increased sense of worthlessness or guilt

VII) Decreased concentration

VIII) Recurrent morbid.thoughts or suicidal ideation

The symptoms should not be due to substance abuse, medical illness or bereavement and should cause significant distress or impairment of functioning. The symptoms should also not be due to medication and shouldn't be better accounted for by bereavement.

1.2 LITERATURE REVIEW

Studies conducted globally indicate an association between depression and cardiac disease while in the general population at any one time the prevalence of major depression is around 5%.[48,49]

Carney et al. (1988) studied a group of 52 patients who were diagnosed with coronary artery disease, the group was given structured psychiatric interviews and 9 participants (17%) met the criteria for Major Depressive Disorder (MDD).[11] In an almost similar study Schleifer et al. (1988) using the Schedule for Affective Disorders and Schizophrenia (SADS) studied 283 patients admitted to two cardiac care units. The patients were interviewed 8 to 10 days after Ml and 171 were re interviewed 3 to 4 months later. Initially 45% met the criteria for major and minor depression (MDD was 18%) and after the 4 months 33% met the criteria for major and minor depression.[14]

In a study to determine whether a diagnosis of major depression following an episode of Ml has an impact on cardiac mortality after discharge, Frasure^Smith et al. (1993) studied a group of 222 cardiac in-patients , the patients were initially interviewed between the 5th and 15th day following Ml and were followed up for 6 months. The prevalence of depression was approximately 16% and by the end of the 6 months 12 patients had died and depression was noted to be a significant predictor of mortality.[9]

A study investigating whether clinical depression is linked to mortality in patients with dilated cardiomyopathy found a prevalence of depression of 21% in a study population of 396 patients. After a follow up period of 48 months 83 patients (21%) had died, 15 patients (4%) had undergone cardiac transplantation and 130 (33%) were readmitted. 29 (35%) of the deaths and 40 (31%) of the readmissions were in the clinically depressed group. The researchers concluded that depressed patients had significantly higher mortality and readmission rates than the non-depressed.[46]

Havranek et al in a study of 45 patients with CHF and 31 controls and using the Centre for Epidemiologic Studies Depression Scale (CES-D tool) found a prevalence of depression of 24.4% [In] the subjects compared to 9.7% in the controls and concluded that there exists an association between CHF and depression.[47] *

Gonzalez et al in a study involving 99 patients admitted with coronary artery disease and using the Diagnostic Interview Schedule (DIS) version III found a prevalence of depression of 23%.[15]

Locally, j$_{n\ a}$ study of 2770 male and female patients (both in and out patients) in different level [gen]eral medical facilities, Ndetei et al (2009)found a prevalence of psychiatric morbidity of

42%in medically ill patients and using the BDI, a prevalence of depression of 16% in patients with cardiovascular disease.[45]

Njenga et al studied 25 patients undergoing coronary angiography, 18 patients had abnormal angiograms while seven had normal angiograms. Among the ones with an abnormal angiogram the highest score on the BDI was 9 while the average score was 2.11, in the normal angiogram group, the highest score on the BDI was 5 and the average was 1.71. The difference among the two groups was not statistically significant and the researchers attributed this to a number of reasons including the small sample size.[4]

Lodenyo et al. (1997) did a prospective study to determine the prevalence and profile of cardiovascular disease among elderly patients admitted into the Medical wards at KNH. The researchers found a prevalence of 39.5% among the patients evaluated.

Barefoot et al. (1996) followed up 1,250 patients with established coronary artery disease and who had been assessed for depression using the Zung Self Rating Depression scale for an average of 19.4 years. Patients with moderate to severe depression had 69% greater odds of cardiac death and 78% greater odds of mortality from all causes than non-depressed patients.[19]

In yet another study Wulsin and Singal (2003) found that depression conferred a relative risk of 1.64 of developing coronary disease in comparison to a risk of 1.25 for passive smokers and 2.5 for active smokers. The researchers concluded that depressive symptoms contribute a significant independent risk for onset of coronary disease.^

In a prospective study on 309 patients hospitalized after Coronary Artery Bypass Graft (CABG) surgery, Connerney et al. (2010) assessed the patients for depression using Diagnostic Interview Schedule and BDI. 63 patients (20%) had MDD according to DSM IV and 87 patients (28%) had BDI scores of >10. Mortality data was obtained from the National Health Statistics, overall mortality was 37.9% (117 of 309) with 20% (62 of 309) being cardiac causes. The researchers concluded that depression was significantly associated with elevated cardiac mortality 10 years after CABG surgery.[17]

Carney et al. (2008) in a study to gauge the effects of an initial episode of MD as compared to recurrent MD on survival after an acute myocardial infarction, compared 370 patients with an initial episode of MD, 550 with recurrent MD and 408 who were free of depression. Results *rorri the study showed that patients with a first episode of MD had a poorer survival (18.4% of a" cause mortality) compared to recurrent MD (11.8%) and the non-depressed (3.4%).[18]

E8ede{2007) in a study to cf£termine major depression in individuals with chronic medical borders analyzed data from the National Health Interview Survey in USA and found a Prevalence rate of 9.3% for depression in coronary artery disease.[27]

In a meta- analysis of references derived from MEDLINE, EMBASE and PSYCINFO (1975-2003) van Melle et al. found a prevalence of depression following myocardial infarction of 20% and a 2-2.5 fold increase in risk for all cause mortality, cardiovascular mortality and cardiovascular events.[29]

Whooley et al. (2008) followed up 1017 outpatients with stable coronary heart disease. One hundred and ninety nine participants (19.6%) had depressive symptoms (PHQ >10). During the follow up 341 cardiovascular events occurred and the rate was 10% for those with depressive symptoms and 6.7% for those without.[25]

