PREVALENCE AND FACTORS ASSOCIATED WITH DEPRESSION AND ANXIETY AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS ATTENDING JERICHO SPECIALIST HOSPITAL IBADAN, OYO STATE

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A PROJECT SUBMITTED TO THE DEPARTMENT OF EPIDEMIOLOGY AND MEDICAL STATISTICS, FACULTY OF PUBLIC HEALTH, UNIVERSITY OF IBADAN

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTERS OF PUBLIC HEALTH DEGREE IN CLINICAL EPIDEMIOLOGY

NOVEMBER, 2017

CERTIFICATION

We certify that this work was carried out in the Department of Epidemiology and Medical Statistics, Faculty of Public Health, University of Ibadan under my supervision.

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DEDICATION

This work is dedicated to the King of kings and the Lord of lords, for 'HIS MERCY, LOVE AND GRACE'

ACKNOWLEDGEMENT

My profound gratitude goes to the Almighty father, the creator of heaven and earth for His enablement in my life.

I acknowledge with gratitude my supervisors, Prof. Olufunmilayo I. Fawole and Dr. Adetokunbo T. Salawu, for their encouragement, patience and support to make this research a reality. I specially appreciate their unwavering support and immense guidance.

I wish to express my sincere gratitude to my Head of Department, Dr. O.B. Yusuf and to all my lecturers. Special thanks go to non-academic staff of the department. My gratitude also goes to my colleagues especially Mr Agbola Seyi. Also, I appreciate Dr. J.O. Adeyinka, Chief consultant of Jericho Specialist Hospital, Ibadan for his support and encouragement.

I sincerely appreciate the unwavering and unrelenting efforts of my best friend and husband, Olukayode for his love and my precious God's gifts David, Sharon, Hephzibah and Joshua. Without you all, I could not have made it this far!

ABSTRACT

Diabetes Mellitus (DM) is a chronic, debilitating and costly disease affecting more than 1.56 million people in Nigeria. The psychosocial stress of having this chronic disease, its treatment, burden associated with living with DM and its debilitating consequences could result in depression and anxiety. Coexistence of depression and anxiety in patients with DM results in worse diabetes outcomes, decreased life satisfaction, poor quality of life, increase health-care utilization and cost. However, there is dearth of studies on coexistence of depression and anxiety among patients with type 2 DM in Nigeria. This study therefore determined the prevalence and factors associated with anxiety and depression among patients with type 2 DM.

This study was a hospital based cross-sectional survey using a semi-structured interviewer-administered questionnaire and physical examination. Data were collected from 273 patients with type 2 DM aged 40 years and above who had been receiving treatment for at least three months at the Medical Out Patient Clinic of Jericho Specialist Hospital (JSH), Ibadan. Respondents were selected using systematic sampling technique. Information on sociodemographic, medical and psychosocial factors related to DM were obtained. Depression, Anxiety and Social support were assessed by using Zung's Self Depression Rating Scale, Beck Anxiety Inventory and Multidimensional Scale of Perceived Social Support respectively. Descriptive statistics, Chi square and multiple logistic regression were used to analyze the data. P value was set at 0.05.

The mean age of the respondents was 62.1±10.2 years. The median duration of having type 2 DM was 4years. Most of the respondents were female (85.3%). About one quarter (27.5%) had depression, out of which 26.4% had mild depression. Anxiety was reported by 16.5% of the respondents, while 4.4% had comorbidity of depression and anxiety. More than half (56.0%) of the respondents had moderate perceived social support while 37.4% and 6.6% had high and low social support respectively. Families provided most of the social support while friends provided the least social support. Depression in this study was significantly associated with being widowed, having low social support and being physically inactive. The predictor of depression after adjustment for confounders was physical inactivity (OR=1.726; 95%CI=1.007-2.959). Christians were 2.3 times more likely to have anxiety compared to those who were Muslim (OR=2.251; 95%CI=1.100-4.605).

Clinicians need to screen for depression and anxiety when treating patients with type 2 DM so that they can receive comprehensive case management and have good clinical outcomes.

Keywords: Depression, Anxiety, Type 2 Diabetes Mellitus, Social support.

Word count: 407

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LIST OF ABBREVIATIONS

BAI	-	Beck Anxiety Inventory
BMI	-	Body Mass Index
BP	-	Blood Pressure
DAN	-	Diabetes Association of Nigeria
DM	-	Diabetes mellitus
ESRD	-	End Stage Renal Disease
FBG	-	Fasting blood glucose
HPA	-	Hypothalamic pituitary axis
IDF	-	International diabetes federation
JSH	-	Jericho Specialist Hospital
MOP	-	Medical Outpatients
MSPSS	-	Multidimensional scale of perceived social support
STAI	-	State trait anxiety index
SS	-	Social Support
WHO	-	World Health Organization
ZSDS	-	Zung self-rating depression scale

