THE CORRELATES OF UNDIAGNOSED DEPRESSION AMONG PATIENTS ATTENDING THE DIABETES OUTPATIENT CLINIC AT MOI TEACHING AND REFERRAL HOSPITAL

ZABLON NYABERI

H56/79619/2012

A DISSERTATION PRESENTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE IN MENTAL HEALTH NURSING DEGREE OF THE UNIVERSITY OF NAIROBI

DECLARATION

I, Zablon Nyaberi, declare that the work in this dissertation is original. This dissertation has not been presented for a degree in this university or any other university or institution of higher learning.

Signature…….Date……..

CERTIFICATE OF APPROVAL

This dissertation is submitted in partial fulfilment of the requirements for the award of Master of Science in Mental Health and Psychiatric Nursing Degree of the University of Nairobi with our approval as supervisors.

1. Dr.Oyieke Jennifer, PhD

Lecturer, University of Nairobi

Signature……..Date……

2. Dr.Chege Margaret, PhD

Lecturer, University of Nairobi

Signature…….Date……

3. Dr.Mwaura James, PhD, MSc, BSc

Lecturer, University of Nairobi

Signature……Date……

DEDICATION

This dissertation is dedicated to all the patients on follow-up at the diabetes outpatient clinic of Moi Teaching and Referral Hospital.

ACKNOWLEDGEMENT

I wish to acknowledge the following for their contribution towards the realization of this dissertation.

My supervisors, Dr Oyieke, Dr Chege and Dr Mwaura for their guidance, support and review of the dissertation.

The staff at MTRH diabetes outpatient clinic for their assistance during the study

The management of MTRH for allowing me to conduct this study at the institution

Dr Philip Ayieko for his technical support on data analysis.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

BDI -Beck's Depression Inventory

CDI -Children's Depression Inventory

CMD -Common mental disorders

DSM -Diagnostic and Statistical Manual for mental disorders

ERC -Ethics and Research Committee

ICD-10 -International Classification of Diseases, 10^{th} revision

IREC -Institutional Research and Ethics Committee

IDF -International Diabetes Federation

KNH -Kenyatta National Hospital

MDD -Major Depressive Disorder

MTRH -Moi Teaching and Referral Hospital

MU -Moi University

RAM -Roy's Adaptation Model

SCAN -Schedule for the Clinical Assessment in Neuropsychiatry

UON -University of Nairobi

US -United States of America

USD -United States of America dollars

WHO -World Health Organization

OPERATIONAL DEFINITIONS

Adaptation	-The process by which an individual uses conscious awareness and choice to achieve human and environmental integration which in turn leads to optimal health and wellbeing
Behavioural responses	- Manifestations of an individual's reaction to a stimulus
Diabetes	-Used to refer to either type 1 or type 2 diabetes mellitus
Disease burden	-Refers to the impact of a disease in a given population in terms Of morbidity and mortality
Environment	-All the conditions, circumstances and influences within and around an individual that affect the development and behaviour of the individual
Gender	-An individual's innate, deeply felt psychological identification as male or female, which may or may not correspond to the individual's designated sex
Health	-A state and process of integration that indicates successful Adaptation
Minimal depression	-The usual normal stress associated with daily living
Undiagnosed Depression	-Refers to major depressive disorder, or dysthymia that has not yet been recognised/identified in a patient

ABSTRACT

Diabetes mellitus is a major public health problem in the world. The prevalence of diabetes in Kenya is estimated at 4.66 %. The comorbidity of diabetes mellitus and depression is associated with poor outcomes. A cross-sectional study was conducted among 181 diabetes patients on follow-up at Moi Teaching and Referral Hospital (MTRH). The objectives of the study were to determine the prevalence and the factors associated with undiagnosed depression among diabetes patients. A questionnaire was used to collect data on independent variables. The symptoms of depression were assessed using Beck's Depression Inventory II (BDI-II).Depression was observed in19 % of the study participants. Female gender, single marital status, low class urban residence, low monthly income and lack of family support were significantly associated with depression ($p<0.0001$). Others were longer duration of illness, difficulties adhering to treatment, alcohol consumption and lack of family history of diabetes mellitus ($p<0.0001$). In this study, a significant proportion of diabetes patients have comorbid depression. Untreated depression can have a negative effect on achieving good glycemic control. Integrating routine screening of depression into diabetes primary care settings will lead to early detection and treatment of depression that is usually concealed in diabetes patients.

CHAPTER 1: INTRODUCTION

1.1 Background

Diabetes mellitus is a complex group of metabolic disorders that are characterized by elevated plasma glucose levels. The disorders result from defects in insulin secretion, insulin action, or both(Heeramun-aubeeluck, Lu, & Luo, 2012). Patients suffering from diabetes mellitus must use oral anti- diabetic agents or daily injections of insulin in order for them to live. Besides, they need to modify their lifestyles and monitor plasma glucose levels at regular intervals so that they can maintain as near normal plasma glucose levels as possible.

There are two main and well known types of diabetes mellitus. These are type 1diabetes mellitus and type 2 diabetes mellitus. Both types of diabetes mellitus are chronic and debilitating.Worldwide,the human, economic and social cost of the disease is staggering(International Diabetes Federation, 2013).Millions of years are lost to disability and reduced quality of life attributable to the complications associated with both types of diabetes mellitus(International Diabetes Federation, 2008). Globally, the cost of treating diabetes mellitus in the year 2013 alone was USD 548 billion(IDF, 2013).High plasma glucose levels lead to complications affecting blood vessels, the heart,eyes,the kidneys, the nerves and teeth.

The prevalence of diabetes mellitus has reached epidemic levels internationally. According to the IDF (2013), 382 million people suffer from diabetes in the world. This figure will rise to 592 people million by the year 2035(International Diabetes Federation, 2013).The IDF (2013) further reports that 80% of people with diabetes mellitus live in middle to low income countries. The comparative prevalence of diabetes mellitus in Kenya is estimated at 4.66 %(International Diabetes Federation, 2012).

Depression is a common mental disorder. More than 350 million people of all ages in the world suffer from depression(World Health Organization, 2012). Reports from an overview of the World Health Mental surveys show that the lifetime prevalence and 12-month prevalence estimates of major depressive disorder range between 4-10% and 3-6% respectively(Kessler et al., 2009). At worst, depression can lead to suicide, which in turn is responsible for an estimated 1 million deaths in the world annually(World Health Organization, 2012).

The cause of depression is not clearly understood. Depressive disorders have been identified as a leading cause of disease burden in the world. In the year 2010, depressive disorders were the second leading cause of years lived with disability(Ferrari et al., 2013). The symptoms of depression can remain unrecognized by both patients and clinicians. However, if recognized early, safe treatment modalities are available for individuals with symptoms that persist beyond several weeks.

Information on the prevalence of depression among patients with diabetes in Kenya is scanty. However, findings of studies done in Kenya and elsewhere in the world show that depression in patients suffering from chronic conditions are common. In a study done at Maseno, it was reported that the point prevalence of common mental disorders (CMD) was 10.8%, largely comprising of mixed anxiety depression, panic disorders, generalized anxiety and depressive episodes(Jenkins et al., 2012). In the same study, it was reported that the rates were significantly higher with advanced age and the presence of a physical illness(Jenkins et al., 2012).

Depression in patients with diabetes mellitus is associated with poor outcomes. Depression leads to higher mortality rates in patients with diabetes mellitus. It leads to poor adherence to treatment, poor glycemic control, higher complication rates, decreased quality of life, and

increased health cost, disability and risk of death. In a systematic review of treatment adherence among individuals with depression and diabetes, it was observed that there was a significant relationship between depression and treatment non-adherence(Gonzalez et al., 2008).

1.2 Statement of the problem

Diabetes mellitus and depression are common health conditions. It is estimated that 382 million people in the world have diabetes (International Diabetes Federation, 2013). This number will rise to 592 million people by the year 2035(International Diabetes Federation, 2013).The comparative prevalence of diabetes mellitus in Kenya is estimated to be 4.66 %(International Diabetes Federation, 2012).The human, social and economic costs of diabetes mellitus are enormous.23 million years of life are lost to disability and reduced quality of life due to complications associated with diabetes mellitus(International Diabetes Federation, 2008).

The burden of depression and other mental disorders is on the rise globally. About 350 million people suffer from depression worldwide(World Health Organization, 2012).According to the World Health Organization (2012), depression is the leading cause of disability worldwide and is a contributor to the global burden of disease. In 2010, depressive disorders were identified as contributors to burden allocated to suicide and ischemic disease (Ferrari et al., 2013).

The comorbidity of diabetes mellitus and depression is complex. There is mounting evidence supporting a bidirectional relationship between diabetes mellitus and depression. The negative effects of depression on patients suffering from diabetes mellitus are enormous. The

presence of depression in diabetes mellitus is associated with poor quality self care, poor glycemic control and poor health outcomes(Bell et al., 2005).

Despite the significant negative consequences associated with the comorbidity of depression and diabetes mellitus, depression among diabetic patients continues to remain undiagnosed and untreated. To compound the problem, almost all diabetic patients who suffer from depression are not aware of the problem. Out of the 273 patients who are seen at the diabetes clinic of MTRH every month, none gets assessed for symptoms of depression.

1.3 Significance of the study

A growing body of evidence shows that depression in patients suffering from diabetes mellitus leads to negative outcomes. Treatment of depression in these patients can lead to good glycemic control and minimize serious complications. Lack of assessment has been identified as a barrier to effective treatment of depression in people living with diabetes mellitus.

In order to improve early detection and prompt treatment, there is need to integrate screening of depression into diabetes outpatient clinics. To convince policy makers on the need for this integration, data on the prevalence of depression in patients living with diabetes must be provided. Unfortunately, literature review did not show information about depression in patients living with diabetes mellitus in Kenya. This study, therefore, is among the first to establish the situation of depression among this group of patients in a teaching and referral hospital in Kenya.

1.4 Research questions

The questions that the study sought to answer were:

1. What is the prevalence of undiagnosed depression among diabetes patients on follow-up at MTRH?

2. What factors are associated with undiagnosed depression among diabetes patients on follow-up at MTRH?

1.5 Objectives

The objectives of the study were to:

i) Determine the prevalence of undiagnosed depression among patients suffering from diabetes mellitus on follow-up at MTRH.

ii) Determine the factors associated with undiagnosed depression among diabetes patients on follow-up at MTRH.

CHAPTER 2: LITERATURE REVIEW AND FRAMEWOKS

2.1 Literature review

Many studies on depression and diabetes have been done. Although the available literature covers a wide variety of such studies, in this review, focus has been put on the prevalence of depression in diabetes, factors associated with depression in diabetes and the consequences of depression in patients suffering from diabetes mellitus. Literature from studies that have been done internationally, regionally and in Kenya has been reviewed.

Internationally, available data shows wide variability in the prevalence rates and demographic correlates of depression in patients living with diabetes mellitus. However, there is a general agreement that the comorbidity of depression and diabetes is common. In a comprehensive review on depression and diabetes, it is reported that the prevalence of major depression in patients with diabetes was 12% and milder depression or elevated symptoms of diabetes are roughly present in about 15-35% 0f patients with diabetes mellitus(Andreoulakis, Hyphantis, Kandylis, & Iacovides, 2012) .Patients with diabetes are up to three times as likely to suffer from comorbid depression as compared to people without diabetes mellitus(Andreoulakis et al., 2012).

In a study done in Greece to determine the prevalence of depression among non-insulin using patients, it was reported that 33.4% of the study participants had elevated depressive symptoms (Sotiropoulos et al., 2008a).In a study done in the United States of America it was shown that the prevalence of depression among patients with diabetes ranged between 2%-28%(Li, Ford, Strine, & Mokdad, 2008).In other studies, the prevalence of depression in patients with diabetes has been shown to be higher. In a study done in Nepal, it was reported that 40.3% of the participants had clinical depression(Niraula et al., 2013)

The prevalence reported depends on whether the study was hospital-based or population-based .The prevalence from population-based studies tends to be lower than that from hospital-based studies. From eighteen surveys of household-residing adults conducted in seventeen countries across the world, it was reported that although mood and anxiety disorders occurred with somewhat greater frequency in persons with diabetes than those without diabetes, the prevalence of major depression among people with diabetes was lower in the general population than reported in previous clinic-based samples(Lin et al., 2008).

A number of factors have been associated with the comorbidity of depression and diabetes mellitus. The female gender has been shown to be a risk factor for depression in patients living with diabetes. In a study done in India, it was reported that not only did females have a higher prevalence of depression than males, they also exhibited a higher severity level of depression(Chaudhry, Mishra, Mishra, Parminder, & Mishra, 2010).These findings are similar to those of a study done in Bangladesh which showed that both mild to moderate and severe depression were more common in females and singles(Rahman, Rahman, & Flora, 2011)

The level of income and affluence are associated with depression among people living with diabetes mellitus. In a study in Nepal, higher personal income and urban residence were associated with higher scores on the BDI-Ia scale(Niraula et al., 2013).In a study done in India,however,it was reported that the prevalence of depression was higher among persons with low income(Mendenhall et al., 2012)

Marital status of an individual has been shown to be a predictor of depression. In a study done in Pakistan, it was shown that marital status was a risk factor for depression(Perveen, Otho, Siddiqi, Hatcher, & Rafique, 2010).This finding is supported by a study done in

Bangladesh whose findings show that being single was a risk factor for depression among people with diabetes mellitus(Rahman et al., 2011).

Other factors that have been associated with depression among diabetes patients include mode of treatment, family structure and prior history of gestational diabetes. Rahman et al (2011) reported that insulin users were six times more likely to develop severe depression than users of oral antidiabetic agents. In a study from Pakistan, it was reported that a history of gestational diabetes and nuclear family were risk factors for depression among diabetes patients(Perveen et al., 2010).

Diabetes complications, history of diabetes in the family and duration of diabetes mellitus have been associated with depression among patients with diabetes mellitus. The study done in Nepal reported that diabetes complications were significantly associated with depression. It was however noted in the same study that a history of diabetes in the family and longer duration of diabetes were associated with less depressive symptoms(Niraula et al., 2013).