In another study investigating the association between MDD and mortality from ischaemic heart disease, Surtees et al. (2008) studied a group of 8,261 men and 11,388 women who were free of manifestations of heart disease. Using the Health and Life Experiences Questionnaire which included a self structured self assessment approach to psychiatric symptomatology, the researchers diagnosed a current MDD episode in 197 men (2.4%) and 389 women (3.4%). During follow up there were 274 deaths from ischaemi^ heart disease. The researchers reported a 2.7 times more likelihood of mortality for participants who reported a major depression within the 12 months prior to the baseline assessment.[22]

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May et al. (2009) in an effort to evaluate the influence of a post coronary artery disease depression diagnosis on heart failure studied 13,708 patients with no diagnosis of heart failure or depression. The patients were then followed up until a diagnosis of heart failure or death. From the number sampled, 1,377 patients representing 10% of the total had a post coronary artery disease diagnosis of depression. The incidence of heart failure among those without a post coronary artery disease diagnosis of depression was 3.6%, while the figure was 16.4% for those with a diagnosis of post coronary artery disease depression.[21]

2. RATIONALE

For a while now it has been known that depression compounds cardiovascular disease by increasing both morbidity and mortality associated with cardiac disease. Pratt et al. (1996) in a prospective study from the Baltimore Epidemiologic Catchment Area to determine whether MDD increases the risk of incident Ml found that people with major depression had a risk of Ml four times higher than normal and that people with two weeks of sadness or dysphoria had a risk two times higher.[6]

Kenya, like most other developing countries, has seen a surge in the population being affected by diseases of lifestyle and affluence such as stroke and CHD.[43] Literature of studies done in Kenyan Hospitals has shown that there is an increase in both CHD and CHD risk factors[43] and that conditions like hypertensive heart disease contribute massively to the development of congestive heart failure.[44]

One of the main challenges of psychiatric co-morbidity with general medical conditions is adherence (compliance) to treatment to both the mecfi.cal and the psychiatric condition.[34] It is with this in mind that diagnosis and treatment of depression in cardiovascular should be encouraged. Ndetei et al (2009) in a study to ascertain the prevalence of mental disorders in adults in general medical facilities in Kenya, found a high prevalence of psychiatric co-morbidity (the bulk of which was depression) which to a larg£ extent was not diagnosed and therefore not treated.[45]

Several studies have been done globally on the prevalence of depression in cardiac disease, unfortunately local data on the same is not substantial. The only local study which this researcher came across was the one by Njenga et al,[4] though the study had several shortcomings and the results showed no relation of depression to cardiac disease.

This study will be beneficial in that it will provide some much needed local data which will assist in coming up with guidelines on how to manage patients with co morbid depression and CVD as it has been noted that depression in CVD markedly increase the risk of morbidity and mortality and also affects compliance to treatment. This researcher intends to incorporate all patients with cardiac disease who will meet the inclusion criteria as opposed to a specific cardiac condition. The reason being most of the studies conducted globally have focused on only a few cardiac conditions most commonly coronary artery disease and dilated cardiomyopathy, it is therefore unclear if the rest of the cardiac conditions will have a similar effect to the above in •"elation to depression. One of the aims of this study will therefore be to determine the distribution of depression afTiong the various cardiac diseases.

3. RESEARCH SCOPE

3.1 Research questions

1. What is the prevalence of depression among cardiac patients at KNH?

2. What is the pattern of distribution of depression among the various cardiovascular diseases?

3. How does the severity of depression differ among cardiac in and out patients?

4. What are the socio demographic characteristics of cardiac patients with a diagnosis of depression?

3.2 Aim

To establish the prevalence of depression among cardiac patients at KNH.

3.3 Specific objectives

1. To determine the prevalence of depression among cardiac patients at KNH.
2. To determine the pattern of distribution of depression among the various cardiovascular diseases.
3. To determine the difference in severity of depression among cardiac in and out patients.
4. To determine the socio demographic characteristics of cardiac patients who also have a diagnosis of depression.

HYPOTHESIS

NULL: The prevalence of depression among cardiac patients at KNH is not higher than that in the general population.

ALTERNATIVE: The prevalence of depression among cardiac patients at KNH is higher than in the general population.

4. METHODOLOGY

4.1 Study design: The study was a cross-sectional descriptive study

4.2 Study area:

The study was conducted at Kenyatta National Hospital, Kenya's largest Teaching and Referral hospital. The facility was established in 1901 with an initial bed capacity of 40, the land on which the hospital lies is approximately 45.7 hectares and within the KNH complex are situated the University of Nairobi School of Medicine, The Kenya Medical Training College, Kenya Medical Research Institute and the National Laboratory Service.

KNH has 50 wards, 22 out- patient clinics, 24 theatres (16 specialized) and accident and Emergency department.

The hospital has 8 adult medical wards situated on the ie\/enth and eighth floors and one cardiothoracic surgical ward situated on the fourth floor. On average the medical wards host around 400 patients in total and at any one time about 48 of those are patients with cardiovascular diseases.

Out of the total bed capacity of 1800, 209 beds are for the private wing. At any given day, the Hospital hosts in its wards between 2,500 and 3,000 patients. On average the Hospital caters for over 80,000 inpatients and over 500,000 out patients annually.

The cardiac clinic, which is housed in clinic 17, is conducted on Tuesdays from 8 am to 1 pm. On average the clinic attends to around 90 patients per day (both new and old cases). The clinic is usually staffed by about 3-4 consultants and about 6 Post graduate Internal Medicine students.

4.3 Study population

Cardiac in-patients admitted to the medical and the cardiothoracic wards, and cardiac out-patients attending the cardiovascular outpatient clinic at KNH.

4.4 Inclusion Criteria

- Those above 18yrs of age
- Those who will give informed consent to participate in the study
- Those with a diagnosis of cardiac disease
- Those admitted to either the medical or the cardiothoracic wards and those attending the cardiac out-patient clinic.