CHAPTER ONE

INTRODUCTION

1.0 Background of the study

Diabetes Mellitus is a metabolic disease characterized by hyperglycaemia and disturbances of carbohydrate, fat, and protein metabolism due to absolute or relative deficiency of insulin secretion. DM is classified into four types. Type 1 DM (previously known as insulin-dependent, juvenile or childhood-onset) is characterized by deficient insulin production and constitutes less than 3% of DM cases in Nigeria. Its onset is usually acute and more than 95 % of people with type 1 DM develop it before the age of 25 (Diabetes association of Nigeria (DAN), 2013). Type 2 DM (formerly called non-insulin-dependent or adult-onset) results from the body's ineffective use of insulin. It constitutes the major type of DM all over the world. In Nigeria, more than 95% cases of DM are type 2 DM. It is highly associated with a family history of DM, older age, obesity and sedentary lifestyle. Typically, type 2 DM affects people older than 40 years, however, it has been diagnosed in children and adolescents as a result of epidemic of obesity in children (DAN), 2013).

In developing countries, the increasing prevalence of DM is due to civilization, change in lifestyle and diets, shift to sedentary lifestyle and increasing awareness (WHO, 2016, Oputa, 2015, DAN, 2013). Gestational DM occurs in pregnancy and usually disappears when a pregnancy is over. Other specific types of DM are those resulting from specific genetic syndromes, surgery, drugs, malnutrition, infections, and other illnesses (WHO global report, 2016, DAN, 2013).

Diabetes Mellitus (DM) is a global health problem with an increasing prevalence worldwide (WHO, 2016). It causes enormous burden on the individual, family, health

services and the country at large (Oputa, 2015). The World Health Organization (WHO) projects that DM will be the seventh leading cause of death in 2030 and that almost half of all deaths attributable to hyperglycaemia will occur before the age of 70 years (WHO, 2016). The global prevalence of DM among adults 18 years and above increased from 4.7% in 1980 to 8.5% in 2014. This increase was more rapid in middle and low income countries (WHO, 2016). Globally in 2015, there were 415 million people with DM, out of which 14.2 million resided in Africa and more than 1.56 million cases was reported in Nigeria (IDF, 2015). Nigeria therefore, had the highest burden of DM in Africa. Two third of DM cases reside in the urban areas of Nigeria (Oputa, 2015).

The economic burden of DM in Nigeria is enormous in terms of its direct and indirect costs (Okoronko et al. 2016). Expenditures are incurred on direct cost such as the cost of drugs, investigations, cost incurred for visiting and receiving treatment within and outside the health facility and other costs incurred as a result of the treatment attributed to DM (Okoronko et al. 2016).

DM is associated with severe complications such as blindness, kidney failure, heart attacks, stroke and lower limb amputation (WHO, 2016). Thus, chronic psychosocial stress of having such a chronic disease, the high cost of its treatment, the stress associated with living with its debilitating consequences could result in depression and anxiety among patients. Comorbidity of depression and anxiety with DM is complex and bidirectional. The complex interaction of social, psychological and biological factors may result in depression (WHO, 2017, Dejean et al, 2013).

Depression is a leading cause of disability worldwide. It is a major contributor to the overall global burden of disease and its burden increases globally (WHO, 2017). It affects all ages

worldwide but the burden is 50% higher for females than male (WHO, 2012). Anxiety is a common mental disorder in the population. It contributes to significant morbidity, productivity loss and poor quality of life. Also, it is a risk factor for development of substance abuse and it often coexists with other mental disorder such as depression and physical conditions such as DM, epilepsy (Maideen et al. 2015). Studies have shown that the occurrence of depression and anxiety is more among people with DM compare to the general population (Rajput et al, 2016, Collins et al, 2009). Also, almost one in six diabetic patients have depression which coexist with anxiety (Mossie et al, 2017). Coexistence of depression, anxiety in patients with DM results in worse diabetes outcomes, decreased life satisfaction, poor quality of life, increase health-care utilization and cost (Egede and Ellis, 2010).

1.1 Problem statement

DM, anxiety, and depression, are three conditions which are common worldwide. Majority of the cases are in developing countries and each constitutes a public health problem ((WHO, 2016, WHO, 2017). Coexistence of these three debilitating conditions are associated with significant morbidity, mortality and healthcare costs (Egede and Ellis, 2010). DM is a chronic medical illness, prevalent worldwide and nearly reached epidemic proportions. Three quarters of people with DM live in low and middle income countries. Nigeria has one third of DM burden in Africa (WHO, 2016, IDF, 2015). Apart from its complications, it is a major risk factor for cardiovascular disease such as stroke which is a major cause of disability and loss of productivity in adults. The economic burden of DM is high such that it accounts for 12% of global health expenditure. Also, an individual die from DM every six seconds (5.0 million deaths) (IDF, 2015). In Nigeria, DM has been

associated with the resurgence of tuberculosis due to immunosuppression, rising prevalence of end-stage kidney disease, erectile dysfunction, lower extremity amputation and stroke (Lawson, et.al, 2017, WHO, 2017). In addition, DM and its complications is responsible for a higher proportion of all admissions in Nigerian medical wards. It causes the longest hospital stay and highest medical bills for patients (Young et al. 2016).