Some studies have associated ethnicity and race with depression in diabetes mellitus. In a telephone interview covering 50 US states,a 25-fold difference in prevalence rates was noted among ethnic groups(Li et al., 2008).The rate was lowest among Asians at 1.1% and highest among American Indians and Alaska natives at 27.8%(Li et al., 2008).In another study, it was reported that increased mortality from depression differs by ethnicity and persistent recognition(Mappsy,Egede,& Mueller,2008).

Depression in patients with diabetes mellitus is associated with negative outcomes. In one study, depression was shown to be associated with non-adherence to the diabetes treatment regimen(Gonzalez et al., 2008).In another study, it was reported that high glycosylated haemoglobin was associated with diabetes mellitus and depression comorbidity(Niraula et al.,

2013).Findings from a prospective cohort study conducted in 11 US states showed that women with diabetes and comorbid depression had increased mortality rates(Pan.,2011).

Findings from studies that have been done in a few countries in Africa show that there is a significant association between depression and chronic conditions. In a study done in Ethiopia, it was reported that the odds ratio for having depression if one had a diagnosis of one non-communicable chronic condition was 2.6(Hailemariam, Tessema, Asefa, Tadesse, & Tenkolu, 2012).It was also reported from the study that advanced age was associated with a higher risk of developing depression(Hailemariam et al., 2012).

In other studies in Africa, the prevalence of depression in people with diabetes has been shown to be high. In a study conducted in a Nigerian teaching hospital, it was demonstrated that 30% of the respondents in the group with diabetes mellitus met a Schedule for the Clinical Assessment in Neuropsychiatry (SCAN) diagnosis for a depressive disorder according to the International Classification of Disease, tenth revision (ICD-10)(Bawo, Omoaregba, & Eze, 2010).In the same study,9.5% of the participants in the control group met a SCAN diagnosis for depression(Bawo, et al., 2010). In a study done in South Africa to assess symptoms of depression and anxiety among people living with chronic conditions, it was reported that a sizeable proportion of the participants experienced symptoms of depression and anxiety. It was demonstrated that 26.1% of the respondents had mild to moderate depression, 15.3% of the respondents had moderate to severe depression and about 4.5% had severe depression(Kagee, 2008) .

In Africa, as in the rest of the world, depression in diabetes has been associated with negative outcomes. In Nigeria, it was reported that major depressive disorder(MDD) is associated with lower scores on the aspects of overall quality of life and health satisfaction(Bawo, Morakinyo, Eze, Lawani, & Omoaregba, 2010).

Considerably fewer studies on depression in patients living with diabetes have been done in Kenya. However, there are studies with reports to suggest that the prevalence of psychiatric illnesses in hospital-based populations can be quite high. In a study done to determine the prevalence of mental illnesses among patients with chronic conditions in Kenyan hospitals, it was reported that instrument-assisted screening of the participants yielded a prevalence rate of 42.3% for depression using BDI(Ndetei, Khasakhala, Kuria, et al., 2009).

Depression is also common among Kenyan children. In a study done in general hospital-based paediatric units, it was reported that 41.3% of the participants had Children's Depression Inventory(CDI) scores suggesting mild to moderate depression(Ndetei, Khasakhala, Mutiso, & Mbwayo, 2009).This is supported by another study in which it was reported that psychiatric illnesses were largely under-detected by clinicians in most health facilities in Kenya(Ndetei, Khasakhala, Kuria, et al., 2009).

In Kenya, like elsewhere in the world, depression is associated with negative outcomes. Reports from studies show that patients who were admitted and had depression were more likely to commit suicide. In a study done in Kenya, it was found that one out of ten patients had suicidal symptoms. The more depressed the patients were on the BDI scale, the higher the prevalence of suicidal symptoms(Ndetei, Khasakhala, Mutiso, & Mbwayo, 2010).

In conclusion, available literature indicates that disorders such as depression appear to be common among patients with medical conditions, especially those that live with chronic illnesses. Depression in people living with diabetes mellitus is associated with poor outcomes. Although treatment is available, very few of those affected receive such treatment. One of the barriers to treatment is lack of assessment. In order to prioritise screening of people living with diabetes for depression, there is need to provide policy makers with data on depression and diabetes comorbidity. Literature review did not show such data.

2.2 Theoretical framework

Roy's Adaptation Model (RAM) was used in the study. Put forward by Sister Callister Roy, the model offers a structural model for shaping nursing activities in the assessment and management of people living with diabetes mellitus. RAM has been used in studies to guide interventions for adaptation to chronic conditions(Bakan & Akyol, 2008). A patient who has been diagnosed with diabetes mellitus is an adaptive system and the system is greater than the sum of individual parts. An assumption of this model is that the patient is in constant interaction with the environment. The environment can be external or internal.

The diabetes patients have inputs (stimuli), outputs (behavioural responses) and coping mechanisms. The stimuli were considered to be focal, contextual or residual. For patients with a diagnosis of diabetes mellitus, the focal stimulus is the inability of their bodies to utilize carbohydrates, leading to high plasma glucose levels. The contextual stimuli included the sociodemographic, disease-related and behavioural variables. These variables were assumed to influence the way the patient responded to the diagnosis of diabetes (focal stimulus).

The behavioural responses to the diagnosis of diabetes mellitus were assumed to be either adaptive or ineffective. If the response of the patient to the diagnosis of diabetes mellitus was adaptive, the patient as an adaptive system accepted their new status, adopted a new lifestyle, modified the diet and mastered the management of diabetes mellitus. The outcome of all these is that the patient was happy, able to comply with treatment, had good glycemic control, lead better quality life and was able to survive.

If on the other hand the response to the diagnosis of diabetes mellitus was ineffective, the patient became depressed. The ineffective responses manifested as withdrawal, loss of appetite/excessive eating or inability to experience pleasure among many other

manifestations. Depression in a patient with diabetes mellitus leads to lack of compliance to treatment, poor glycemic control, poor quality of life and suicide among many more outcomes.

During the study, the behavioural responses to the focal stimulus were observed, measured or reported subjectively by the patient. In the study, the behavioural responses to the diagnosis of diabetes mellitus were assessed using BDI-II tool that evaluates the symptoms and severity of depression. A score of 0 to 13 on the BDI-II indicated no depression (minimal depression), while a score of more than 13 indicated the patient has depression.

According to Roy health can exist for individuals with a diagnosis of diabetes mellitus and the goal of nursing is to promote adaptive responses that positively affect health, while trying to reduce ineffective responses at the same time. The nurse should prepare the human system through counselling and health education. During the study, those who were diagnosed with depression were put on treatment which involved counselling and health education among other treatment modalities.

2.3 Conceptual model

Not all patients that live with diabetes mellitus develop depression. The development of depression is influenced by patient factors (age, gender), disease factors (type of diabetes, treatment modality, duration of illness, complications) and social factors (family structure and support).Depression in a patient living with diabetes mellitus can lead to negative outcomes. The outcomes include hospitalization, poor glycemic control, and increased cost of treatment and complications among others. The diagram in figure 1 below illustrates the relationship among these variables

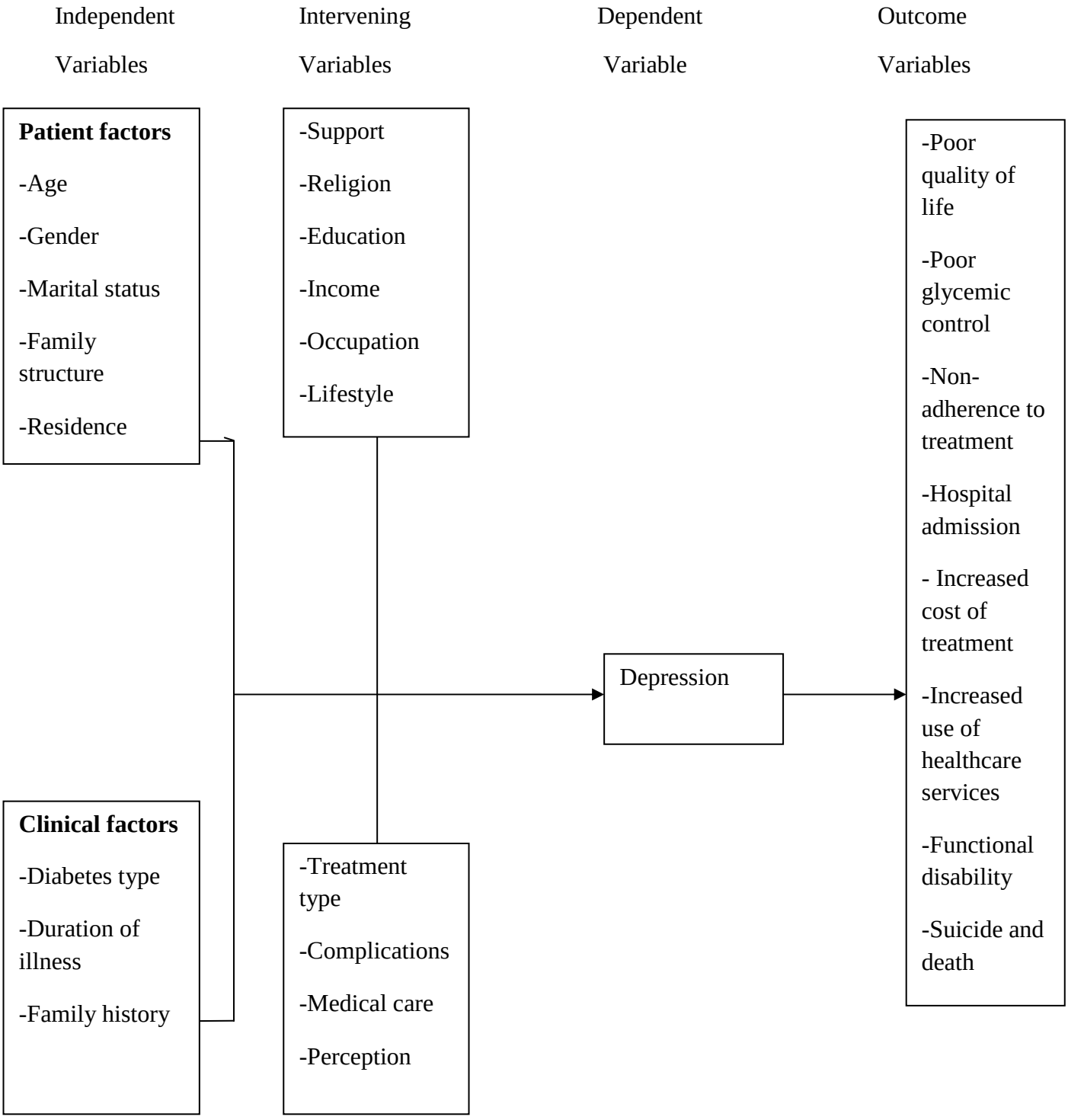


Figure 1: Conceptual model

Z.Nyaberi (2014)

CHAPTER 3: METHODOLOGY

3.1 Study setting

The study was conducted at Moi Teaching and Referral Hospital. This is a government of Kenya run national referral and teaching facility. It is the largest hospital in the western Kenya region. It was started in 1917 as a cottage hospital with a bed capacity of 60 to cater for the health needs of Africans. Since then, the hospital has continued to grow and in the year 1998, it was elevated from a district hospital to one of the national referral hospitals in Kenya.

Moi Teaching and Referral Hospital is located along Nandi road in Eldoret town, 310 km northwest of Nairobi. It is an 800 bed capacity hospital that caters for the health needs of people from Western, Nyanza and Rift valley regions of Kenya. It also serves patients from Rwanda, Uganda, Burundi and South Sudan. The hospital is home to the Academic Model Providing Access to Healthcare (AMPATH), a program involved in cutting edge research and the provision of Primary Healthcare and management of chronic conditions including diabetes mellitus.

Moi Teaching and Referral Hospital serves as the teaching facility for Moi University College of Health Sciences, University of East Africa (Baraton) and several other medical training institutions in Eldoret and its environs. Besides, the hospital is allowed by the ministry of health to train nurses, clinical officers and other healthcare personnel.

A number of special clinics are run at the hospital. Among these clinics is the diabetes outpatient clinic where, on average, 273 patients with diabetes mellitus are seen every month.

3.2 Study design

This was a cross-sectional study.

3.3 Study population

The population for the study included all patients with a diagnosis of diabetes mellitus attending the diabetes outpatient clinic at Moi Teaching and Referral Hospital during the study period. The study was conducted from 13th June 2014 to 11th July 2014.

3.4 Inclusion criteria

All patients attending the diabetes outpatient clinic at MTRH during the period of study, and who met the criteria as set out below were eligible to participate in the study.

a) Patients with at least three months of diagnosed diabetes
b) Patients who were at least 18 years or more
c) Patients who were willing to give informed consent

3.5 Exclusion criteria

The criteria for exclusion from the study sample were as follows.

a) Patients with an established diagnosis of any psychiatric disorder.

b) Patients with a history of psychiatric disorder.

c) Diabetic patients who were pregnant.

d) Diabetic patients on psychotropics.

e) Diabetic patients with cognitive impairment.

f) Diabetic patients with severe organic illness.

3.6 Sample size determination

The sample size was estimated based on the prevalence of depression among diabetes patients in an African population. Review of literature did not reveal the prevalence in a Kenyan population. In a study done in a Nigerian Teaching Hospital it was reported that the proportion of patients with diabetes mellitus who had depression was 30%(Bawo, Omoaregba, et al., 2010)

The sample size was calculated using Fisher's formula(Mugenda, 2003).For a population greater than 10,000 the sample required to estimate a proportion to within ±5% of the true value with a 95% confidence interval can be calculated as shown below.

$n=Z^2 P (1-P)/ \ell^2$

Where:

Z=1.96

ℓ=0.05

P=30(The prevalence of depression among patients with diabetes in a Nigerian hospital).