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4.5 Exclusion criteria

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- Those below 18 years of age
- Those who will not give informed consent to participate in the study.
- Those who will be too sick to complete the questionnaire

4.6 SAMPLE SIZE

The sample size was calculated using the formula: Naing L, et al.[23]

$$N\text{-}Z^2pq$$

- $$d^2$$

Where n is the sample size

^{2} is the standard normal deviation usually set at 1.96 which corresponds to 95% confidence interval.

P is the best prevalence estimator at 16%.[45]

Q is 1-p

D is the degree of precision set at 0.05(5%)

Therefore substituting the values as follows;

$N = \frac{1.96 \times 1.96 \times 0.16 \times 0.84}{(0.05)^2}$

=207

4.7 SAMPLING METHOD

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Participants for the study were obtained from the study population who met the inclusion criteria. With an estimate of 90 patients per clinic da'y, the researcher interviewed around 12 patients per clinic day using systematic random sampling where every 3"[1] patient who qualified for the study was interviewed. All the cardiac patients in the wards were incorporated, in this regard an average of 7 patients was interviewed per day in the wards. The data collection took approximately 4 months.

4.8 STUDY IMPLEMENTATION

This researcher set aside five days in a week (Monday to Friday) to interview patients over a Period of four months. Mondays, Wednesdays, Thursdays and Fridays were dedicated to [In]terviewing cardiac patients admitted to the medical and cardiothoracic wards with the data [Co]lection commencing from 8.00am to 5.00pm, all the cardiac patients who met the inclusion [Cr]'teria were interviewed.

^esdays were set aside to interview cardiac patients attending the cardiovascular out-patient pi: .

[c]- In this instance systematic random sampling was employed with every 3[KI] patient who

appeared for the clinic and who met the study criteria interviewed. The interviews lasted from 8.00am to around 2.00pm.

Total number of patients interviewed was 207 patients which was the total number of the estimated sample size.

In both the clinic and the wards, the researcher, after introductions, explained the study to the patients. An informed consent was then signed. The researcher then administered the socio demographic questionnaire followed by the BDI II. In the study no names were used and only serial numbers and the in-patient/out-patient numbers (to aid in follow up) were used. If for any reason a patient withdrew from the study in the middle of the interview the patient was thanked and bid farewell, the researcher then moved on to the next patient

At the end of an interview session, this researcher fevkluated/scored the BDI II tool so that patients who required psychiatric referral were appropriately managed. The patients were then thanked and the interview terminated.

4.9 STUDY INSTRUMENTS

1. Socio demographic questionnaire

   This is a researcher designed questionnaire that captured identification data and relevant demographic variables like age, sex, religion, marital status, level of education, occupation and approximate amount of income.

2. Beck Depression Inventory

   This is a 21 question multiple choice self-report inventory that measures the severity of depression by asking questions related to symptoms of depression. The 21 questions have four possible responses with each response assigned a score from 0 to 3 depending on the severity of the symptom.

   The questions range from assessment of mood, pessimism, sense of failure, guilt, punishment, self dislike, suicidal ideas, irritability, work difficulties, insomnia, fatigue and weight loss among others.

Questions 1 -13 generally assess psychological symptoms while questions 14-21 assess more physical symptoms.

The version of the BDI used was the BDI-II which was administered in 5-10 minutes and its reliability and validity is comparable to other tools. It has been observed that using the BDI-II, accurate classification rate compared with trained clinicians was 91% with sensitivity of 81% and specificity of 92%.[50,51,52]

Interpretation of the BDI II is as follows: 0-13 (Minimal/No Depression), 14-19 (Mild depression), 20-28 (Moderate depression) and 29-63 (Severe depression).

4.10 DATA ANALYSIS AND PROCESSING

Data analysis (descriptive and inferential) was done using SPSS (statistical package for social sciences) version 20. Results were considered to be statistically significant when $P<0.05$. Results are presented in form of tables, charts, graphs and narratives.

4.11 Time schedule tor the study

Proposal development.....October 2010-March 2011

Approval by the department.....April2011

Ethical committee clearance.....July2011

Data collection.....August-November 2011

Data Analysis.....January-March 2012

Report writing.....April-May 2012

Presentation.....June 2012

4.12 ETHICAL CONSIDERATION

Authority to carry out the study

Approval to carry out the study was obtained from the department of Psychiatry University of Nairobi and clearance was obtained from Ethics and research committee at KNH.

Consent

A written informed consent was sought from the participants after full detailed explanation of the study.

The participants were then explained to that participation in the study was voluntary and that information collected was only to be used for the purpose of the study and not for any other puipose, it was also stressed to the participants that therf \yas to be no material gain from the study, though it was hoped that the data collected would aid in coming up with appropriate guidelines for better management of depression in cardiac disease. The participants were also told of a potential benefit in that patients having depression would be diagnosed and referred for appropriate treatment. The participants would also have the right to refuse to participate in the study and could withdraw from the study at any stage^of the research.

Participants were informed that there would be no invasive procedures during the course of the study.

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Study participants were also assured of confidentiality in that all through the study they would only be identified by serial numbers and in-patient/out-patient numbers and not by names. Signatures would only be required on the consent forms and these forms would be stored separately from the research documents.

Data was stored in a locked cabinet only accessible to this researcher.