Depression is the second leading cause of year loss to disability (YLDs) and leading cause of disability-adjusted life years (DALYs). It causes poor functioning at work, at school and in the family and if severe could lead to suicide (WHO, 2017). The prevailing situations such as economic recession, unemployment, insecurity, increased debt and high level of stress at work are risk factors for the development of depression (WHO, 2012). The burden of depression on the society lead to increase cost on health care system and loss of productivity.

In a study in Malaysia, adults who were depressed had almost 19 times higher risk of having anxiety compared to those without depression (Maideen et al., 2015). Coexistence of depression and anxiety among people with DM is associated with decreased adherence to treatment, poor blood glucose control, higher complication rates, decreased quality of life, increased healthcare services and cost of utilization, increased disability, loss of productivity and increased risk of death (Mosaku et al, 2008, Egede and Ellis, 2010).

1.2 Justification for the study

DM is a treatable condition and its consequences could be avoided or delayed by lifestyle modification and regular screening. Despite the frequent occurrence of depression and

anxiety among people with DM, prevalence and factors associated with anxiety has not been adequately studied in Nigeria as most studies focused on depression alone. There are several validated, easy-to-administer tools available to facilitate diagnosis and monitoring of outcomes in patients with depression and anxiety. However, these are not routinely used by clinicians thus the disorders remained under-recognized and undertreated (Vermani, et al, 2011, Hassan et al, 2016).

Although, there are effective treatments for depression, yet globally, less than 50% of cases receive treatments (WHO, 2017). This could be due to lack of awareness, poor knowledge and stigmatization. The coexistence of anxiety and depression in people with DM is associated with significant negative impact in self-care, glycaemic control and health outcomes (Andreoulakis, 2012). Lack of assessment has been identified as a barrier to effective treatment of coexistence of depression and anxiety in people with DM (WHO, 2017). Therefore, there is need to screen for depression and anxiety among DM patients to determine their prevalence.

There are studies on depression among people with DM. There is dearth of study on coexistence of depression and anxiety among patients with type 2 DM in Nigeria. Hence, this study will inform the practice of clinicians. The information obtained will provide data to support the content of health education, commencement of treatment and effective management of cases to improve treatment outcomes. In addition, the findings of this study are expected to provide data needed by health planners to promote optimal treatment, institution of lifestyle modification and comprehensive follow up. Furthermore, data from this study can be used as monitoring, advocacy and educational tools in enhancing holistic care. This study will also provide baseline information about the prevalence and factors

associated with depression and anxiety among patients with type 2 DM in Ibadan, Nigeria. It will serve as a guide for the development of interventions for DM patients in Nigeria.

1.3 General objective

To determine the prevalence and factors associated with depression and anxiety among patients with type 2 DM attending Medical Outpatient clinic, Jericho Specialist Hospital, Ibadan.

1.3.1 Specific objectives

1. To determine the prevalence of depression among patients with type 2 DM.
2. To determine the prevalence of anxiety among patients with type 2 DM.
3. To assess the level of social support perceived by patients with type 2 DM.
4. To identify factors associated with depression among patients with type 2 DM.
5. To identify factors associated with anxiety among patients with type 2 DM.

1.4 Research questions

1. What is the prevalence of depression and anxiety among patients with type 2 DM?
2. What level of social support is perceived by patients with type 2 DM?
3. What are the factors associated with depression and anxiety among patients with type 2 DM?

CHAPTER TWO

LITERATURE REVIEW

2.0 Diabetes mellitus

Diabetes mellitus (DM) is a metabolic disease with hyperglycaemia as its central feature, it affects many organs in the body and its long-term consequences has significant impact on quality of life (WHO, 2016, IDF, 2015). Thus, it is one of the four important non-communicable diseases (Cardiovascular Disease, Diabetes Mellitus, Cancer and Chronic Obstructive Pulmonary Disease) targeted for prevention and control (WHO global report, 2016). The prevalence of DM has been increasing steadily over the years such that 1 in 11 adults have DM (WHO, 2016, IDF, 2015). Globally, 422 million people had DM in 2014, which was 8.5% of the adult population (WHO, 2016). This rise in prevalence is more in low- and middle-income countries where three quarters of people with DM live (WHO, 2016, IDF,2015). It is due to population expansion, urban migration, declining physical activity and dietary factors (WHO, 2016). In the projection of DM burden for the year 2050 among adult population in United States of America, it was estimated that annual diagnosed DM incidence will increase from about 8 cases per 1,000 in 2008 to about 15 cases in 2050 and total DM prevalence (diagnosed and undiagnosed cases) will increase from 14% in 2010 to 21% by 2050, such that one in four persons will have DM in 2050 (Boyle et al, 2010).