Therefore, at the 95% confidence level and ±5 percentage precision and a population proportion of 30%,

$n=1.96^2x0.3(1-0.3)/0.05x0.05$

n=3.8416x0.3 (0.7)/0.0025

n=3.8416x0.21/0.0025

n=3.8416x2100/25

n=323 people (desired sample size in a population greater than 10,000)

The estimated number of patients who were attended to at the diabetes clinic during the study period was 410(the study population).In this case, the population size was less than 10,000. To get the desired sample size (nf) from this population size (which is less than 10, 0000), the following formula was used.

nf=n/1+ (n/N)

Where:

n=323

N=410, which is the estimate of population size (the estimated number of patients who were supposed to be attended to at the diabetic outpatient clinic over the anticipated study period)

Therefore,

nf=323/1+ (323/410)

nf=323/1+0.7878

nf=323/1.7878

nf=180.6

nf=181(The desired sample size)

3.7 Sampling technique

All patients who came to the diabetes outpatient clinic during the period of study and who met the inclusion criteria were recruited as they came until the desired sample size of 181 participants was attained.

3.8 Study variables

The independent variables were those factors that are thought to influence the occurrence of depression in patients living with diabetes. They include, age, gender, marital status, occupation, number of children, type of diabetes, presence of diabetes complications, family support, duration of illness, religion, treatment modality, education level of the study participants, average monthly income of the study participants, family support, residence, family history of diabetes mellitus, plasma glucose monitoring frequency, smoking and alcohol consumption.

The dependent variable was depression.

3.9 Study instruments

Two sets of instruments were used to collect data. These included a semi-structured questionnaire and Beck's Depression Inventory-II (BDI-II).

The semi-structured questionnaire was used to collect information on sociodemographic characteristics, disease variables and behavioural characteristics.

The symptoms of depression were screened using the BDI-II.The BDI-II is a 21 question, multiple choice self report inventory, designed to be used for individuals aged 13 years and

above. The tool includes 21 items on depressive symptoms and attitudes. Each item is rated on a 4-point scale ranging from 0 to 3.Participants were asked to pick the option that best described the way they had been feeling during the preceding two weeks. The total depression score ranged from 0 to 63.Higher scores indicated more severe depression.

The BDI-II has been widely used by health care professionals and researchers in a variety of settings. The BDI-II has been tested and shown to be reliable with high internal consistency and good item-total intercorrelations. Besides, criterion-related validity of the tool has been demonstrated(Grothe et al., 2005).

3.10 Data processing and analysis

The questionnaires were checked for completeness immediately after filling and clarification sought from respective participants for any missing information. Coding of the data was done and the data was entered into a data base. Basic descriptive statistics were used to summarize the data. The relationships between the subjects' sociodemographic, disease and outcome variables were examined by use of bivariate analysis models. The results have been presented in tables, pie charts and bar graphs.

3.11 Ethical considerations

The study was conducted after approval by the institutional research and ethics committees of the Kenyatta National Hospital/University of Nairobi College of Health Sciences and the Moi Teaching and Referral Hospital/Moi University School of Medicine. Permission to conduct the study was granted by the office of the director, Moi Teaching and Referral Hospital

During the study, the principles of autonomy, beneficence and justice were observed. All information about the study was explained to the patients and only those who gave informed consent participated in the study. Participation was voluntary and could be withdrawn at any point during the study.

To maintain confidentiality, the study participants were requested not to enter their names anywhere on the data collection tools. Instead, identification numbers were used in the data collection tools. The participants were neither induced nor given any form of compensation.

The researcher put measures in place to ensure that the study participants were protected from harm. The study did not involve major risks and there were no incidents of participants being distressed by recalling unpleasant memories or feelings. Those who were diagnosed with depression during the study were referred to the mental outpatient clinic for treatment.

There was fairness during the recruitment of study participants. The selection was not based on any other reasons other than those directly related to the objectives of the study. Only persons from groups that are likely to be among beneficiaries of subsequent applications of the research were involved in the study.

3.12 Limitations of the study

The study has a number of limitations. They include the following.

ii The study was conducted in a clinical setting. The sample drawn from a clinical setting is not representative of the general population. It will, therefore, be difficult to generalize the findings of the study to the general population.

iii The data collected from this study cannot be used to establish causal relationships between independent and dependent variables. The data can only be used to show an association between the independent variables and depression.

CHAPTER 4: RESULTS

A total of 181 patients attending the diabetes outpatient clinic at MTRH participated in the study. The analysis of participant characteristics and disease-related variables is presented in this chapter, followed by an analysis of the prevalence of depression and its association with patient factors, disease-related factors and behavioural characteristics.

4.1 Sociodemographic characteristics of participants

Age distribution

The average age of patients was 36.2 years, range 18 to 63 years. Figure 2 presents the age distribution of participants. Majority of the patients, 92 % (n=167) were aged below 53 years. Only 8 % (n=14) were aged above 53 years. Most participants, 36 % (n=68) were aged between 27 and 35 years.

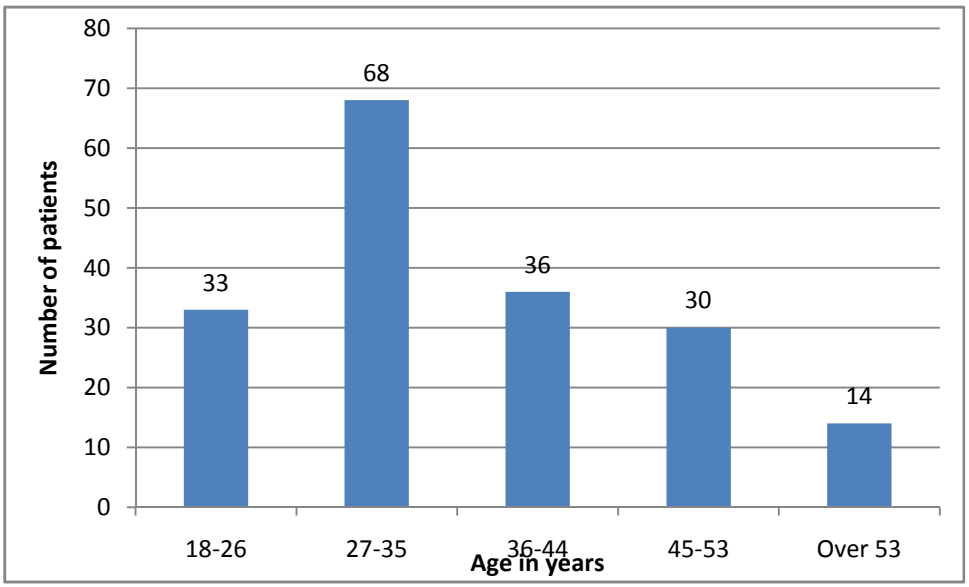


Figure 2: Age distribution of patients attending MTRH diabetes clinic

Gender

Females accounted for 62.4% (n = 113) patients in the study. The remaining 37.6 %(n=68) were males yielding a ratio of male-to-female patients of approximately 1: 2

Marital status

Majority of the participants, 70 %(n=126) were married, 15 %(n=28) were single while 11 %(n=19) were divorced. Only 4 %(n=8) of the study participants were widows/widowers (Figure 3).

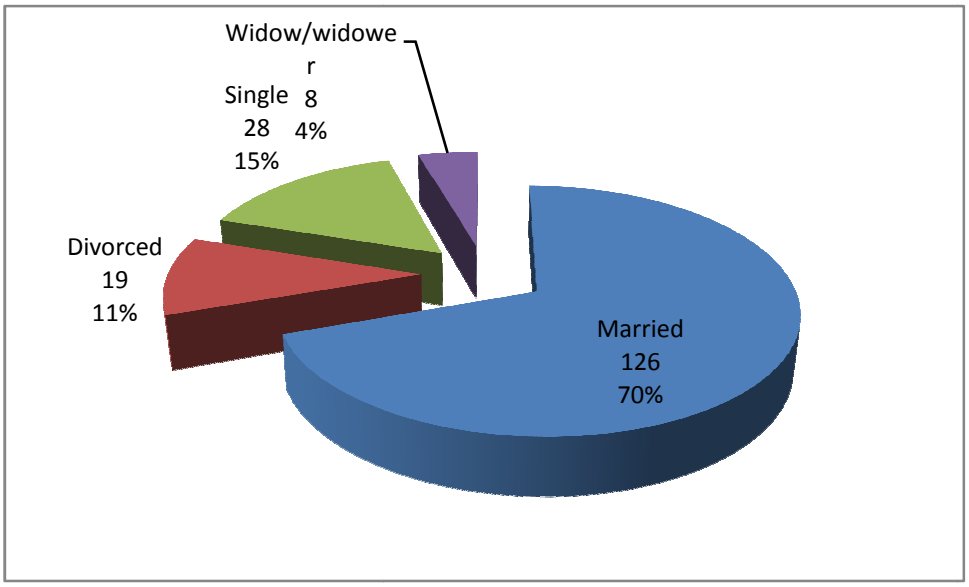


Figure 3: Marital status of patients attending the diabetes clinic at MTRH

Occupation

A majority of the study participants, 54 %(n=97) were engaged in business. 22 %(n=40) were formally employed, 18 %(n=33) were in farming and the rest, 6 % (n=11) were students (figure 4)

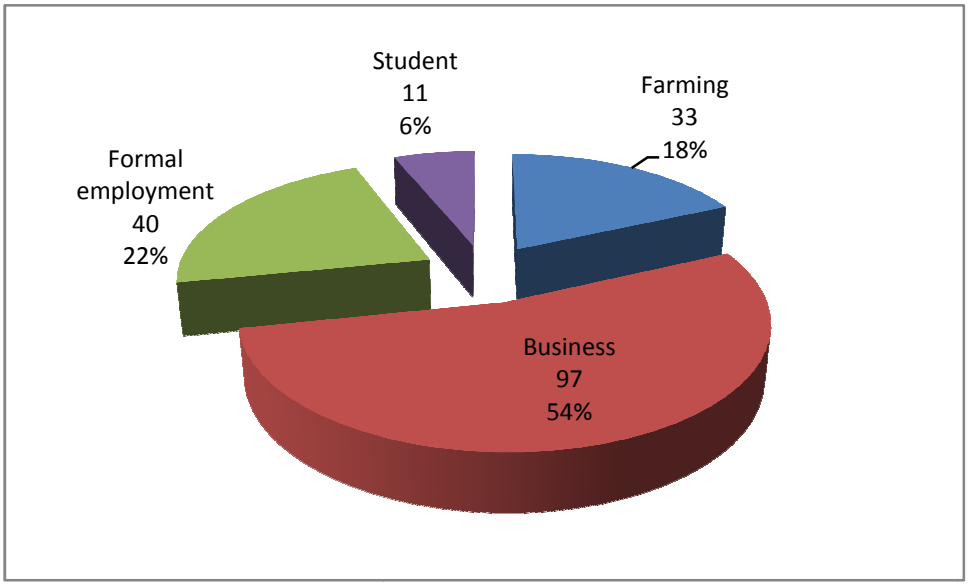


Figure 4: The occupation of patients attending MTRH diabetes clinic

Number of children

Majority of the study participants, 54.7 %(n=99) had between 1 and 3 children.19.9 % of the participants (n=36) had between 4 and 6 children, 18.2 %(n=33) had no children at all while7.2 %(n=13) had more than 6 children (figure 5)

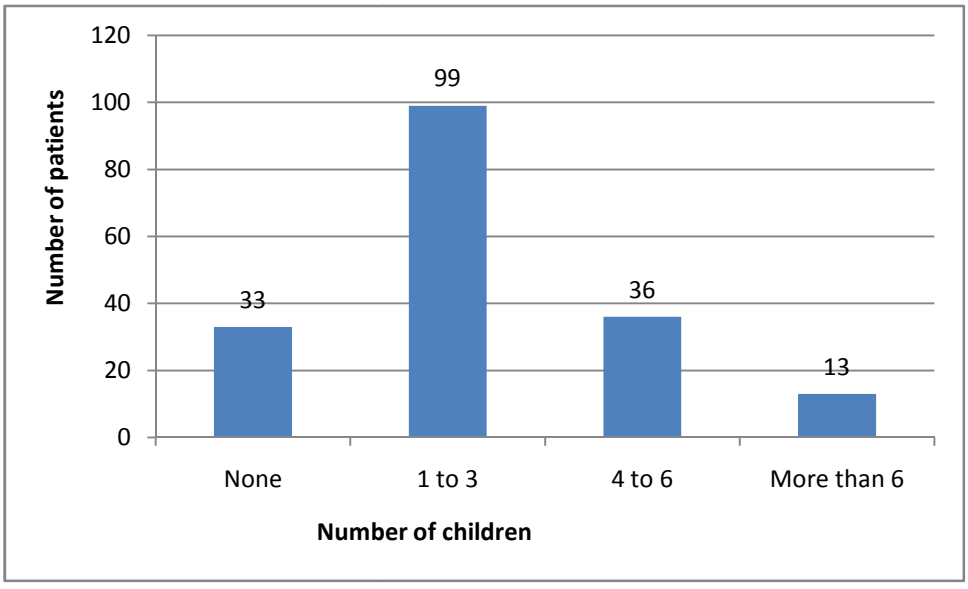


Figure 5: Number of children patients attending MTRH diabetes clinic have

Educational level

3%(n=5) of the study participants had no formal education,17%(n=30) did not complete primary education,22%(n=40)completed primary education,11%(n=20)did not complete secondary education and the rest,47%(n=85)had secondary education and above(figure 6)