4.13 FINANCIAL BUDGET (KENYA SHILINGS)

Stationary	25,000/=
Co rmputer/Printer/Photocopy services	25,000/=
Communication and local transport	15,000/=
D a t a analysis	40,000
Dissertation typing /Binding	5000/=
Contingencies	16,500/=
Tot 31	**126,500/**

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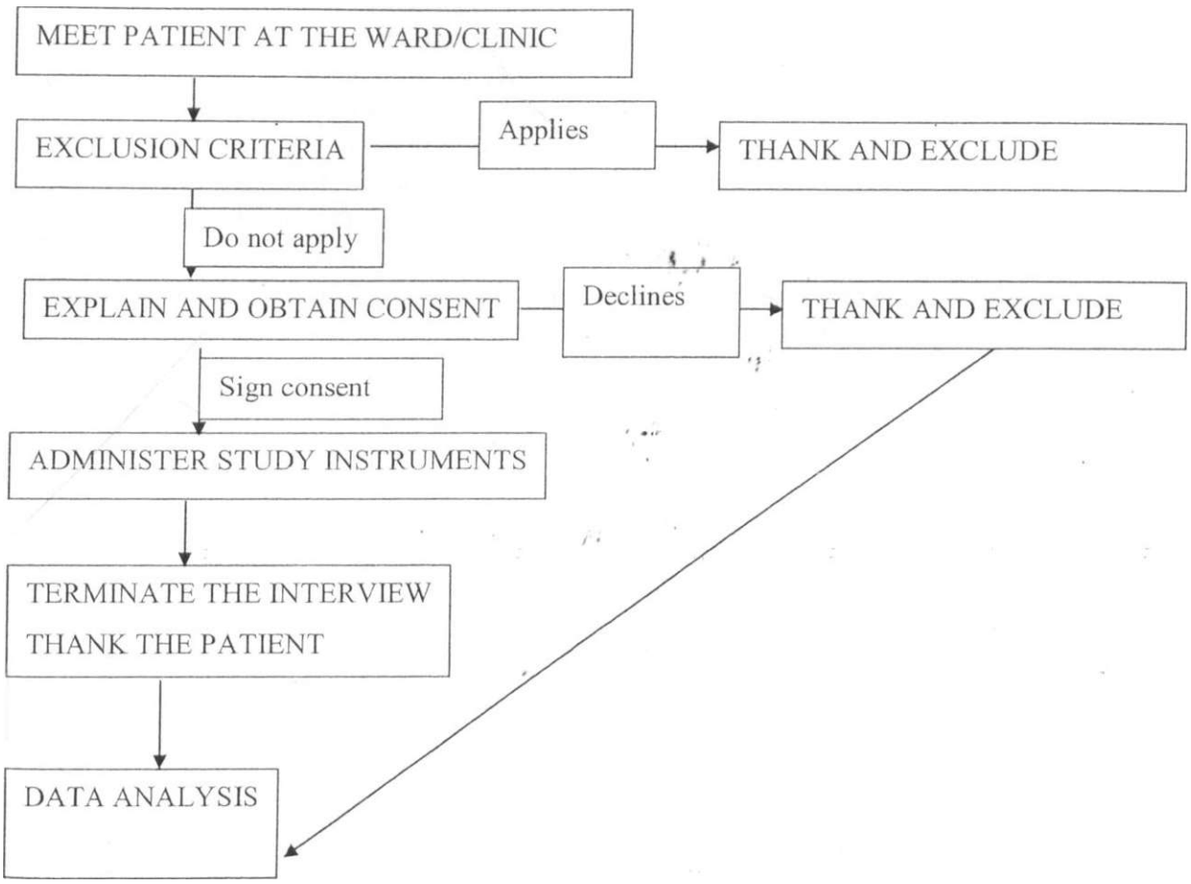
METHODOLOGY FLOW CHART



CHAPTER 5: RESULTS

Socio-demographic characteristics

The study enrolled 207 participants who were either outpatient, 67.6% (n=140) or inpatient 32.4% (n=67) cardiac patients at KNH. Of the study population, 47.8% were male (n=99) and 50.7% (n-105) were female (Male: female ratio 0.9:1). The socio-demographic characteristics of all the study participants are summarized in table 1. The median age was 41 years. Most (72.9%) of the 207 patients were married (n=151). 24.6% were single (n=51) and had never been married, 0.96% (n=2) were divorced, 0.96% (n=2) were widowed and 0.48% (n=l) was separated from the spouse. Majority of the participants 43% (n=89) had attained a secondary education whereas 42.5% (n=88) had primary education. 14.5% (n=30) had a tertiary level education. In terms of occupation, 39.1% (n=81) were unemployed, 25.1% (n=52) were engaged in informal employment, 20.3% (n=42) were in formal employment, 8.2% (n=17) were students and 7.2% (n=15) were classified as business people. Of the participants involved in income generating activities, 39.4% (n=43) had an income of between Ksh 10,000-39,999, 37.6% h=41) had an income of Ksh-6,000-9,999. 12.8% (n=14) had an income of less than Ksh 6,000. 7 participants (6.4%) had an income of between Ksh 40,(J00-99,999. 3.7% (n=4) did not state their income levels. 64.3% (n=133) of the participants were Protestants, 32.9% (n=68) were Catholic, 3 participants (1.4%) were Muslims and 4 participants (1.9%) did not state their religious affiliations.