DM has a wide range of prevalence across Africa (WHO global report,2016). In a population-based household survey in Nairobi, Kenya, age adjusted prevalence of DM was 5.3% while in Uganda, a population-based national survey found prevalence of 1.4% (Ayah et al, 2013, Bahendeka et al, 2016). Nigeria, the most populous country in Africa, has high

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burden of DM. (IDF, 2015). In a review of population-based studies on DM in Nigeria involving both urban and rural populations, the prevalence of DM ranged from 0.8% to 11% (Dairu, 2016).

DM-related morbidity and mortality is high (WHO, 2016, IDF, 2015). In 2012, an estimated 1.5 million deaths were directly caused by DM and another 2.2 million deaths were attributable to hyperglycaemia (WHO, 2016, IDF, 2015). Adults with DM have a 2-3-fold increased risk of heart attacks and strokes, lower limb amputation rates are 10 to 20 times higher among diabetic patients. DM is responsible for 2.6% of global blindness and 12–55% of end stage renal failure (ESRD) is attributable to it. The incidence of ESRD is 10 times higher among diabetic patients than those without DM (WHO global report, 2016). Apart from its complications, DM is a major risk factor for Cardiovascular disease which is a major cause of disability and loss of productivity in adults (WHO global report, 2016). Thus, DM is a public health problem with huge economic burden to people with DM, their families, health systems and national economies through direct medical costs and loss of work and wages (WHO global report, 2016).

Types of diabetes mellitus

Type 1 DM- previously called insulin-dependent diabetes mellitus (IDDM) or juvenile-onset DM. It accounts for about 5% of DM, majority of which occur in children and adolescents (WHO, 2016). IDF reported that 542,000 children globally have type 1 DM. (IDF, 2015). It is characterized by deficiency of insulin production by the pancreas. The exact causes are unknown, autoimmune destruction of the beta-cells of the pancreas is involved and it is currently not preventable. (WHO, 2016)

Type 2 DM- previously called non-insulin-dependent diabetes mellitus (NIDDM) or adult-onset DM. It accounts for about 95% of DM, it is usually seen in adults, though it has been found in children. It is characterized by resistance to insulin at target cell receptors (WHO, 2016). Type 2 DM results from interactions of non- modifiable risk factors (such as age, sex, family history of DM, ethnicity) and modifiable risk factors (such as overweight or obesity, physical inactivity, alcohol intake and smoking) (WHO global report, 2016). Globally, more than1 in 3 adults were overweight and more than 1 in 10 were obese in 2014 (WHO global report, 2016). In a study on risk factors correlates of DM in Kenya, DM correlates were: 13.1% smoking, 74.9% alcohol consumption, 75.7% high level of physical inactivity; 16.3% obese and 29% overweight. Also, higher rates were found in women, risk of type 2 DM increases with age and its prevalence peak at 45-54years (Ayah et al, 2013). Type 2 DM could be prevented, or its onset and its consequences delayed through behavioural and environmental changes (WHO global report, 2016).

Gestational DM- it occurs in pregnancy and usually disappears when a pregnancy is over. Women with gestational DM are at an increased risk of complications during pregnancy and at delivery,1 in 7 births is affected by gestational diabetes. Also, it increases risk of type 2 diabetes in the future (WHO global report, 2016).

Other specific types of diabetes- These are DM resulting from specific genetic syndromes, surgery, drugs, malnutrition, infections, and other illnesses (WHO global report, 2016).

2.1 Depression

Depression is a mental disorder prevalent in both developed and developing countries affecting people in all communities across the world (Marcus et al, 2012). Globally, more than 300 million people of all ages suffer from depression (WHO, 2017). Depression impairs cognitive and social functioning resulting in decreased performance with effect on the individual, family, occupation and society (Lepine and Briley, 2011). Depression is a major contributor to the global burden of disease in form of morbidity, disability, mortality, economic burden and family burden (Ferari, et al, 2010, Marcus et al, 2012). In addition, the burden of depression had increased (Lepine and Briley, 2011). In 1990, depression was the fourth leading cause of burden worldwide, while in 2000, it was the third leading cause of disease burden (Ferari, et al, 2010, Marcus et al, 2012). In the global burden of disease 2010, depression was identified as the leading cause of disease burden and the leading cause of disability adjusted life years DALYs worldwide. Also, it was the second leading cause of year loss to disease YLDs (WHO, 2017, Ferari, et al, 2010). Thus, depression burden increased by 37.5% between 1990 and 2010 (Ferari, et al, 2010). Furthermore, depression has a major impact on mortality risk by suicide and ischemic heart disease increasing the overall burden of depressive disorders to 3.8% of global disability adjusted life years (Ferari, et al, 2010).