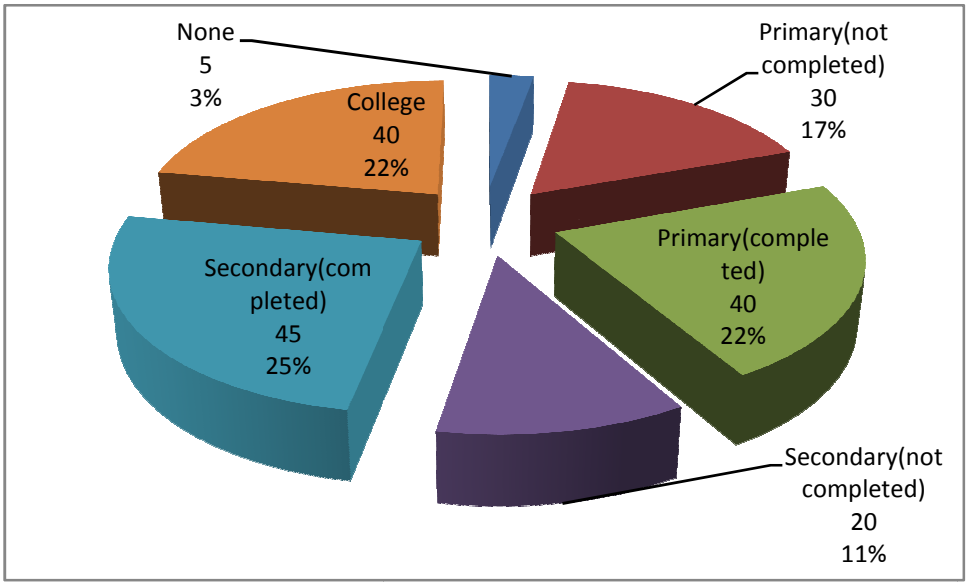


Figure 6: Level of education of patients attending MTRH diabetes clinic

Average monthly income

Majority 61.3 %(n=111) of the study participants earned less than Ksh 10,000 a month. Only 11.6 %(n=21) earned an income of more than Ksh 50,000 a month (figure 7)

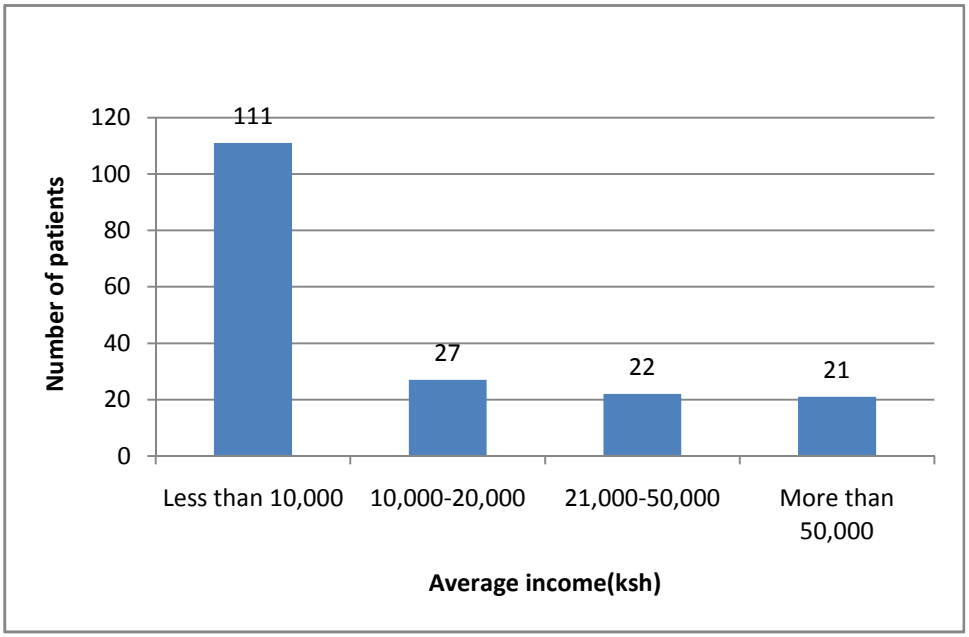


Figure 7: Average monthly income of patients attending MTRH diabetes clinic

Religious affiliation

Christians constituted 95 %(n=172) of the study participants. The remaining 5 %(n=9) were not affiliated to any religion.

Residence

Majority of the participants, 59 %(n=107) lived outside the municipality. Most of those that lived within the municipality had residencies in middle class residential areas (28 %, n=51) (figure 8)

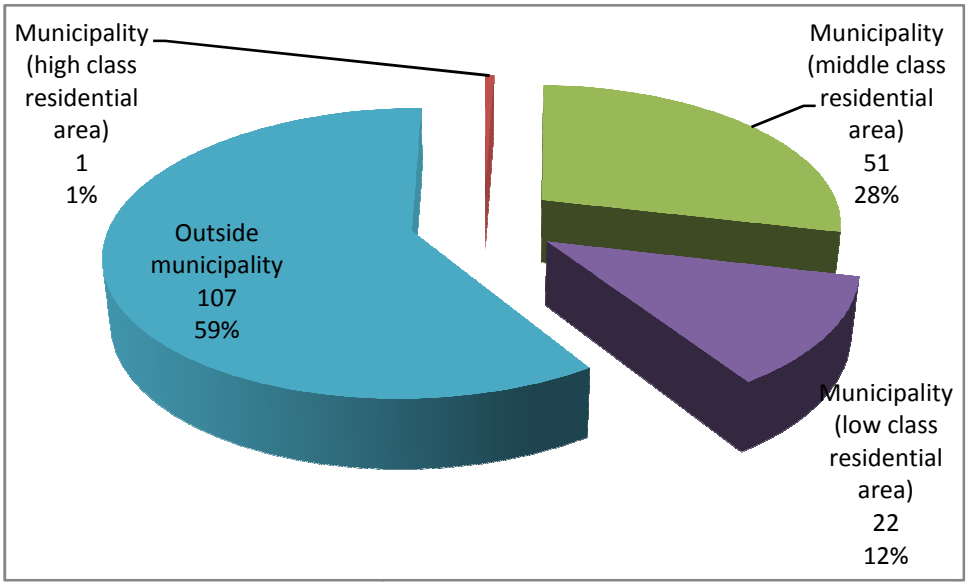


Figure 8: The residence of patients attending MTRH diabetes clinic

Family support

Majority of the study participants, 77 %(n=140) said they were supported by their families.23 % (n=41) reported lack of support from their families

4.2 Disease-related variables

Duration of illness

Majority of the participants, 68.5 %(n=124) have had diabetes for between 1 and 5 years. Only one participant (.6%) has had diabetes for more than 20 years (Figure 9)

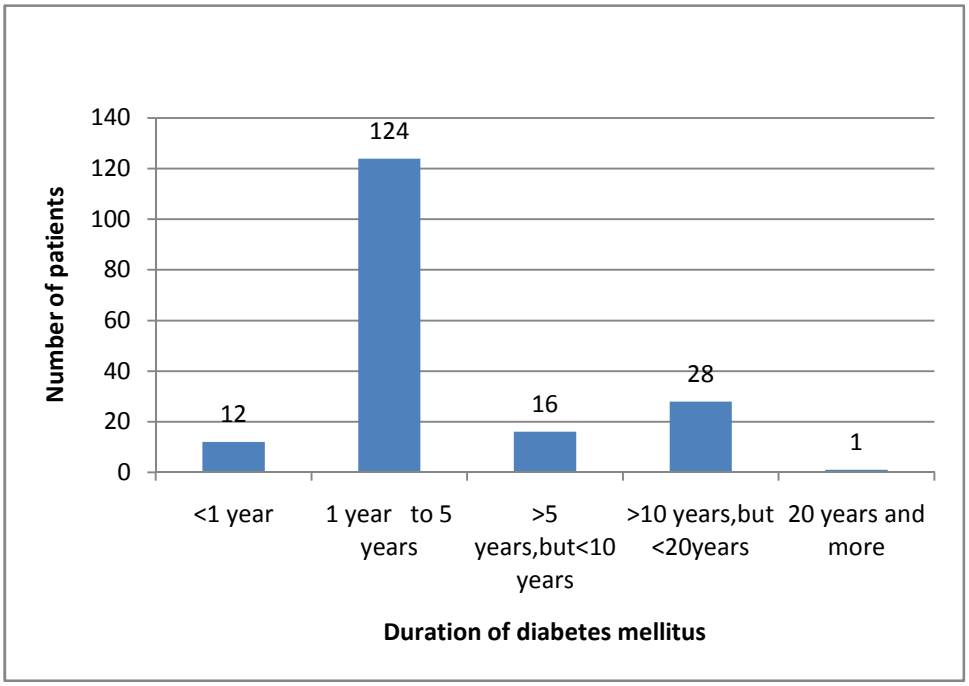


Figure 9: Length of time patients at MTRH diabetes clinic have suffered from diabetes

Type of diabetes mellitus

Most participants, 69 %(n=125) had a diagnosis of type 1 diabetes mellitus. The rest, 31 % (n=56) had type 2 diabetes mellitus.

Treatment modality

Most patients, 79.6 %(n=144) were on injections. The others, 19.9 %(n=36) were on oral tablets and .6 %(n=1) was on a combination of injections and tablets (Figure10)

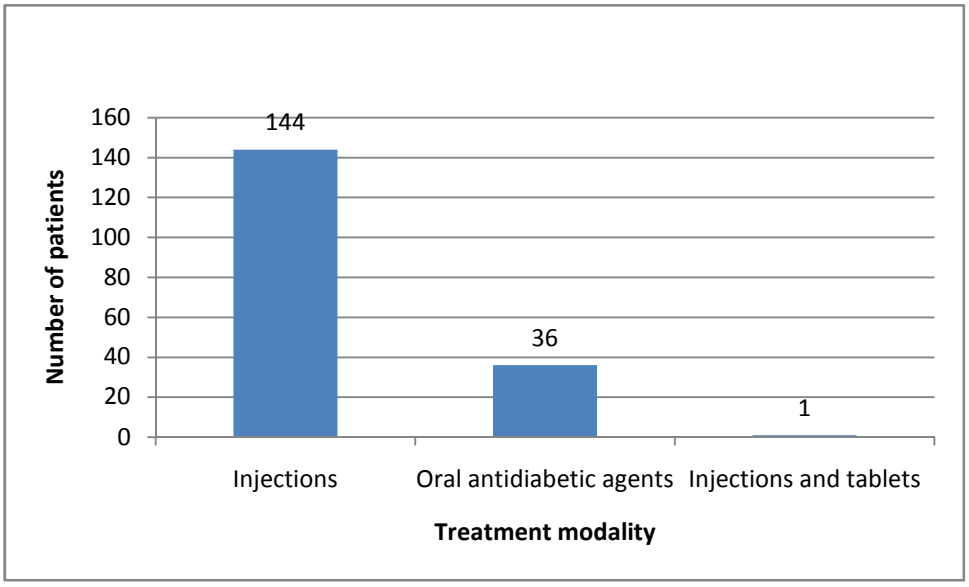


Figure10: The treatment modality used to manage patients at MTRH diabetes clinic

Adherence difficulties

Most of the patients 72 % (n=130) did not have difficulties adhering to the treatment regimen .The rest, 28 %(n=51) reported having difficulties with adherence to treatment.

Family history of diabetes mellitus

60 %(n=108) had a family history of diabetes mellitus.40 %(n=73) did not have a family history of diabetes mellitus.

Plasma glucose monitoring frequency

Most participants, 48.6 % (n=88) monitored their plasma glucose levels occasionally. 12.2 %(n=22) did not monitor blood glucose at all(figure11)

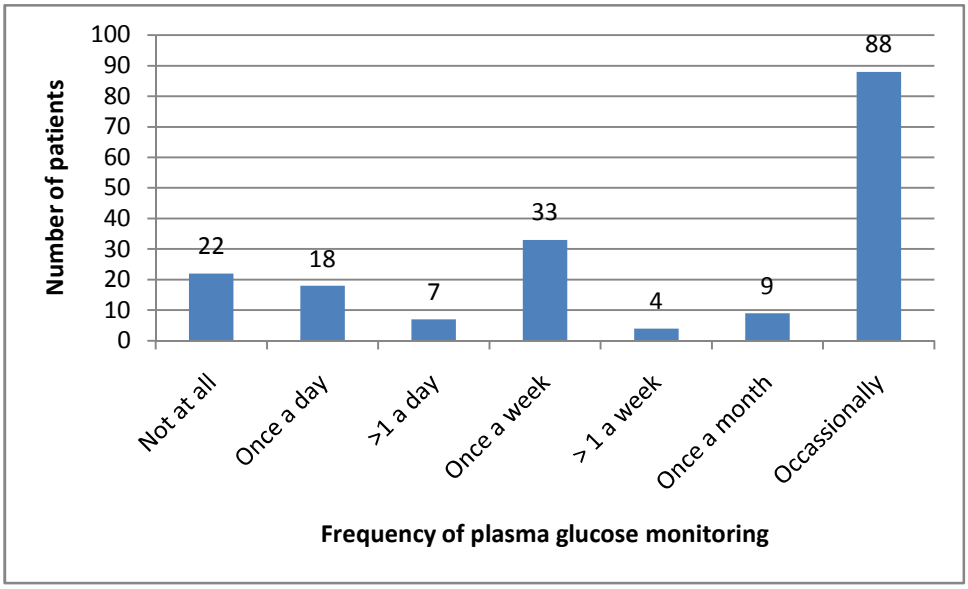


Figure11: Blood glucose monitoring frequency by patients at MTRH diabetes clinic

Presence of diabetes complications

Most patients, 76 %(n=138) had one or more complications of diabetes mellitus. The rest, 24 %(n=43) did not have any complications of diabetes mellitus.

4.3 Behavioural characteristics

Smoking

Most patients, 95% (n=172) were not smokers. The rest, 5 %(n=9) were smokers.

Alcohol consumption

Most patients, 94 %(n=170) did not consume alcohol. The rest, 6 %(n=11) were alcohol consumers.