Table 1: Socio demographic profile

Variable	Category	n	%
Gender	Male	99	47.8%
	Female	105	50.7%
	Unstated	3	1.4%
	Total	207	100%
Marital status	Single	51	24.6%
	Married	151	72.9%
	Separated	, 1	0.5%
	Divorced	2	1.0%
	Cohabiting	0	0.0%
	Widowed	2	1.0%
	Total	207	100.0%
Education	No formal education	0	0.0%
	Primary	88	42.5%
	Secondary	89	43.0%
	Tertiary	30	14.5%
	Total	207	100.0%
Occupation	Student	17	8.2% ,,
	Formal employment	42	20.3%
	Informal employment	52	, 25.1%
	Business Person	15	•7.2%
	Unemployed	81	39.1%
	More than one category	0	0.0%
	Total	207	100.0%
Income	Less than 6,000	14	12.8%
	6,000-10,000	41	37.6%
	10,000-40,000	43	39.4%
	40,000-100,000	7	6.4%
	Unstated	4	3.7%
	Total	109	100.0%
Religion	Catholic	68	32.9%
	Protestant	133	64.3%
	Muslim	3	1.4%
	Unstated	4	1.9%
	Total	207	100.0%

Table 2: Cardiovascular diseases

		n	%
Diagnosis	ACUTE DECONGESTED HEART FAILURE	1	0.5%
	ATRIAL MYXOMA	1	0.5%
	CONGESTIVE CARDIAC FAILURE	32	15.5%
	DILATED CARDIOMYOPATHY	33	15.9%
	HYPERTENSION/HYPERTENSIVE HEART DISEASE	63	30.4%
	INFECTIVE ENDOCARDITIS	7	3.4%
	MYOCARDIAL INFARCTION	10	4.8%
	PERIPARTUM CARDIOMYOPATHY	1	0.5%
	RHEUMATIC HEART DISEASE	59	28.5%
	Total	207	100.0%

Hypertension with a prevalence of 30.4% was the most common cardiac diagnosis seen in the study, closely followed by Rheumatic Heart Disease at 28.5%. The least common was Peripartum Cardiomyopathy, Acute Decongested Heart Failure and Atrial Myxoma with a prevalence of 0.5%. This is summarized in **Table 2** above.

Table 3: Prevalence of Depression

		n	%
Depression	No depression	156	75.4%
	Mild depression	38	18.4%
	Moderate depression	12	5.8%
	Severe depression	1	0.5%
	Total	207	100.0%

Majority of the participants interviewed (n=156, 75.4%) had no depression (Minimal depression score on BDI II). 18.4% (n=38) had mild depression, 12(5.8%) had moderate depression and 1(0.5%) had severe depression. **(Table 3)**

Table 4: Association between Socio demographic characteristics and levels of depression

		Depression											
		No depression n=156		Mild depression n=38		Moderate depression n=12		Severe depression n=1			X^2	df	P value
		n	%	n	%	n		n	%	Total			
Age group	<25 years	13	68.4%	5	26.3%	1	5.3%	0	0.0%	19	22.307	15	0.1
	25-34.9 years	42	84.0%	7	14.0%	0	0.0%	1	2.0%	50			
	35-44.9 years	34	70.8%	10	20.8%	4	8.3%	0	0.0%	48			
	45-54.9 years	22	71%	3	9.7%	6	19.4%	0	0.0%	31			
	55-64.5 years	22	78.6%	6	21.4%	0	0.0%	0	0.0%	28			
	>=65 years	23	74.2%	7	22.6%	1	3.2%	0	0.0%	31			
Gender	Male	76	76.8%	19	19.2%	3	3.0%	1	1.0%	99	3.833	3	0.28
	Female	77	73.3%	19	18.1%	9	8.6%	0	0.0%	105			
Marital status	Single	37	72.5%	11	21.6%	2	3.9%	1	2.0%	51	20.910	12	0.52
	Married	117	77.5%	26	17.2%	8	5.3%	0	0.0%	151			
	Separated	1	100.0%	0	0.0%	0	0.0%	0	0.0%	1			
	Divorced	0	0.0%	1	50.0%	1	50.0%	0	0.0%	2			
	Cohabiting	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0			
	Widowed	1	50.0%	0	0.0%	1	50.0%	0	0.0%	2			
Education	No formal education	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	5.723	6	0.455
	Primary	66	75.0%	14	15.9%	8	9.1%	0	0.0%	88			
	Secondary	67	75.3%	19	21.3%	2	2.2%	1	1.1%	89			
	Tertiary	23	76.7%	5	16.7%	2	6.7%	0	0.0%	30			
Occupation	Student	12	70.6%	4	23.5%	1	5.9%	0	0.0%	17	8.719	12	0.727
	Formal employment	35	83.3%	5	11.9%	2	4.8%	0	0.0%	42			
	Informal employment	42	80.8%	8	15.4%	1	1.9%	1	1.9%	52			
	Business Person	11	73.3%	3	20.0%	1	6.7%	0	0.0%	15			
	Unemployed	56	69.1%	18	22.2%	7	8.6%	0	0.0%	81			
	More than one category	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0			
Income	Less than 6,000	11	78.6%	1	7.1%	1	7.1%	1	7.1%	14	9.499	9	0.393
	6.000-10.000	36	87.8%	4	9.8%	1	2.4%	0	0.0%	41			
	10,000-40,000	33	76.7%	8	18.6%	2	4.7%	0	0.0%	43			
	40,000-100.000	6	85.7%	1	14.3%	0	0.0%	0	0.0%	7			
	Greater than 100,000	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0			
Son	Catholic	53	77.9%	13	19.1%	2	2.9%	0	0.0%	68	11.995	6	0.062
	Protestant	101	75.9%	22	16.5%	9	6.8%	1	0.8%	133			
	Muslim	0	0.0%	2	66.7%	1	33.3%	0	0.0%	3			

Table 4 summarizes the association between the socio demographic characteristics of the participants and the levels of depression. There was no statistically significant association between the two even though from the table we can deduce that the highest proportion of the depressed were aged 25 years and below(31.6%) were female (26.7%) and were either separated (100%) or widowed (50%). The depressed were also likely to have had only a primary school education (25%) were unemployed (30.8%) or had income levels of less than Ksh 6,000. All the Muslim participants in the study had an element of depression, compared to 24.1% of the Protestants and 22% of the Catholics.