Depression refers to a state of low mood and indisposition to activity that can influence one's thoughts, behaviour, emotions and sense of well-being experience (American Psychiatric Association, 2013). International statistical classification of diseases and related health problems defines 10 symptoms for depression, three of which are core depressive symptoms (depressed mood, loss of interest or pleasure and reduced energy).

Two of these typical symptoms should be present most days, most of the time for at least 2 weeks to make a diagnosis of depression. Other depressive symptoms include disturbed sleep, poor concentration, low self-confidence, poor or increased appetite, loss of libido, suicidal thoughts or acts, agitation or slowing of movements and guilt or self-blame (WHO ICD-10, 1992). Depression could be mild, moderate or severe (with or without psychotic symptoms) depending on the number and severity of symptoms. In mild depressive episode there is some difficulty in continuing with ordinary work and social activities but in severe depressive episode, there is limitation in performing social, work, or domestic activities (American Psychiatric Association, 2013).

The aetiology of depression is multifactorial, contributing causes include genetics, environmental factors, and neurochemical influences. In depression there is imbalance of neurochemical serotonin, dopamine, and/or norepinephrine. (WHO, 2017) Worldwide, there are certain risk factors associated with a higher risk of depression. These include gender, socioeconomic status, marital status, social support, age, occurrence of adverse life events, family history of depression or mental illness, substance use and presence of chronic medical conditions such as stroke, DM (Afolabi et al, 2008, Marcus et al, 2012).

2.2 Anxiety

Anxiety disorders are common, chronic, disabling mental disorder affecting people all over the world (Remes et al, 2016). The term anxiety is a normal process in life characterized by the feelings of tension and worry thoughts and it is usually transient. However, when it becomes severe, persistent or impair life functioning it is regarded as a disorder. Anxiety disorder is characterized by feelings of fear, anxiety and related behavioural disturbances

(American Psychiatric Association, 2013). Fear is the emotional response to real or perceived imminent threat, whereas anxiety is anticipation of future threat. Fear is associated with surges of autonomic arousal necessary for fight or flight, thoughts of immediate danger and escape behaviours while anxiety is associated with muscle tension and vigilance in preparation for future danger and cautious or avoidant behaviour (American Psychiatric Association, 2013). Many patients with anxiety disorders experience physical symptoms which vary depending on the type of anxiety disorder, generally, the features of anxiety disorder are headache, excessive sweating, muscle spasms, palpitation and high blood pressure. According to the American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders (DSM-5) anxiety disorders include separation anxiety disorder, selective mutism, specific phobia, social anxiety disorder (social phobia), panic disorder, agoraphobia, generalized anxiety disorder, substance/medication-induced anxiety disorder and anxiety disorder due to another medical condition.

The portion of the brain controlling fear and anxiety is Amygdala, which is a pair of small almond-shaped clusters of neurons near the base of the brain (Schumann et al, 2011). Anxiety disorders contribute to morbidity and mortality through neuroendocrine, neuroimmune mechanisms or by direct neural stimulation. Anxiety disorders are caused by an interaction of biopsychosocial factors, including genetic vulnerability which interact with situations, stress, or trauma to produce clinically significant disorder (Schumann et al, 2011).

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The global current prevalence of anxiety disorders was 7.3 % and past year prevalence was 11.6 % in a systematic review and meta regression (Baxter et al., 2013). Point prevalence of anxiety disorders was estimated at 3.8% in 1990 and 4.0% in 2010 (Baxter et al., 2014). In the Nigerian Survey of Mental Health and Well-Being, anxiety disorders were the most common with 5.7% lifetime and 4.1% 12-month rates (Gureje et al. 2006). Anxiety disorders are generally more prevalent in women than in men, women are almost twice as likely to be affected as men (American Psychiatric Association, 2013). Anxiety symptoms are more common in patients with diabetes compared to those without DM, also risk of anxiety disorders was found to be slightly higher among people with DM.

2.3 Assessment of depression and anxiety

Depression can be assessed using self-report questionnaires or by standardized diagnostic interviews (Hirschfeld, 2001). Standardized diagnostic interviews is a clinical interview carried out by a clinician or a trained professional using either a semi structured interview such as the Structured Clinical Interview for DSM-IV (SCID), the Hamilton Rating Scale for Depression, the Diagnostic Interview Schedule (DIS) or the Composite International Diagnostic Interview (CIDI). These Standard interviews, can yield a clinical diagnosis according to the Statistical Manual of Psychiatric Disorders, 4th edition (DSM-IV) but it is a lengthy assessment, time-consuming requiring healthcare professional, thus its extensive use in large population-based surveys is costly.

In contrast, self-report questionnaires can establish provisional diagnoses, they have good psychometric properties, have convenient number of items, it is understandable, free of charge and easily accessible (Hirschfeld, 2001). Thus, because of its brevity, cheap cost

and acceptability it is recommended for screening in primary and secondary care settings for depression. These tools have been validated and used in studies in Nigeria.