4.4 Prevalence of depression among patients attending MTRH diabetes clinic

Most patients, 81 %(n=147) were not diagnosed with depression. The rest, 19 %(n=34) were diagnosed with depression ranging from mild (7 %, n=12) to severe depression (2 %, n=.3).10 %(n=19) had moderate depression (Figure 12)

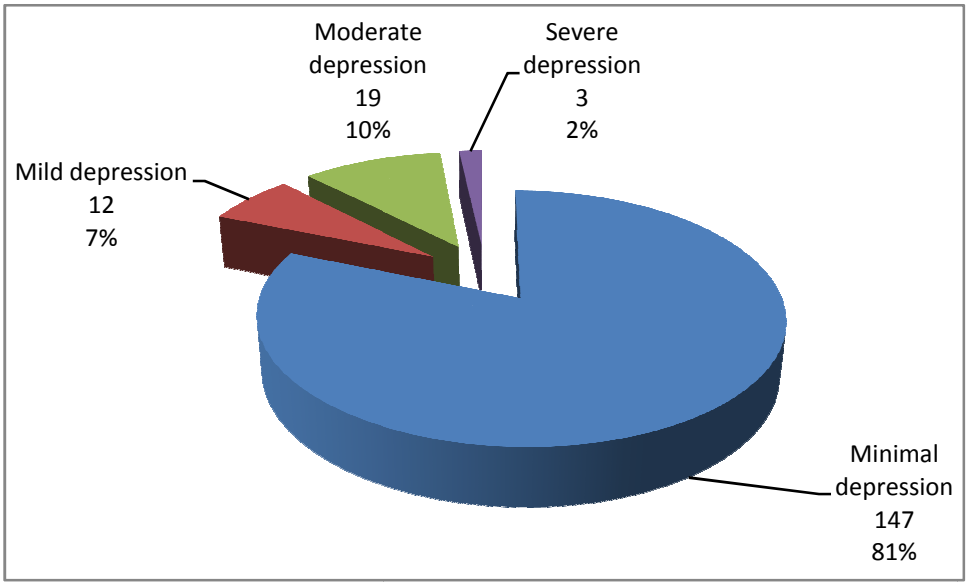


Figure 12: Prevalence of depression among patients attending MTRH diabetes clinic

4.5 Depression and sociodemographic factors

The occurrence of depression in diabetic patients was significantly associated with most sociodemographic characteristics.

Female patients had a higher prevalence of moderate depression compared to male patients (15.9% versus 1.5%) while male patients had a higher prevalence of mild depression than female patients (14.7% versus 1.8%). The prevalence of severe depression (2.7%) was higher in females than that observed in males (0%)

Single patients had a higher prevalence of moderate depression (42.9%) compared to patients in other marital states (0 to 5.3%, p <0.0001).

Depression was more prevalent (46.3%, p<0.0001) in patients without family support compared to their colleagues who had family support (10.7%, p< 0.0001)

Table 1: Association between Sociodemographic Variables and Depression

Variables	Minimum Depression	Mild Depression	Moderate Depression	Severe Depression	P Value
Age					
18-26	29(87.9)	1(3.0)	1(3.0)	2(6.1)	0.049
27-35	63(92.6)	1(1.5)	3(4.4)	1(1.5)	0.019
36-44	21(58.3)	1(2.8)	14(38.9)	0(0.0)	<0.0001
45-53	22(73.3)	8(26.7)	0(0.0)	0(0.0)	<0.0001
More than 53	12(85.7)	1(7.1)	1(7.1)	0(0.0)	0.928
Gender					
Male	57(83.8)	10(14.7)	1(1.5)	0(0.0)	<0.0001
Female	90(79.6)	2(1.8)	18(15.9)	3(2.7)	<0.0001
Marital status					
Married	110(87.3)	9(7.1)	6(4.8)	1(0.8)	0.001
Divorced	18(94.7)	0(0.0)	1(5.3)	0(0.0)	0.425
Single	12(42.9)	2(7.1)	12(42.9)	2(7.1)	<0.0001
Widow	7(87.5)	1(12.5)	0(0.0)	0(0.0)	0.684
No of children					
None	29(87.9)	1(3.0)	1(3.0)	2(6.1)	0.049
1-3	79(79.8)	3(3.0)	16(16.2)	1(1.0)	0.009
4-6	28(77.8)	7(19.4)	1(2.8)	0(0.0)	0.002
More than 6	11(84.6)	1(7.7)	1(7.7)	0(0.0)	0.944
Education level					
None	1(100.0)	0(0.0)	0(0.0)	0(0.0)	0.972
Primary-incomplete	12(66.7)	6(33.3)	0(0.0)	0(0.0)	<0.0001
Primary-complete	16(72.7)	1(4.5)	3(13.6)	2(9.1)	0.030
Secondary-incomplete	0(0.0)	0(0.0)	2(66.7)	1(33.3)	<0.0001
Secondary-complete	11(73.3)	1(6.7)	3(20.0)	0(0.0)	0.614
College	107(87.7)	4(3.3)	11(9.0)	0(0.0)	0.002
Religion					
None	8(88.9)	1(11.1)	0(0.0)	0(0.0)	0.681
Christianity	139(80.8)	11(6.4)	19(11.0)	3(1.7)	0.681
Family support					
Yes	125(89.3)	5(3.6)	8(5.7)	2(1.4)	<0.0001
No	22(53.7)	7(17.1)	11(26.8)	1(2.4)	<0.0001

4.6 Depression and socioeconomic factors

Table 2 shows that patient income and residence were significantly associated with depression. Patients residing within municipalities had higher prevalence of depression compared to those in rural areas ($p < 0.05$). Middle class municipality residents had prevalence of 23.5% for moderate depression ($p = 0.003$), and the prevalence of mild and moderate depression were 31.8% and 18.2%, respectively among residents in low class municipality areas ($p < 0.0001$).

Reported monthly income of between Ksh 10,000 and 20,000 was associated with higher prevalence of mild depression (29.6%), $p < 0.0001$.

Table 2 : Association Between Socioeconomic Variables and Depression

Variables	Minimum Depression	Mild Depression	Moderate Depression	Severe Depression	P Value
Occupation					
Farming	31(93.9)	2(6.1)	0(0.0)	0(0.0)	0.126
Business	79(81.4)	7(7.2)	8(8.2)	3(3.1)	0.294
Formal employment	28(70.0)	2(5.0)	10(25.0)	0(0.0)	0.007
Other	9(81.8)	1(9.1)	1(9.1)	0(0.0)	0.956
Average monthly income(Ksh)					
Less than 10,000	92(92.0)	0(0.0)	5(5.0)	3(3.0)	<0.0001
10,000-20,000	16(59.3)	8(29.6)	3(11.1)	0(0.0)	<0.0001
21,000-50,000	20(90.9)	2(9.1)	0(0.0)	0(0.0)	0.313
More than 50,000	9(81.8)	1(9.1)	1(9.1)	0(0.0)	0.956
Residence					
Municipality(High class)	0(0.0)	1(100.0)	0(0.0)	0(0.0)	0.003
Municipality(Middle class)	36(70.6)	3(5.9)	12(23.5)	0(0.0)	0.003
Municipality(Low class)	10(45.5)	7(31.8)	4(18.2)	1(4.5)	<0.0001
Outside municipality	101(94.4)	1(0.9)	3(2.8)	2(1.9)	<0.0001

4.7 Disease related factors and depression

Patients with recent diagnosis of diabetes (less than one year) had high prevalence of mild depression (66.7%), $p < 0.0001$, while longer durations of illness were associated with higher prevalence of moderate depression (25% for 5-10 years and 35.7% for 11-20 years), Table 3.

Treatment modality showed an association with depression. Patients on oral treatment had high prevalence of mild depression (16.7%) and those on injection had high prevalence of moderate depression (11.8%).

The prevalence of depression was significantly higher among patients who had difficulties adhering to treatment (37.5%, $p<0.0001$) compared to those who did not have difficulties adhering to treatment (11.5, $p < 0.0001$). Patients with family history of diabetes appeared to report consistently lower prevalence of depression (3.7%) in comparison to those without family history of depression (41.1%, $p < 0.001$).

Table 3 : ***Association Between Disease-related Variables and Depression***

Variable	Minimum Depression	Mild Depression	Moderate Depression	Severe Depression	P Value
Duration of illness					
<1 year	3(25.0)	8(66.7)	1(8.3)	0(0.0)	<0.0001
1 year and 5 years	118(95.2)	1(0.8)	4(3.2)	1(0.8)	<0.0001
>5 years,< 10 years	11(68.8)	1(6.3)	4(25.0)	0(0.0)	0.246
> 10 years <20 years	15(53.6)	1(3.6)	10(35.7)	2(7.1)	<0.0001
> 20 years	0(0.0)	1(100.0)	0(0.0)	0(0.0)	0.003
Type of diabetes					
Type 1	106(84.8)	4(3.2)	13(10.4)	2(1.6)	0.050
Type 2	41(73.2)	8(14.3)	6(10.7)	1(1.8)	0.050
Treatment modality					
Injection	118(81.9)	6(4.2)	17(11.8)	3(2.1)	0.038
Oral tablets	29(80.6)	6(16.7)	1(2.8)	0(0.0)	0.018
Injections and tablets	0(0.0)	0(0.0)	1(100.0)	0(0.0)	
Adherence difficulties					
Yes	32(62.7)	4(7.8)	14(27.5)	1(2.0)	<0.0001
No	115(88.5)	8(6.2)	5(3.8)	2(1.5)	<0.0001
Family history of diabetes					
Yes	104(96.3)	3(2.8)	1(0.9)	0(0.0)	<0.0001
No	43(58.9)	9(12.3)	18(24.7)	3(4.1)	<0.0001
Frequency of blood glucose monitoring					
Not at all	14(63.6)	7(31.8)	1(4.5)	0(0.0)	<0.0001
Once a day	18(100.0)	0(0.0)	0(0.0)	0(0.0)	0.202
>1 a day	3(42.9)	1(14.3)	1(14.3)	2(28.6)	<0.0001
Once a week	23(69.7)	0(0.0)	10(30.3)	0(0.0)	<0.0001
>1a week	2(50.0)	0(0.0)	1(25.0)	1(25.0)	0.002
Once a month	6(66.7)	2(22.2)	1(11.1)	0(0.0)	0.275
Occasionally	81(92.0)	2(2.3)	5(5.7)	0(0.0)	0.003

4.8 Behavioural characteristics and depression

Table 4 shows an association between alcohol consumption and depression. The prevalence of depression was 17.7% among patients who did not consume alcohol while a higher prevalence of 36.4% was seen in the group of patients who reported alcohol consumption (p = 0.031). Smoking was not associated with depression (p = 0.534).

Table 4: Association between behavioural characteristics and depression

Variable	Minimum Depression	Mild Depression	Moderate Depression	Severe Depression	P Value
Smoking					
Yes	9(100.0)	0(0.0)	0(0.0)	0(0.0)	0.534
No	138(80.2)	12(7.0)	19(11.0)	3(1.7)	0.534
Alcohol consumption					
Yes	7(63.6)	0(0.0)	4(36.4)	0(0.0)	0.031
No	140(82.4)	12(7.1)	15(8.8)	3(1.8)	0.031

CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

This was a cross-sectional study carried out at a diabetes outpatient clinic of a large teaching and referral hospital in Western Kenya. The objectives of the study were to determine the prevalence and the factors associated with depression among diabetes patients on follow-up at MTRH. Patients who had been suffering from diabetes mellitus for at least three months before the study were eligible to participate in the study.

In the study, depression was observed in 19% of the study participants. This rate is comparable to rates observed in studies done in other countries that included a study in India in which a prevalence range of 8.5% to 32.5% was observed(Chaudhry et al., 2010) and a study in the USA, where the prevalence of depression among adults has been reported to range between 2% and 28%(Li et al., 2008). The prevalence is, however, lower than that in a study conducted in a Nigerian teaching hospital in which a prevalence of 30% was observed(Bawo, Omoaregba, et al., 2010), and in Greece, where a rate of 33.4% was observed(Sotiropoulos et al., 2008b).

A number of factors were found to be significantly associated with depression. In this study, an association was observed between gender and depression. The prevalence of depression in females was higher than the prevalence of depression in males (20.4% versus 16.2%). A number of studies support this finding. In a study done in India, it was reported that the prevalence of depression observed in females is higher than that in males(Chaudhry et al., 2010). In another study in Bangladesh , it was demonstrated that depression is more common among females(Rahman et al., 2011). It is possible that diabetes mellitus may impair the fulfilment of gender specific social roles, hence the observed high proportion of depression in women.

There was a significant association between being single and depression. Single patients had a higher prevalence of depression (57.1%, $p<0.0001$) compared to patients in other marital states. This observation is consistent with findings of a study done in Bangladesh that reported that depression was common among single patients(Rahman et al., 2011). In a study done in Nepal, however, it was reported that marital status was not significantly associated with depression in patients living with diabetes mellitus(Niraula et al., 2013). Being single is stressing because it involves dealing with loneliness, stigma and lack of a supportive adult relationship, hence the high prevalence of depression in this group of patients.

As expected, family support was significantly associated with depression in this study. Those patients who did not get any kind of support from their families had a higher prevalence of depression (46.3%, $p<0.0001$) compared to the prevalence (10.7%, $p<0.0001$) among those patients that reported receiving family support. People with family support are likely to quickly mobilize resources that enable them deal with the distress that is brought about by the diagnosis of diabetes, hence the low prevalence of depression in this group of patients.

Low class municipality residents had a higher prevalence of depression (54.5%) compared to the prevalence (5.6%) among those patients who resided outside the municipality. Although it was not evaluated during the study, living outside the town enables the patient to have access to social support that is not available in the towns. Besides, rural areas are associated with a low cost of living. Hence, residents of rural areas are not exposed to the distressing challenges that their counterparts in the town are faced with. In study done in Nepal, it was observed that urban residence is associated with higher scores on the BDI scale(Niraula et al., 2013).