Table 5: Comparison of levels of depression among in and out-patients

		No depression		Mild depression		Moderate depression"		Severe depression		Total	X^2	df	P value
In or Outpatient	Outpatient	116	82 9%	20	14.3%	4	2.9%	0	0.0%	140	15.669	3	0.001
	Inpatient	40	59.7%	18	26.9%	8	11.9%	1	1.5%	67			

A vast majority of the depressed participants were inpatients (40.3%) compared to 17.2% of the outpatients, this difference was also statistically significant P=0.001 (table 5) and figure 1.

Figure 1: Comparison of level of depression among the in and out-patients

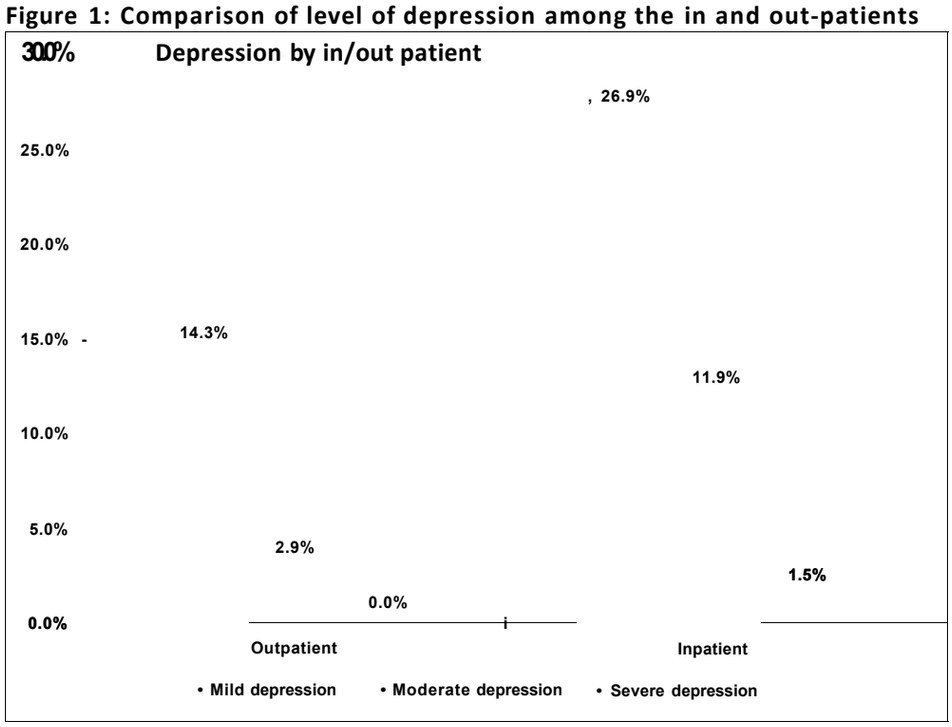


Table 6: Association between Cardiac diseases and the Level of depression (N=207)

Cardiac Disease	Level of Depression				
CCF	No depression (%)	Mild (%)	Moderate (%)	Severe (%)	P-value
No CCF (n=175)	137 (78.3)	29 (16.6)	8 (4.6)	1 (0.6)	0.067
CCF (n=32)	19 (59.4)	9(28.1)	4(12.5)	0(0)	
RHD					
No RHD (n=148)	107 (72.3)	30 (20.3)	10(6.8)	1 (0.7)	0.083
RHD (n=59)	49 (83.1)	8 (13.6)	2 (3.4)	0(0)	
DCM					
No DCM (n=174)	129 (74.1)	34(19.5)	10 (5.7)	1 (0.6)	0.76
DCM (n=33)	27 (81.8)	4(12.1)	2(6.1)	0(0)	
IE					
No IE (n=200)	152 (76)	36(18.0)	12(6)	0(0)	> < 0.001
IE (n=7)	4(57.1)	2(28.6)	0(0)	1 (14.3)	
HTN/HHD					
No HTN/HHD (n=144)	107 (74.3)	26(18.1)	10(6.9)	1 (0.7)	P = 0.32
HTN/HHD (n*63)	49(77.8)	12 (19.0)	2 (3.2)	0(0)	
Ml					
No Ml (n=197)	150 (76.1)	36 (18.3)	10(5.1)	1(0.5)	P = 0.44
Ml (n=10)	6 (6 0) ^	2 (20.0)	2(20.0)	0(0)	

P is significant when <0.05

As shown in **table 6** above, there was statistical significance in the assoration between Infective Endocarditis and the level of depression (PcO.OOl).

CHAPTER 6: DISCUSSION

Cardiovascular disease affects the whole spectrum of age, in this particular study the youngest participant was 18 years old with a median age of 41 years. The distribution pattern was pyramid shaped which is a reflection of the wider general population in Kenya.

The male to female ratio was 0.9:1, this difference was not significant. The gender ratio is similar to that seen in the general population as per the National Census of 2009.[59] It also mirrors the finding of Mark et al (2004) who found no gender bias in referral of patients for cardiac catheterization and that of Geddes[b7]. This researcher speculates that this could be due to the very wide array of cardiac diseases and multiple causes of the same. Access to medical care is also widely available equally to both men and women.

On the literacy levels, all the participants had at least a primary level education and 14% had a tertiary education. Ndetei et al[4] found an almost similar pattern in his study on prevalence of mental disorders in adults in general medical facilities, this could be as a result of the emphasis the government has placed on education with primary education being free. A UNICEF report[76] puts the adult literacy rate in Kenya at 87% and primary school enrolment at 83%.

The unemployed and those in the informal employment sector were the vast majority of the study population. This could be as a result of the clientele that VNH Serves, which is mainly the middle and lower classes.

The vast majority of the sampled population was Christian (97.2%) and this was a reflection of the patterns within the general population.

All the study participants were native black Africans.

The most common cardiac conditions seen were; Hypertension and hypertensive heat diseases, Rheumatic heart disease, Dilated Cardiomyopathy and Congestive cardiac failure. Peripartum Cardiomyopathy was the least prevalent..