The self-report questionnaires for depression include Beck Depression Inventory (BDI), it is a questionnaire that is widely used for detecting depression and it had been used in different populations. The Center for Epidemiological Studies Depression Scale (CES-D) is a self-administered questionnaire used to assess current levels of depressive symptoms in the general population (epidemiological studies). The Patient Health Questionnaire (PHQ-9) is used to detect and measure severity of depression among medical population in clinical setting. It is also useful to assess the symptom severity and monitor symptoms evolution and treatment response. Geriatric depression scale (GDS) is used to assess depression in the elderly (65years to 85years and above) and not for younger adults. Zung Self-Rating Depression Scale (ZSDS) is widely used as a screening tool, covering affective, psychological and somatic symptoms associated with depression. It can be effectively used in a variety of settings, including primary care, psychiatric, drug trials and various research situations. The scores provide indicative ranges for depression severity that can be useful for clinical and research purposes. The Zung scale also provides a simple tool for monitoring changes in depression severity over time in research studies (Smarr and Keffer, 2011).

The self-report questionnaires for assessing anxiety include Hospital anxiety and depression scale (HADS), the anxiety section is a self-assessment scale reliable in detecting states of anxiety in clinical setting. State Trait Anxiety Inventory (STAI) has two scales, the state anxiety and the trait anxiety. It was designed to differentiate between the

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temporary condition of state anxiety and the more general and long-standing quality of trait anxiety. The time frame for the state anxiety questionnaire is ''right now,'' which may not be useful when assessing patients with panic disorder outside the context of a panic attack. Beck Anxiety Inventory (BAI) is a self-report measure of anxiety in adults and adolescents, it was recommended for use in both clinical and research settings. Each item is descriptive of subjective, somatic, or panic-related symptoms of anxiety. It was designed to discriminate anxiety from depression in an individual. It is not a measure of trait or state anxiety but assess symptoms occurring over the last week and this is an important assessment in a clinical setting (Julian, 2011).

2.4 Comorbid depression and diabetes mellitus

Depression often coexists with other chronic diseases such as DM. Depression affect up to one-third of people with DM. (Holt et al, 2014). The prevalence of depression is significantly higher in patients with Type 2 DM compared with those without DM. (Anderson et al, 2001) Generally, patients with DM are twice more likely to have comorbid depression compared to people without DM. (Siddiqui et al, 2014, Anderson et al, 2001). The World Health Survey in 60 different countries worldwide among adults aged 18 and above found that 1-year prevalence for depression in DM was 2% (Moussavi et al., 2007). In Nigeria 1-year prevalence for depression in diabetes was 19.4% (Agbir et al, 2010). The prevalence of depression among DM varies widely depending on study design, sample size, study setting, depression assessment methods, time frame, and the level of country development.

In a systemic review and meta-analytical study, the prevalence of comorbid depression was significantly higher in clinical (32%) than in community (20%) samples, in uncontrolled (30%) than in controlled studies (21%), and when assessed by self-report questionnaires (31%) than by standardized diagnostic interviews (11%) (Anderson et al, 2001). In review of literature on prevalence of depression among patients with type 2 DM in a hospital-based cross-sectional study using self-report questionnaires, the prevalence was 49.6% in Saudi Arabia, 32.3% in Kenya and 40.3% in Nepal (Mahali, 2015, Kanu et al, 2016). In contrast, depression prevalence among DM patients was lower in Nigeria and Ethiopia, it was 20% and 13% respectively (Mosaku et al, 2008, Habtewold et al, 2015). This difference might be due to the use of different psychometric scale, time frame, and difference in the level of country development.

In an institution-based cross-sectional studies in Nigeria using standardized diagnostic interviews, prevalence of depression among patients with type 2 DM in Maiduguri was 15.4% and 30% in Benin. (Ibrahim et al, 2013, James et al, 2010). The discrepancy could be due to the differences in the subjects selected and sample size. In Maiduguri, patients with comorbid medical conditions that could independently predispose to depression were excluded while in Benin they were included. In Maiduguri the sample size was 350 while in Benin, the sample size was 200.

There is a higher rate of depression in women with diabetes compared to men (Anderson et al, 2001). A meta-analysis in 2006 showed that depression was significantly higher in diabetic women than in diabetic men (23.8% and 12.8% respectively) (Ali, et.al, 2006)

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Similarly, in Nigeria depression was significantly correlated with sex with a female-to-male ratio of 3:1 (Agbir, et.al, 2010).

2.5 Pathogenesis

The relationship between DM and depression has been hypothesized to be bidirectional in which the onset of depression is increased in patients with DM and the onset of DM increased in patients with depression (Mezuk et al, 2008; Nouwen, et al, 2010). These two major hypotheses explain the causal pathway between DM and depression (Katon, 2008; Holt et al, 2014).