Patients with monthly income of between Ksh 10,000 and 20,000 had a higher prevalence of mild depression (29.6%,p<0.0001). Compared to other groups, patients with average income of less than ksh10, 000 had the highest prevalence of severe depression (3%, p<0.0001). This observation is supported by a study done in India in which it was reported that the prevalence of depression was higher among persons with low income(Mendenhall et al., 2012). From the Nepal study, however, it was reported that higher personal income was associated with higher scores on the BDI scale(Niraula et al., 2013). Low monthly income predisposes patients to economic distress because these patients are not able to afford the drugs and lifestyle that a diagnosis of diabetes imposes on them.

It was observed in this study that patients with recent diagnosis of diabetes had a high prevalence of mild depression (66.7%, p<0.0001) while those with longer duration of illness had a higher prevalence of moderate depression (25% for 5-10 years and 35.7% for 11-20 years). It seems that as the patients live longer with diabetes mellitus, there is deterioration in the symptoms and associated complications; hence the higher scores on the BDI scale. This finding differs from the findings of a study in Nepal that showed the early period of the disease to be associated with greater depression severity(Niraula et al., 2013).

Those patients who reported difficulties with adherence to treatment had a higher prevalence of depression (37.5%, p<0.0001). The prevalence of depression in those who did not have difficulties adhering to treatment was 11.5%. It can be speculated that since depression is associated with helplessness and loss of hope, people who are depressed are likely to encounter difficulties in the management of their condition, hence the high prevalence of depression in this group. This finding is supported by studies from a number of countries including(Kalsekar ID, Madhavan SS, Amonkar MM, Makela EH, Scott VG & BLM:, 2006) ,(Niraula et al., 2013) and(Goldney RD, Phillips PJ, Fisher LJ, 2004).

Those patients with a family history of the illness had a lower prevalence of depression (3.7%) compared to their counterparts who did not have a family history of the condition (prevalence of 41.1 %, $p<0.0001$). The possible explanation for this observation is that prior experience with a member of the family living with diabetes may reduce the fear and anxiety associated with being diagnosed with diabetes mellitus. Findings of the study done in Nepal support this observation of lower depression prevalence among patients with a family history of diabetes mellitus(Niraula et al., 2013).

Finally, among the behavioural characteristics assessed, alcohol consumption had a significant association with depression. While the prevalence of depression among patients who admitted to consuming alcohol was 36.4%, it was 17.7% among those who did not consume alcohol ($p=0.031$). This observation differs from the findings of a study on the risk of alcohol consumption, and depression multimorbidity in the American Indian and Alaskan native population(Tann, S.S., Yabiku, S.K., Yanow, J.2007). People who are depressed tend to consume alcohol in an attempt to run away from what is worrying them. There was no significant association between smoking and depression ($p=0.534$).

5.2 Conclusion

It is observed in this study that a significant proportion of patients diagnosed with diabetes mellitus have comorbid depression. The female gender, being single, lack of family support, urban residence and low income were the sociodemographic and socioeconomic factors that were observed to have a significant association with depression. Difficulties adhering to treatment and longer duration of illness were associated with increased severity of depression. The proportion of patients with depression was lower among those with a family

history of diabetes mellitus. Of the behavioural characteristics studied, only alcohol consumption was observed to be significantly associated with depression.

5.3 Recommendations

Based on the findings of this study, the following recommendations are made.

1. The screening and treatment of depression should be integrated into diabetes care settings. This will lead to early detection and treatment of depression that is usually concealed in patients suffering from diabetes mellitus.

2. Education about the symptoms, screening and treatment of depression in patients with diabetes should be provided. Primary care providers should encourage the patients to be proactive in identifying symptoms of depression and seeking treatment.

3. Further research is recommended to establish whether there is a causal relationship between the independent variables and depression.

REFERENCES

Andreoulakis, E., Hyphantis, T., Kandylis, D., & Iacovides, a. (2012). Depression in diabetes mellitus: a comprehensive review. *Hippokratia*, *16*(3), 205–14. Retrieved from http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3738724&tool=pmcentrez&rendertype=abstract

Bakan, G., & Akyol, A. D. (2008). Theory-guided interventions for adaptation to heart failure. *Journal of Advanced Nursing*, *61*(6), 596–608. doi:10.1111/j.1365-2648.2007.04489.x

Bawo, O. J., Morakinyo, O., Eze, G. O., Lawani, A. O., & Omoaregba, J. O. (2010). Depression and subjective quality of life among outpatients with diabetes mellitus at a teaching hospital in Nigeria. *Mental Health in Family Medicine*, *7*(3), 179–83. Retrieved from http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3018949&tool=pmcentrez&rendertype=abstract

Bawo, Omoaregba, J. O., & Eze, G. (2010). Depression among patients with diabetes mellitus in a Nigerian teaching hospital. *South African Journal of Psychiatry*, *16*(2), 61–64.

Bell, R. a, Smith, S. L., Arcury, T. a, Snively, B. M., Stafford, J. M., & Quandt, S. a. (2005). Prevalence and correlates of depressive symptoms among rural older African Americans, Native Americans, and whites with diabetes. *Diabetes Care*, *28*(4), 823–9. Retrieved from http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1592640&tool=pmcentrez&rendertype=abstract

Chaudhry, R., Mishra, P., Mishra, J., Parminder, S., & Mishra, B. P. (2010). Psychiatric morbidity among diabetic patients: A hospital-based study. *Industrial Psychiatry Journal*, *19*(1), 47–9. doi:10.4103/0972-6748.77637

Ferrari, A. J., Charlson, F. J., Norman, R. E., Patten, S. B., Freedman, G., Murray, C. J. L., … Whiteford, H. A. (2013). Burden of depressive disorders by country, sex, age, and year: findings from the global burden of disease study 2010. *PLoS Medicine*, *10*(11), e1001547. doi:10.1371/journal.pmed.1001547

Goldney RD, Phillips PJ, Fisher LJ, W. D. (2004). Diabetes, depression and quality of life: a population study. *Diabetes Care*, (27), 1066–107.

Gonzalez, J. S., Peyrot, M., McCarl, L. A., Collins, E. M., Serpa, L., Mimiaga, M. J., & Safren, S. A. (2008). Depression and diabetes treatment nonadherence: a meta-analysis. *Diabetes Care*, *31*(12), 2398–403. doi:10.2337/dc08-1341

Grothe, K. B., Dutton, G. R., Jones, G. N., Bodenlos, J., Ancona, M., & Brantley, P. J. (2005). Validation of the Beck Depression Inventory-II in a low-income African American sample of medical outpatients. *Psychological Assessment*, *17*(1), 110–4. doi:10.1037/1040-3590.17.1.110

Hailemariam, S., Tessema, F., Asefa, M., Tadesse, H., & Tenkolu, G. (2012). The prevalence of depression and associated factors in Ethiopia: findings from the National Health Survey. *International Journal of Mental Health Systems*, *6*(1), 23. doi:10.1186/1752-4458-6-23

Heeramun-aubeeluck, A., Lu, Z., & Luo, Y. (2012). Comorbidity of Depression and Diabetes : In a Nutshell, *3*(September), 787–794.

International Diabetes Federation. (2008). *The human,social and economic impact of diabetes*. Brussels: IDF.

International Diabetes Federation. (2012). *Diabetes atlas* (5th ed.). Brussels: IDF.

International Diabetes Federation. (2013). *Diabetes atlas* (6th ed.). Brussels: IDF.

Jenkins, R., Njenga, F., Okonji, M., Kigamwa, P., Baraza, M., Ayuyo, J., … Kiima, D. (2012a). Prevalence of common mental disorders in a rural district of Kenya, and socio-demographic risk factors. *International Journal of Environmental Research and Public Health*, *9*(5), 1810–9. doi:10.3390/ijerph9051810

Jenkins, R., Njenga, F., Okonji, M., Kigamwa, P., Baraza, M., Ayuyo, J., … Kiima, D. (2012b). Prevalence of common mental disorders in a rural district of Kenya, and socio-demographic risk factors. *International Journal of Environmental Research and Public Health*, *9*(5), 1810–9. doi:10.3390/ijerph9051810

Kagee, A. (2008). Depression and Anxiety among a Sample of South African Patients Illness. doi:10.1177/1359105308088527

Kalsekar ID, Madhavan SS, Amonkar MM, Makela EH, Scott VG, D. S., & BLM:, E. (2006). Depression in patients with type 2 diabetes: impact on adherence to oral hypoglycemic agentsNo Title. *Ann Pharmacother*, *40*(4), 605–611.

Kessler, R. C., Aguilar-Gaxiola, S., Alonso, J., Chatterji, S., Lee, S., & Ustün, T. B. (2009). The WHO World Mental Health (WMH) Surveys. *Psychiatrie (Stuttgart, Germany)*, *6*(1), 5–9. Retrieved from http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2995950&tool=pmcentrez&rendertype=abstract

Li, C., Ford, E. S., Strine, T. W., & Mokdad, A. H. (2008). Prevalence of depression among U.S. adults with diabetes: findings from the 2006 behavioral risk factor surveillance system. *Diabetes Care*, *31*(1), 105–7. doi:10.2337/dc07-1154

Lin, E. H. B., Korff, M. Von, Alonso, J., Angermeyer, M. C., Anthony, J., Bromet, E., … Williams, D. (2008). Mental disorders among persons with diabetes--results from the World Mental Health Surveys. *Journal of Psychosomatic Research*, *65*(6), 571–80. doi:10.1016/j.jpsychores.2008.06.007

Mendenhall, E., Shivashankar, R., Tandon, N., Ali, M. K., Narayan, K. M. V., & Prabhakaran, D. (2012). Stress and diabetes in socioeconomic context: a qualitative

study of urban Indians. *Social Science & Medicine (1982)*, *75*(12), 2522–9. doi:10.1016/j.socscimed.2012.09.040

Mugenda, A. G. M. and O. M. (2003). *Research Methods.Quantitative and Qualitative Approaches* (Revised Ed.). Nairobi: Acts P.

Ndetei, D. M., Khasakhala, L. I., Kuria, M. W., Mutiso, V. N., Ongecha-Owuor, F. A., & Kokonya, D. A. (2009). The prevalence of mental disorders in adults in different level general medical facilities in Kenya: a cross-sectional study. *Annals of General Psychiatry*, *8*, 1. doi:10.1186/1744-859X-8-1

Ndetei, D. M., Khasakhala, L. I., Mutiso, V., & Mbwayo, A. W. (2010). Suicidality and depression among adult patients admitted in general medical facilities in Kenya. *Annals of General Psychiatry*, *9*, 7. doi:10.1186/1744-859X-9-7

Ndetei, D. M., Khasakhala, L. I., Mutiso, V. N., & Mbwayo, A. W. (2009). Recognition of depression in children in general hospital-based paediatric units in Kenya: practice and policy implications. *Annals of General Psychiatry*, *8*, 25. doi:10.1186/1744-859X-8-25

Niraula, K., Kohrt, B. A., Flora, M. S., Thapa, N., Mumu, S. J., Pathak, R., … Shrestha, R. (2013). Prevalence of depression and associated risk factors among persons with type-2 diabetes mellitus without a prior psychiatric history: a cross-sectional study in clinical settings in urban Nepal. *BMC Psychiatry*, *13*, 309. doi:10.1186/1471-244X-13-309

Perveen, S., Otho, M. S., Siddiqi, M. N., Hatcher, J., & Rafique, G. (2010). Association of depression with newly diagnosed type 2 diabetes among adults aged between 25 to 60 years in Karachi, Pakistan. *Diabetology & Metabolic Syndrome*, *2*, 17. doi:10.1186/1758-5996-2-17

Rahman, M., Rahman, A., & Flora, M. S. (2011). Depression and associated factors in diabetic patients attending an urban hospital of Bangladesh. *Intern J Collaborative Res Intern Med Public Health*, *3*(1), 65–76.

Sotiropoulos, A., Papazafiropoulou, A., Apostolou, O., Kokolaki, A., Gikas, A., & Pappas, S. (2008a). Prevalence of depressive symptoms among non insulin treated Greek type 2 diabetic subjects. *BMC Research Notes, 1*, 101. doi:10.1186/1756-0500-1-101

Sotiropoulos, A., Papazafiropoulou, A., Apostolou, O., Kokolaki, A., Gikas, A., & Pappas, S. (2008b). Prevalence of depressive symptoms among non insulin treated Greek type 2 diabetic subjects. *BMC Research Notes*, *1*, 101. doi:10.1186/1756-0500-1-101

Tann, S.S., Yabiku, S.K., Yanow, J. (2007). TriaDD:The risk for alcohol abuse,depression and diabetes multimorbidity in the American Indian and Alaskan native population. *Am Indian Alsk Native Mental Health Res*, *14*(1), 1–23.

World Health Organization. (2012). WHO fact sheet on depression. WHO. Retrieved from http://www.who.int/mediacentre/factsheets/fs369/en/

APPENDICES

Appendix 1A: Information sheet

My name is Zablon Nyaberi. I am a student at the school of Nursing sciences of the University of Nairobi, pursuing a Master of Science in nursing degree. I am carrying out a study on the correlates of undiagnosed depression among patients attending the diabetes outpatient clinic at Moi Teaching and Referral Hospital.

I would like to invite you to take part in the study. Before you make a decision on your participation, please take time to read the following information carefully. Do not hesitate to ask questions or ask for more information if anything you read is not clear. Take time to decide whether you would like to or decline to participate in the study.

What is the purpose of the study?

I am doing this study in partial fulfilment of the requirements for the award of Master of Science in nursing degree of the University of Nairobi.

Why have I been invited?

You have been invited because you fit the criteria that have been set for inclusion in the study. All patients who are 18 years and over, suffer from diabetes mellitus and attend the diabetes outpatient clinic at Moi Teaching and referral Hospital are eligible to participate in the study. If you agree to participate, you will be among 180 people who will take part in the study.

Do I have to participate?

Taking part in this study is voluntary. If you agree to participate, I will ask you to sign a consent form to show you agreed to take part. You are free to withdraw your participation at

any time, without giving a reason. Withdrawing from the study will not, in any way, affect the standard of care that you receive in this hospital.

What will happen to me if I take part?