There was a statistically significant relationship between having Infective Endocarditis and the probability of having depression, with a p value of <0.001. The other cardiac conditions didn't show a significant association with depression in this study. The only study this researcher came across which compared depression in the different cardiac diagnostic groups was the one-by Geddes[b/] which showed no statistical significance, most other studies have been focusing on one cardiac condition. Studies previously had centered on depression in Coronary Artery Disease [4,60,34] and the impact of other cardiac diseases on depression was unclear.

This study shows that the prevalence of depression was higher among the young (45 years and below) compared to the aged (>45 years), even though this difference was not statistically significant. This is in keeping with the findings of Scott K.M et al (2008)[54] who found that depressive and anxiety disorders in the general population decreased with age despite the greatly increasing physical morbidity with age. Gottlieb et al, (2004)[h5] also found that depression was more common among the young than those over the age of 65 years. These findings are however contrary to those of Jorm AF, (2000)[i] who found no consistent pattern across studies for age differences in the occurrence of anxiety, depression or distress.

In terms of gender, females had a higher prevalence compared to the males (27% to 23%), though this was also not statistically significant (p=0.079). Faller et al, (2007)[56] found no gender difference in rates of depression and associated survival in chronic heart failure. Geddes M.S in her post graduate theses in 2010[57] also found no gender difference among hospitalized cardiac

patients who were depressed. Naqvi et al, (2007)[67] on the other hand found that the female gender was a significant independent predictor of depressive symptoms and their severity post AMI. Gottlieb et al, (2004)[5S] in a study to determine the influence of age, gender and race on prevalence of depression in heart failure patients found that "women had significantly worse depression scores than men. The difference was significant even after controlling for age among other factors."Some of the theories to explain this difference postulate that women easily verbalize emotional distress while men are more open about physical distress (Danielsson and Johansson, 2005)[66].

This study found no significant differences in the rate of depression among the married, cohabiting, single (never married) widowed, separated or divorced. This finding mirrors that of Gottlieb et al, (2004)[bS] who found no difference among those who lived alone and those who lived with others and those of Panagiotakos et al (2008)[70] and Chung et al (2009)[71]. Weiss N.S (1973)[l;] and Nilsson et al (2005)[68] to the contrary found that there was a significant relation between mortality due to cardiac disease and the marital status.

This study found no statistical difference between occupation, income levels and the level of depression. This is in contrast to other studies which had shown a link between socio economic status and depression[01,62]. This researcher speculates that the patients served at KNH belong to an almost similar socio economic class and hence any difference would be negligible.

The prevalence of depression among cardiac patients in this study was 24.7%, this compares to other studies which have shown a prevalence of between 16% to 40%[9,46,47,15,n,14]

There was significant difference in the prevalence of depression among the cardiac inpatients and the outpatients (40.3% compared to 17.2%), this could be due to the fact that admitted patients have more severe symptoms. A study done among cardiac patients at a tertiary health facility in Pakistan though found a higher prevalence among the outpatients compared to the inpatients.[63]

The prevalence of depression in the general population Ganges between 13%-16%[64,65].

The null hypothesis of this study was therefore rejected and the alternative hypothesis accepted.

LIMITATIONS

Even though depression was seen in a number of cardiac patients, it is not possible to determine from the study which came first, the depression or the cardiac condition.
Due to the fact that there were no controls (patients with depression and no cardiac disease) it was also not possible to quantify the effect of the somatic symptoms on the depressed cardiac patients.
The effect of the duration a person has had cardiac disease to the probability of getting a depressive disorder was not included in this particular study.

CONCLUSIONS

As evidenced by this study, the prevalence of depression is higher among patients with cardiac disease as compared to the general population.
Age, marital status and the socio economic status of the participants did not seem to have an impact on the presence or absence of depression in them.
In-patients with cardiac disease had a higher prevalence of depression as compared to the out-patients.

RECOMMENDATIONS

Patients with cardiac disease need to be routinely screened for depression and where possible treatment instituted as studies have shown that they are more susceptible to have depression compared to the general public and also that depression has been shown to increase the rates of mortality in such patients.
Further studies examining the role of somatic symptoms in cardiac disease and depression and the impact of duration a patient has had cardiac disease to the probability of getting depression need to be conducted.

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8. APPENDIX A

CONSENT FORM

la, Informed Consent Explanation

To be read and questions answered in a language in which the subject is fluent (English or Kiswahili).

I, Dr. Edgar N. Munga pursuing a Masters degree in Psychiatry wish to conduct a study entitled "Prevalence of depression among patients attending the cardiac clinic at Kenyatta National Hospital, Nairobi".

The purpose of the study is to establish the magnitude of depression among patients with cardiac disease. My supervisors are Dr. Mary Kuria and Dr. Muthoni Mathai who are lecturers in the department of Psychiatry at the University of Nairobi. < #

This is a medical research and you are required to understand the following which apply to all in medical research.

i) Your participation is completely voluntary and you may withdraw consent at any time in the course of the interview.

ii) Refusal to participate will not lead to any penaltyor benefit to which you are otherwise entitled.

After reading the explanation, do not hesitate to ask any questions which may lead to your better understanding of the study.

The procedure will involve asking you questions regarding your personal data such as age, health and marital status. You will then fill a 21 question questionnaire regarding your mood and general outlook to life.

No invasive procedures such as drawing of blood will be done.

All information obtained from the study will remain confidential and your privacy will be upheld, identification will be by numbers only, no, names will be used in this study nor in future publications.

A.

The information generated from this study will hopefully help in improving the care of patients who have both depression and cardiac disease.