Depression increases the risk of developing DM - Depression may be a risk factor for new onset DM, possibly as a result of the biochemical changes which occur in depression as well as reduced self-care behaviours associated with depression (Golden et al, 2008). Depression is characterized by loss of interest and reduced energy, patients with depression tend not to adhere to lifestyle modification (Nouwen, et al, 2010). This can lead to established risk factors for Type 2 DM, such as obesity and hyperglycaemia. The relationship between depression and new onset of Type 2DM is supported by some studies. In a meta-analysis, it was found that the risk for new onset of DM was 60% higher in depressed participants, compared to non-depressed controls (Mezuk, et al, 2008). Also, in another meta-analysis it was concluded that depression increased the risk for type 2 DM by 37% (Knol et al, 2006). Furthermore, from a prospective population-based study, depression was associated with an increased risk for the development of type 2 DM at 10 years' follow-up (Engum, 2007).

Diabetes Mellitus increases the risk of developing depression - The daily burden of self-care behaviours and the long-term risk of serious complications in DM could lead to depression. In a longitudinal study conducted over 5 years' period in which large sample participants were recruited from across United States of America, it was found that patients treated for DM had higher odds of developing depressive disorder (Golden et al, 2008). Similarly, in a meta-analysis Type 2 DM is associated with increased risk of depression compared with patients without DM (Mezuk et al, 2008). Also, in a systematic review and meta-analysis people with type 2 DM have a 24% increased risk of developing depression compared with non-diabetic controls (Nouwen et al, 2010).

2.6 Pathophysiological mechanisms

Several pathophysiological mechanisms underlie the comorbidity between type 2 DM and depression (Katon, 2008, Holt et al, 2014, Manigault, 2016).

Physiological Burden of Diabetes Diagnosis: The physiological burden associated with DM diagnosis, demands of managing the disease, burden of self-care behaviours, health cost and risk of diabetes and cardiovascular complications may lead to emotional distress, resulting in a depressive state. A meta-analysis found an increased risk of depression in patients who were diagnosed with DM compared with patients who had DM but were unaware of their diagnosis suggesting that the knowledge of the diagnosis and the burden increased the rate of depression (Nouwen et al, 2010).

Behavioural Factors: Depression is associated with poor health behaviours such as smoking, high-fat diet, physical inactivity and excessive alcohol intake, that increase risk of type 2 DM. A meta-analysis concluded that diabetic patients with depression are less

adherent to DM treatment recommendations (e.g. diet, medication use, glucose monitoring) when compared to diabetic patients without depression (Katon, 2008). A population-based study in diabetic patients showed that patients with depression are less likely to have diabetes self-care activities (diet, exercise, non-smoking, glucose monitoring, and foot checks) than patients with DM but without depression (Lin et al, 2004).

Biological Factors: Depression and DM are associated with physiological abnormalities, including activation of the hypothalamic-pituitary-adrenal axis (HPA), Sympathetic-adrenal system, and pro-inflammatory cytokines, which can induce insulin resistance and contribute to diabetes risk. Stimulation of the HPA axis increases the production of cortisol, a stress hormone, by the adrenal cortex. Excess cortisol leads to increased glucose and insulin resistance; chronic elevation of cortisol increases the risk of metabolic syndrome, which elevates the risk of type 2 DM. Stress can also activate the sympathetic nervous system, thereby increasing cortisol. Furthermore, increase in immunoinflammatory as a result of this cascade produces proinflammatory cytokines such as interleukin-1 (IL-1) and tumour necrosis factor-α and interferon-α. These lead to insulin resistance and dysfunction of beta islet cells thereby causing DM. Cortisol and cytokines induce negative changes in the monoamine system and hippocampus, thus worsening depressive symptoms (Katon, 2008, Holt et al, 2014, Berge and Riise, 2015).

2.7 Consequences of depression in diabetes

Depression is a significant comorbid condition in DM with the potential to worsen its outcome (Egede, 2005, Schram et al, 2009). The management goal for DM is to prevent both acute and chronic complications, while preserving a good quality of life. This could be achieved by adherence to DM self-care and treatment. However, co-occurrence of DM and depression is associated with poor adherence to medication, diet regimens and lower levels of physical activity resulting in poorly controlled DM, an increased risk of complications, higher mortality and decreased quality of life (Egede, 2005, Schram et al, 2009). These eventually lead to absenteeism in work place, loss of productivity, increased use of health care resources and increased healthcare costs (Egede, 2005). Among individuals with DM, total health care expenditures for individuals with depression was 4.5 times higher than that for individuals without depression (Egede et al, 2002).