You will be asked questions by the researcher or a research assistant. The responses that you will give will be used to fill a questionnaire. Filling the questionnaire will take between 30 and 45 minutes.

All the information that is collected about you in the course of the study will be held in strict confidence and will be used for study purposes only. Don't allow your name to be indicated anywhere in the questionnaire.

What are the possible disadvantages and risks of participating in the study?

This study does not involve major risks to the participants. However, there is the risk of the participants suffering from distress by recollecting unpleasant memories or feelings. Should this happen, the researcher has organized for counselling services for those who will be distressed by unpleasant memories.

What are the possible benefits of taking part in the study?

I cannot promise the study will benefit you directly or immediately. However the information gathered from the study will shed more light on depression in patients suffering from diabetes mellitus .This may be used to cause a policy shift on routine screening of this group of patients for depression so that they can be treated.

What will happen if there is a problem?

If you have a concern about any aspect of this study, you should request to speak to the researcher. The researcher will do his best to answer your questions. The phone number of the researcher is ***0710694195***

If you feel unhappy about any aspect of the study and want to complain formally, you can do this through the **KNH/UON Ethics** and **Research committee (ERC).**The telephone number of **ERC** is *+**254-020- 2726300 extension 44355***

What will happen to the findings of the study?

The study findings will be published in a peer reviewed journal. The findings will also be shared with the management of Moi Teaching and Referral Hospital.

Contact details

1. The researcher

*Mobile phone: +**254-710694195***

*Email address:**bongoyemwengenya@yahoo.com***

2. KNH/UON ERC

*Telephone: +**254-020- 2726300 extension 44355***

*Email address:**uonknh_erc@uonbi.ac.ke***

3. MTRH/Moi University IREC

*Telephone: **+254-035-33471/2/3***

Thank you for taking your time to consider the study.

If you wish to participate in the study, please sign the attached consent form.

Appendix 1B: Kijikaratasi cha maelezo

Mimi ninaitwa Zablon Nyaberi. Mimi ni mwanafunzi katika chuo kikuu cha Nairobi. Ninasomea shahada ya uzamili katika uuguzi.Ninafanya utafiti kutimiza sehemu ya mahitaji ili kutuzwa shahada ya uzamili katika uuguzi ya chuo kikuu cha Nairobi.

Ningependa kukukaribisha ushiriki katika utafiti huu.Kabla ufanye uamuzi kuhusiana na kushiriki kwako,tafadhali soma taarifa ifuatayo kwa makini.Usisite kuuliza maswali au kuomba taarifa zaidi kama kuna jambo lolote lenye si wazi.Chukua mda wako kuamua kama ungependa au haungependa kushiriki.

Ni nini lengo la utafiti huu?

Ninafanya utafiti huu kutimiza sehemu ya mahitaji kwa ajili ya kutuzwa shahada ya uzamili katika uuguzi ya chuo kikuu cha Nairobi.

Ni kwa nini nimealikwa?

Umealikwa kwa sababu uko na sifa zinazoingiana na vigezo vilivyowekwa kwa ajili ya kuingizwa katika utafiti.Yeyote ambaye ako na umri wa miaka kumi na minane na zaidi,anakabiliwa na ugonjwa wa kisukari,na anahudhuria kiliniki katika hospitali ya rufaa ya Moi ako na nafasi ya shiriki katika utafiti.Kama utakubali kushiriki,utakuwa miongoni mwa watu mia moja tisini na tisa ambao watashiriki katika utafiti huu.

Ni lazima nishiriki?

Kushiriki ni hiari.Kama utakubali kushiriki,utahitajika kutia sahihi fomu ya idhini ili kuonyesha ya kwamba ulikubali kushiriki.Uko huru kujiondoa kwa utafiti wakati wowote bila kutoa sababu yoyote.Kujiondoa kwako hakutakuwa na athari yoyote kwa kiwango ya huduma ya matibabu unayopokea kwa hospitali hii.

Ninahitajika kufanya nini kama mshiriki?

Utapatiwa dodoso yenye utahitajika kujaza.Kutakuwa na mtu wa kukusaidia iwapo utahitaji usaidizi wa kujaza dodoso.Kujaza dodoso itakuchukua katika ya dakika thelathini hadi arobaini na tano.Taarifa yoyote yenye itakusanywa katika utafiti huu itawekwa siri na itatumika kwa minajili ya utafiti peke yake.Utaulizwa uhakikishe kwamba haujaweka jina lako mahali popote katika dodoso.

Kuna hatari yoyote inayoambatana na kushiriki?

Utafiti huu hauna hatari kubwa kwa mshiriki.Hata hivyo,kuna uwezekano kwa baadhi ya washiriki kusumbuliwa na kumbukumbu au hisia mbaya.Ikiwa kutakuwa na shida kama hii,mtafiti ameandaa huduma za ushauri kwa wenye wataathirika.

Kuna faida yoyote yenye nitapatata kama mshiriki?

Siwezi kukuahidi faida ya moja kwa moja au mara moja.hata hivyo,taarifa zitakazokusanywa zitaangazia matatizo ya huzuni wanayopitia watu walio na ugonjwa wa kisukari.Hii inaweza kutumika kusababisha mabadiliko ya sera ili ikuwe kawaida kwa kundi ili la watu Kuchunguzwa kwa minajili ya kupata huduma ya matibabu.

Nitafanya nini kama kuna tatizo?

Ukiwa na swali lolote kuhusiana na sehemu yoyote ya utafiti,unapaswa kuomba kuzungumza na mtafiti.Mtafiti atafanya kadiri ya uwezo wake kujibu maswali yako.Nambari ya simu ya mtafiti ni ***0710694195***.Ikiwa hautaridhika na ungetaka kulalamika rasmi,unaweza fanya hivyo kupitia kwa kamati ya maadili na utafiti ya hospitali kuu ya Kenyatta na chuo kikuu cha Nairobi.Nambari ya simu ya hiyo kamati ni **020 2726 300 ugani 44355.**

Matokeo ya utafiti yatafanyiwa nini?

Matokeo ya utafiti yatachapishwa katika jarida.Matokeo pia yatapeanwa kwa usimamizi wa hospitali ya rufaa ya Moi.

Maelezo ya mawasiliano

1. Mtafiti

Simu ya mkononi:***0710694195***

Barua pepe : ***bongoyemwengenya@yahoo.com***

2. Kamati ya maadili na utafiti ya KNH/UON

Simu : ***020 2726 300, ugani 44 355***

Barua pepe : ***uonknh_erc@uonbi.ac.ke***

3. Kamati ya maadili na utafiti ya MTRH/MU

*Simu : **33471/2/3***

Asante kwa mda wako.

Kama unataka kushiriki kwa utafiti, tafadhali tia sahihi katika fomu ya idhini.

Appendix 2A: Consent form

Please tick in the box beside each statement to indicate your consent.

1. I have read, or have had read to me in my first language the participant information sheet Yes [ ] No [ ]

2. I have been given sufficient time to consider whether or not to participate in this study

Yes [ ] No [ ]

3. I am satisfied with the answers I have been given regarding this study yes [ ] No [ ]

4.I understand that taking part in this study is voluntary and that I may withdraw my participation at any point without it affecting the standard of care I receive in the hospital Yes[ ] No[ ]

5. I consent to the research staff collecting information from me, including information about my health Yes [ ] No [ ]

6. I understand that my participation in this study is confidential and that no material, that could identify me personally, will appear on any reports on the study Yes [ ] No [ ]

7. I know who to contact if I have questions regarding the study yes [ ] No [ ]

I hereby consent to take part in the study.

Signature ……Date……

In the presence of (researcher/assistant)

Name……Signature……Date……

Appendix 2B: Fomu ya idhini

Tafadhali weka alama katika sanduku kando ya kauli kuonyesha umekubali kushiriki katika utafiti.

1.Nimesoma,au nimesomewa kwa lugha ninayoelewa nanimeelewa taarifa yote kuhusiana na kushiriki katika utafiti Ndio[ ] La[ ]

2.Nimepatiwa mda wa kutosha kufikiria kama nitashiriki katika utafiti Ndio[ ] La[ ]

3.Nimeridhika na majibu yenye nimepatiwa kuhusu utafiti Ndio[ ] La[ ]

4.Naelewa kwamba kushiriki katika utafiti ni hiari na ninaweza kujiondoa wakati wowote bila huduma yangu ya matibabu kuathirika Ndio[ ] La[ ]

5.Ninatoa idhini kwa wenye wanafanya utafiti kukusanya habari kunihusu,ikiwa ni pamoja na taarifa kuhusu afya yangu Ndio[ ] La[ ]

6.Naelewa kwamba kushiriki kwangu katika utafiti itawekwa siri na kwamba hakuna nyenzo,yenye inaweza kunitambua mimi binafsi,zitatumika kwa taarifa yoyote inayohusiana na utafiti huu Ndio[ ] La[ ]

7.Ninaelewa ni nani nitawasiliana naye ikiwa niko na swali lolote kuhusiana na utafiti huu kwa ujumla Ndio[ ] La[ ]

Nimekubali kushiriki katika utafiti.

Sahii ya mshiriki……Tarehe……

Jina la mtafiti……Sahii……Tarehe……

Appendix 3: Questionnaire

The correlates of undiagnosed depression among patients attending the diabetes

Outpatient clinic at Moi Teaching and Referral Hospital.

Serial number……Date……

Instructions

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

Section I: Sociodemographic variables

Q1.1. what is your age (in years)?

1.18-26 [ ] 2.27-35[ ] 3.36-44[ ] 4.45-53[ ] 5.Over 53[ ]

Q1.2. what is your gender?

1. Male [ ] 2.Female [ ] 3.Other [ ](specify)……

Q1.3 what is your marital status?

1. Married [ ] 2.Divorced [ ] 3.Single [ ] 4.Widow/widower

5. Other [ ] (specify)……

Q1.4 what do you do for a living?

1. Farming [ ] 2.Business [ ] 3.Formally employed [ ]

4. Other [ ](specify)……..

Q1.5 How many children do you have?

1. None [ ] 2.1-3[ ] 3.4-6[ ] 4.More than 6[ ]

Q1.6 what is your level of education?

1. None [ ] 2. Primary-incomplete [ ] 3.Primary-complete [ ]

4. Secondary-incomplete 5.Secondary-complete [ ] 6.College [ ]

Q1.7. what is your average monthly income?

1. Less than Ksh 10,000[ ] 2. Ksh10, 000 to 20,000[ ]

4. Ksh21, 000 to Ksh 50,000[ ] 4. More than Ksh50, 000[ ]

Q1.8. Which religion are you affiliated to?

1. None [ ] 2.Christianity [ ] 3.Islam [ ] 4.Other [ ](specify)……..

Q1.9. Where do you stay?

1. Within the municipality in a high class residential area[ ]
2. Within the municipality in a middle class residential area[ ]
3. Within the municipality in a low class residential area[ ]
4. Outside the municipality/outside town [ ]

Q1.10. Do you receive any kind of support from your family?

1. Yes [ ] 2.No [ ]

Section II: Disease-related variables

Q2.1. For how long have you been suffering from diabetes mellitus?

1. Less than one year [ ] 2.Between 1 year and five years [ ]

3. More than 5 years but less than 10 years [ ] 4.More than 10 years but less than 20 Years [ ] 5.More than 20 years [ ]

Q2.2.Type of diabetes mellitus (ascertain from the file)

1. Type 1 diabetes mellitus [ ] 2.Type 2 diabetes mellitus [ ]

Q2.3. What do you use to manage the condition (diabetes mellitus)?

1. Injections [ ] 2.Oral tablets [ ] 3.Diet and exercise only [ ] 4. Mixed [ ]

Q2.4. Do you have any difficulties adhering to the treatment regimen?

1. Yes [ ] 2.No [ ]

Q2.5. Is there any other person in your family who suffers from diabetes mellitus?

1. Yes [ ] 2. No [ ]

Q2.6. How often do you monitor your blood glucose levels?

1. Not at all [ ] 2.Once a day [ ] 3.More than once a day [ ] 4.Once a week [ ]
5. More than once a week [ ] 6.Once a month [ ] 7.Occassionally [ ]

Q2.7. Do you have any complications of diabetes mellitus?

1. Yes [ ] 2.No [ ]

Section III: Behavioural characteristics

Q3.1. Do you smoke?

1. Yes [ ] 2.No

Q3.2. Do you take alcohol?

1. Yes [ ] 2.No [ ]

Appendix 4 A: Beck Depression Inventory-II (BDI-II)

Instructions

Below are 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 in the **past two weeks**, including today .Circle the number beside the statement that you have picked. If several statements in a group seem to apply equally well to you, circle the highest number in that group. **Do not choose more than one statement for any group**. Make sure you read all the statements in each group before making your choice.

1. Sadness

    0 .I do not feel sad

    1. I feel sad

    2. I am sad all the time and I can't get out of it

    3. I am so sad or unhappy that I can't stand it

2. Pessimism

    0. I am not discouraged about the future

    1. I feel more discouraged about the future than I used to be

    2. I do not expect things to work out for me

    3. I feel my future is hopeless and will only get worse

2. 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 I 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 many things I have done or should have done

2. I feel quite guilty most of the time

3. I feel guilty all 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 in myself

3. I dislike myself

8. Self criticalness

0. I do not criticise or blame myself more than usual

1. I am more critical of myself than I used to be

2. I criticise myself for all of my faults

3. I blame myself for everything bad that happens

9. Suicidal thoughts

0. I do not have any thoughts of killing myself

1. I have thoughts of killing myself, but I would not carry them ou

2. I would like to kill myself

3. I would kill myself if I had the chance

10. Crying

0. I do not 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

11. Agitation

0. I am 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 that it is hard to stay 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 than before

    2. I have lost most of my interest in other people or things

    3. It is hard to get interested in anything

13. Indecisiveness

    0. I make decisions about as well as ever

    1. I find it more difficult to 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 do not consider myself as worthwhile and as useful as I used to feel

    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

    2. I do not have enough energy to do very much

    3. I do not have enough energy to do anything

16. Change in sleep pattern

0. I have not experienced any change in my sleep pattern

1a.I sleep somewhat more than usual

1b.I sleep somewhat less than usual

2a.I sleep a 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 hours early and can't get back to sleep

17. Irritability

0. I am no more irritable than usual

1. I am more irritable than usual

2. I am much more irritable than usual

3. I am irritable all the time

18 .Change in appetite

0.I have not experienced any changes in my appetite

1a.My appetite is somewhat less than usual

1b.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

19. Concentration difficulty

0. I can concentrate as well as ever

1. I can’t concentrate as well as before

2. It is hard to keep my mind on anything for very long

3. I find I can’t concentrate on anything

20. Fatigue

0. I am no more tired or fatigued than usual

1. I get tired or fatigued more easily than 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 changes in my interest in sex

1. I am less interested in sex than I used to be

2. I am not much interested in sex now

3. I have lost interest in sex completely

Appendix 4B: Beck Depression Inventory (Kiswahili version)

Yafuatayo ni mafungu ya sentensi.Kutoka kila fungu, chagua sentensi ambayo inaeleza vyema vile umekuwa ukihisi majuma mawili yaliyopita na unavyohisi leo.Weka alama ya mviringo kwa nambari ya sentensi uliyochagua.