In case of any queries feel free to contact me on telephone number **0721514275** or my supervisors Dr. Mary Kuria **0722755681** or Dr. Muthoni Mathai **0727329904.**

Any concerns can also be forwarded to the KNH/University of Nairobi Ethics and Research Committee at KNH, telephone number **726300-9** or **P.O Box 20723 Nairobi**

Ib) CONSENT FORM

I, the undersigned do hereby volunteer to participate in this study. The nature and purpose have been fully explained to me by Dr. Edgar Munga whose contacts are; Telephone **0721514275** and Email, **drmungaedgar@yahoo.com**

I understand that all information obtained will be used for this study only and that I can withdraw my consent at any time without losing any benefits to which I'm otherwise entitled to.

Signature of Participant. Date

Serial Number

Signature of researcher. Date

APPENDIX B

SOCIO-DEMOGRAPHIC QUESTIONNAIRE

Date

Serial Number.....In-patient/Out-patient number

1. Age in years
2. Sex M F
3. Marital Status i) Single

   ii)Married

   iii)Separated

   iv)Divorced

   v)Widowed

   vi)Cohabiting
4. Highest Level of education

   i)No formal education

   ii)Primary

   iii)Secondary

   iv)Tertiary
5. Occupation

   i)Student

   ii)Formal employment

   iii)Informal employment

   iv)Business Person

   v)Un employed

   vi)More than one category

6. Approximate amount of income per month (Ksh)

i) Less than 6,000

li) 6,000-10,000

iii) 10,000-40,000

iv) 40,000-100,000

v) >100,000

7. Religion

i)Catholic

ii)Protestant <

iii)Muslim

iv)Others

Specify……:

8. What is the patients diagnosis (from the file)

Roche, **Beck Depression Inventory** **Baseline**

V 0477 CRTN: CRF number: Page 14 patient inits:

BDI-II Date:

Name: **Marital Status:** **Age:** **Sex:**

Occupation: **Education:**

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness

0 I do not feel sad.
1 I feel sad much of the time.
2 I am sad all the time.
3 I am so sad or unhappy that I can't stand it.

2. Pessimism

0 I am not discouraged about my future.
I feel more discouraged about my future than I used to be.
I do not expect things to work out for me.
I feel my future is hopeless and will only get worse.

3. Past Failure

0 I do not feel like a failure.
1 I have failed more than I should have.
2 As I look back, I see a lot of failures.
3 I feel I am a total failure as a person.

4. Loss of Pleasure

0 I get as much pleasure as I ever did from the things I enjoy.
1 I don't enjoy things as much as 1 used to.
2 I get very little pleasure from the things I used to enjoy.
3 I can't get any pleasure from the things I used to enjoy.

5. Guilty Feelings

0 I don't feel particularly guilty.
1 I feel guilty over man)' things I have done or should have done.
2 I fee^quite guilty most of the time.
3 I feel guilty all of the time.

6. Punishment Feelings

0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.

7. Self-Dislike

0 I feel the same about myself as ever.
1 I have lost confidence in myself.
2 I am disappointed ir. myself.
3 I dislike myself.

8. Self-Criticalness

0 I don't criticize or blame myself more than usual.
1 I am more critical of myself than I used to be.
2 I criticize myself for all of my faults.
3 I blame myself for everything bad that happens.

S. Suicidal Thoughts or Wishes

0 I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not cany them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

10. Crying

0 I don't cry anymore than I used to.
1 I cry more than I used to.
2 I cry over every little thing.
3 I feel like crying, but I can't.

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Subtotal Page 1

Continued on Back

Roche) **Beck Depression Inventory** **Baseline**

V 0477 CRTN: CRF number: Page 15 patient inits:

11. Agitation

0 I air. no more restless or wound up than usual.
1 I feel more restless or wound up than usual.
2 I am so restless or agitated thai it's hard to say still.
3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest

0 I have not lost interest in other people or activities.
1 I am less interested in other people or things thaD before.
2 I have lost most of my interest in other people or things.
3 It's hard to get interested in anything.

13. Indecisiveness

0 I make decisions about as well as ever.
1 I find it more difficult tc make decisions than usual. -
2 I have much greater difficulty in making decisions than I used to.
3 I have trouble making any decisions.

14. Worthlessness

0 I do not feel I am worthless.
1 I don't consider myself as worthwhile and useful as 1 used to.
2 I feel more worthless as compared to other people.
3 I feel utterly worthless.

15. Loss of Energy

0 I have as much energy as ever.
1 I have less energy than I used to have.
2 I don't have enough energy' to do very much.
3 I don't have enough energy to do anything.

16. Changes in Sleeping Pattern

0 I have not experienced any change in my sleeping pattern.
la I sleep somewhat more than usual.
lb I sleep somewhat less than usual.
2a I sleep z lot more than usual.
2b I sleep a lot less than usual.
3a I sleep most of the day.
3b I wake up 1-2 boursearіy and can't get back to sleep.

17. Irritability

0 I am no more irritable than usual.
1 I am more lmtable than usual.
2 I am much more irritable than usual.
3 I am imtable all the time.

18. Changes in Appetite

0 I have not experienced any change ir. my appetite.
la My appetite is somewhat less than usual,
lb My appetite is somewhat greater than usual.
2a My appetite is much less than before.
2b My appetite is much greater than usual.
3a I have no appetite at all.
3b I crave food all the time.

15. Concentration Difficulty

<3 ,1 can concentrate as well as ever.
1 • I can't concentrate as well as usual.
2 It's hard to keep my mind on anything for very long.
3 I fin d I can't concentrate on anvthinE.

20. Tiredness or Fatigue

• 0 I am no more tired or fatigued than usual.
3 I get more tired or fatigued more easily thar. usual.
2 I am too tired or fatigued to do a lot of the things I used to do.
3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

mm

Subtotal Page 2

Subtotal Page]

Total Score