Hakikisha umesoma sentensi zote katika fungu kabla ya kuchagua sentensi inayoelezea vile unahisi

1. Huzuni

    0. Sina huzuni

    1. Nina huzuni

    2. Nina huzuni wakati wote na siwezi kujiondoa katika hali hii ya huzuni

    3...Nina huzuni sana mpaka siwezi kustahimili

2. Kutokuwa na matumaini

    0. Sijavunjika moyo hasa na siku za usoni

    1. Nahisi nimevunjika moyo na siku za usoni

    2. Ninahisi sina ninalotarajia siku za usoni

    3. Ninahisi nimekata tama ya siku za usoni,na naona mambo hayawezi kuwa bora zaidi

3. Kushindwa maishani

0. Sijihisi kama nimeanguka maishani
1 Ninahisi nimeanguka maishani zaidi ya mtu wa kawaida
2 Nikiangalia maisha yangu yaliyopita naona nimeanguka sana
3 Nahisi nimeanguka kabisa maishani

4.Kutokuwa na furaha

0. Naridhika na mambo kama ilivyo kawaida yangu
1 Sifurahii mambo kama nilivyokuwa nikifurahia
2 Sitosheki tena kikamilifu na jambo lolote
3 Sitosheki wala sichangamshwi na chochote tena

5.Hisia za hatia

0 Sihisi hasa kama nina hatia Fulani
1 Nahisi nina hatia wakati mwingine
2 Nahisi nina hatia wakati mwingi
3 Nahisi nina hatia wakati wote

6.Hisia za kuadhibiwa

0 Sihisi kama nina adhibiwa

1 Nahisi kama naweza kuadhibiwa

2 Natarajia kuadhibiwa

3 Nahisi ninaadhibiwa

7.Kujichukia

0 Sihisi kama nimekasirikia nafsi yangu

1 Nimekasirikia nafsi yangu

2 Najidharau

3 Najichukia

8.Kujikosoa

0 Sihisi kama mimi ni mbaya zaidi ya mtu yeyote Yule

1 Najisuta sana katika makosa yangu ama udhaifu wangu

2 Najilaumu wakati wote kwa makosa yangu

3 Najilaumu kwa hofu lolote linalotendeka

9.Mawazo ya kujiua

0 Sina wazo lolote la kujiua

1 Nina wazo la kujiua,lakini sitalitimiza wazo hilo

2 Ningetaka kujiua

3 Nitajiua nikipata nafasi

10.Kulia

0. Silii siku hizi zaidi ya vile ilivyo kawaida yangu

1 .Nalia siku hizi zaidi ya ilivyokuwa kawaida yangu

2 .Nalia wakati wote siku hizi

3 .Nilikuwa nikiweza kulia,lakini sasa hata nikitaka kulia siwezi

11.Kushindwa kutulia

0 .Sikasirishwi kwa urahisi siku hizi zaidi ya ilivyokuwa kawaida yangu

1 .Nakasirishwa kwa urahisi zaidi ya ilivyokuwa kawaida yangu

2 .Nahisi nimekasirishwa wakati wote siku hizi

3 .Sikasirishwi kamwe na mambo ambayo yalikuwa yakinikarisirisha

12.Hamu ya kujumuika na watu

0 .Sijapoteza hamu ya kujihusisha au kujumuika na watu

1 .Hamu yangu ya kujihusisha na watu imepungua zaidi ya ilivyokuwa

2 .Nimepoteza sana hamu yangu ya kujihusisha na watu

3 .Nimepotesha hamu yangu yote ya kujihusisha na watu

13.Kuamua

0 .Ninafanya uamuzi kuhusu jambo lolote kama kawaida

1 .Ninahairisha kufanya uamuzi zaidi ya vile nilivyokuwa nikifanya

2 .Nina uzito mkubwa wa kufanya uamuzi kuliko hapo awali

3 .Siwezi tena kufanya uamuzi wa jambo lolote lile

14.Kutokuwa na thamani

0 .Sihisi kuwa naoneka vibaya zaidi ya vile nilivyokuwa

1 .Nina wasi wasi kuwa naonekana sivutii

2 .Ninahisi kuwa kuna mabadiliko yasiyo ondoka kwenye umbo langu yanayofanya nisifutie

3 .Nina amini ya kuwa nina sura mbaya

15.Upungufu wa ngufu mwilini

0 .Naweza fanya kazi kama vile ilivyokuwa hapo awali

1 .Ni lazima nifanye bidii,ndipo nianze kufanya jambo lolote

2 .Inabidi nijilazimishe sana ili niweze kufanya jambo lolote

3 .Siwezi kabisa kufanya kazi yoyote

16.Mabadiliko ya usingizi

0 . Ninalala kama kawaida yangu

1 .Silali vyema kama nilivyokuwa nikilala hapo awali

2 .Naamka mapema kwa saa moja au masaa mawili, ambayo sio kawaida yangu,halafu ni ngumu kupata usingizi tena

3 .Naamka mapema zaidi ya masaa mawili ,ambayo si kawaida yangu,halafu siwezi kupata usingizi tena

17. Kukasirika.

0.Sikasirikangi haraka kushinda kawaida

1.Ninakasirika haraka kushinda kawaida

2. Ninakasirika haraka zaidi kushinda kawaida

3. Huwa nimekasirika wakati wote

18.Mabadiliko ya hamu ya chakula

0 .Hamu yangu ya chakula sio mbaya zaidi ya vile ilivyokuwa hapo awali

1 .Hamu yangu ya chakula sio nzuri kama ilivyokuwa hapo awali

2 .Hamu yangu ya chakula ni mbaya sana siku hizi

3 .Sina tena hamu ya chakula hata kidogo

19.Kuwaza

0 .Kumakinika kwangu in kama hapo awali

1 .Siwezi waza jambo moja kama hapo awali

2 .Ni vigumu kuwaza jambo moja kwa mda mrefu

3 .Siwezi waza jambo lolote

20.Kuchoka

0 .Sichoki zaidi ya nilivyokuwa nikichoka hapo awali

1 .Nachoka kwa urahisi zaidi ya kawaida yangu

2 .Nachoshwa karibu na kila jambo ninalofanya

3 .Ninachoka sana,hata siwezi kufanya lolote

21.Hamu ya kushiriki ngono

0 .Sijaona mabadiliko yoyote hivi karibuni kuhusu hamu ya kufanya mapenzi

1 .Hamu yangu ya kufanya mapenzi imepungua zaidi ya vile ilivyokuwa

2 .Hamu yangu ya kufanya mapenzi imepungua sana siku hizi

3 .Nimepoteza kabisa hamu yangu ya kufanya mapenzi

Appendix 5: Permission to conduct research at MTRH

MOI TEACHING AND REFERRAL HOSPITAL

Telephone: 2033471/2/3/4
Fax: 61749
Email: director@mtrh.or.ke
Ref: ELD/MTRH/R.6/VOL.II/2008

P. O. Box 3
ELDORET

13th June, 2014

Zablon Nyaberi,
School of Nursing Sciences,
College of Health Sciences,
UNIVERSITY OF NAIROBI.

RE: APPROVAL TO CONDUCT RESEARCH AT MTRH

Upon obtaining approval from the Institutional Research and Ethics Committee (IREC) to conduct your research proposal titled:-

"The Correlates of Undiagnosed Depression among Patients attending the Diabetes Outpatient at Moi Teaching and Referral Hospital".

You are hereby permitted to commence your investigation at Moi Teaching and Referral Hospital.

DR. JOHN KIBOSIA
DIRECTOR
MOI TEACHING AND REFERRAL HOSPITAL

CC - Deputy Director (CS)
- Chief Nurse
- HOD, HRISM

Appendix 6: Approval by MTRH/MU IREC

INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE (IREC)

MOI TEACHING AND REFERRAL HOSPITAL
P.O. BOX 3
ELDORET
Tel: 33471/2/3

MOI UNIVERSITY
SCHOOL OF MEDICINE
P.O. BOX 4606
ELDORET

Reference: IREC/2014/118
Approval Number: 0001196

13th June, 2014

Zablon Nyaberi,
School of Nursing Sciences,
College of Health Sciences
NAIROBI- KENYA.

Dear Mr. Nyaberi,

RE: FORMAL APPROVAL

The Institutional Research and Ethics Committee has received your request for approval of your study titled:-

"The Correlates of Undiagnosed Depression among Patients Attending the Diabetes Outpatient at Moi Teaching and Referral Hospital".

On the basis of your study review and approval by the KNH/UoN-Ethics and Research Committee (KNH/UoN-ERC), IREC is glad to inform you that your study has been granted a Formal Approval Number: **FAN: IREC 0001196** on 13th June, 2014. You are therefore permitted to continue with your study.

Note that this approval is for 1 year; it will thus expire on 12th June, 2015. If it is necessary to continue with this research beyond the expiry date, a request for continuation should be made in writing to IREC Secretariat two months prior to the expiry date.

You are required to submit progress report(s) regularly as dictated by your proposal. Furthermore, you must notify the Committee of any proposal change (s) or amendment (s), serious or unexpected outcomes related to the conduct of the study, or study termination for any reason. The Committee expects to receive a final report at the end of the study.

Sincerely,

PROF. E. WERE
CHAIRMAN
INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE

INSTITUTIONAL RESEARCH & ETHICS COMMITTEE
13 JUN 2014
APPROVED
P.O. Box 4606-30100 ELDORET

cc Director - MTRH
Principal - CHS
Dean - SOM
Dean - SOP
Dean - SON
Dean - SOD

Appendix 7: Approval by KNH/UON ERC

UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
(254-020) 2726300 Ext 44355

KNH/UON-ERC
Email: uonknh_erc@uonbi.ac.ke
Website: www.uonbi.ac.ke

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/170 Link:www.uonbi.ac.ke/activities/KNHUoN 5th June 2014

Zablon Nyaberi
School of Nursing Sciences
College of Health Sciences
University of Nairobi

Dear Zablon

Research proposal: The correlates of undiagnosed depression among patients attending the Diabetes the Diabetes outpatient at Moi Teaching and Referral Hospital (P136/03/2014)

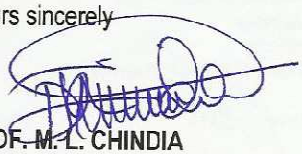
This is to inform you that the KNH/UoN-Ethics & Research Committee (KNH/UoN-ERC) has reviewed and **approved** your above proposal. The approval periods are 5th June 2014 to 4th June 2015.

This approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b) All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH/UoN ERC before implementation.
c) Death and life threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH/UoN ERC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH/UoN ERC within 72 hours.
e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
f) Clearance for export of biological specimens must be obtained from KNH/UoN-Ethics & Research Committee for each batch of shipment.
g) Submission of an *executive summary* report within 90 days upon completion of the study This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/or plagiarism.

For more details consult the KNH/UoN ERC website **www.uonbi.ac.ke/activities/KNHUoN.**

Yours sincerely



PROF. M.L. CHINDIA
SECRETARY, KNH/UON-ERC

c.c. The Principal, College of Health Sciences, UoN
The Deputy Director CS, KNH
The Chairperson, KNH/UoN-ERC
The Assistant Director, Health Information, KNH
The Director, School of Nursing Sciences, UoN
Supervisors: Dr. Oyieke Jennifer, Dr.Chege Margaret, Dr. Mwaura James

Appendix 8: Time frame

Duration(in Weeks) / Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Concept development	■																	
Proposal Writing		■	■															
Approval by Ethics committee				■	■	■												
Recruitment and training of research assistants							■											
Data collection									■	■	■	■	■	■				
Data cleaning and entry															■			
Data analysis																■		
Report writing and presentation																	■	
Compilation of final report and dissemination																		■

Appendix 9: Budget

Item	Units	Number of units	Unit cost(Ksh)	Total Cost(Ksh)
Proposal development				
Internet	Hours	50	60	3000
Printing	Pages	54	5	270
Photocopying	Pages	108	2	216
Binding	Copies	3	120	360
KNH ERC	Numbers	1	2000	2000
Subtotal				**5860**
Materials and equipment				
Pens	Numbers	10	10	100.00
Staples	Boxes	4	200	800.00
Stapler	Numbers	2	500	1000.00
Subtotal				**1900.00**
Data collection tools				
printing	Pages	8	5	40.00
Photocopying	Pages	1592	3	4776.00
Subtotal				**4816.00**
Allowances				
Researcher	Days	25	1500	37500.00
Statistician	Numbers	1	6000	6000.00
Research assistant	Days	25	500	12500.00
Subtotal				**56000.00**
Book binding				
Printing	Pages	88	5	440.00
Photocopying	Pages	528	2	1056.00
Binding	Copies	7	350	2450.00
Subtotal				**3946.00**
Grand Total				**72508.00**