Depression could contribute to poor DM outcomes through decreased physical activity. Koopmans et al (2009) reported that about 48% of the DM patients were physically inactive and presence of depressive symptoms almost doubles the likelihood of physical inactivity in patients with type 2 diabetes. In a systematic review and meta-analysis of longitudinal studies, depression was associated with an almost 1.5-fold increased risk of mortality in people with DM (Van Dooren et al., 2013). Microvascular complications such as end-stage renal disease, retinopathy, foot ulcers and macro-vascular complications, such as myocardial infarction or stroke were found to increase by 36% and 25% respectively in type 2 diabetes patients with comorbid depression during a longitudinal cohort study (Lin et al., 2010). Depression impairs quality of life, co-occurrence of depression and DM will further worsen quality of life (Schram et al, 2009). In a systematic review all the studies

reported a negative association between depressive symptoms and at least one aspect of quality of life in people with diabetes. Diabetic individuals with depressive symptoms also had a severely lower DM specific quality of life (Schram et al, 2009).

2.8 Comorbid anxiety and type 2 diabetes mellitus

Anxiety frequently co-occur with DM, this may be due to fear of serious complications accompanying DM, worry about possibility of hypoglycaemia (Grisby et al, 2002). Comorbid anxiety is of clinical importance to people with DM because it has been shown to be associated with increased DM burden, increased DM complications, worsened blood glucose levels, reduced quality of life, increased depression, increased body-mass index, and greater disability (Smith et al, 2013). The prevalence of anxiety disorders among patients with diabetes is higher compared to those without DM (Grisby et al, 2002, Smith et al, 2013). In a systematic review and meta-analysis to determine whether people with DM are more likely to have anxiety disorders or elevated anxiety symptoms than people who do not have DM, it was found that patients with DM had an excess risk of 20% and 48% for anxiety disorders and elevated anxiety symptoms respectively compared to those without DM (Smith et al, 2013). In a review of 18 studies with a total of 4076 participants 40% of diabetic patients were found to have elevated anxiety symptoms on self-report measures (Grisby et al, 2002). In a national population-based cohort study in Taiwan, the 1-year prevalence rate of anxiety disorders among diabetic patients was 128.76 per 1000 in 2000, and the cumulative prevalence increased to 289.89 per 1000 in 2004. Diabetic patients had a higher cumulative prevalence and annual incidence than the general population throughout the observation period (Huang et al, 2011). In a cross-sectional study in Chandigarh, India the prevalence of anxiety was 34% among DM patients (Thour

et al, 2016). Also, female diabetic patients had a higher prevalence and incidence density of anxiety disorders (Huang et al, 2011). In a systematic review, the prevalence of elevated anxiety symptoms was significantly higher in women compared to men (55.3% vs. 32.9% respectively). In addition, Anxiety disorders in diabetic patients were more prevalent in older age and in those with low income (Huang et al, 2011). Anxiety in the context of DMs has not been explored extensively but has been studied mostly in association with depression.

2.9 Comorbidity of depression and anxiety

Anxiety often coexist with other mental disorders particularly depression and comorbidity of anxiety and depression is very high (Lamer et al, 2011). In a longitudinal cohort study, 67% percent of those with a depression had a current anxiety and 75% had a lifetime anxiety while 63% of those with anxiety had a current comorbid depression and 81% had a lifetime comorbid depression (Lamer et al, 2011). Comorbidity of depression and anxiety is common with large impact on the course and prognosis of the disorders (Hirschfeld, 2001). The co-occurrence of depression and anxiety increased the chronicity of each disorder, slowed recovery, increased disability, decreased compliance with treatment of medical illness, and increased utilization of medical services (Hirschfeld, 2001).

Temporal sequencing of depression and anxiety was studied in persons with comorbid depression and anxiety and it was found that anxiety could precede depression or vice-versa. The Netherlands study of depression and anxiety showed that anxiety preceded depression in 57% of comorbid cases and depression preceded anxiety disorders in 18% of cases (Lamer et al, 2011). Comorbidity of anxiety and depression could be explained by

shared genetic risk factors or neuroticism, the fact that there is a considerable overlap between symptoms of anxiety and depression. Also, is the role of stressful life events and HPA Axis provoking symptoms in either condition (Faravelli, et al, 2012).

2.10 Depression and anxiety among patients with type 2 diabetes mellitus

Anxiety and depression are common mental disorders that often affect people with DM, approximately one fifth of people with type 2 DM are affected (Hassan et al, 2016). The prevalence of anxiety and depression in patients with type 2 DM is higher than in general population (Collins et al, 2009). It was found that larger proportion of diabetic patients had depression, anxiety and comorbid depression and anxiety (26.3%, 27.6% and 21.0% respectively) as compared to healthy controls (11.2%, 12.7% and 7.3% respectively) (Collins et al, 2009). Studies have shown that the presence of DM increases the risk of developing depression and anxiety and that anxiety frequently coexist with depression (Dejean et al, 2013, Mossie et al, 2017). Patients with type 2 DM experience negative emotions which increase their risk of developing psychological disorders particularly depression and anxiety. Dysregulation of the hypothalamic-pituitary-adrenal axis and over activation of the sympathetic nervous system due to fear of hypoglycaemia, complications or mortality are immediate physiological processes that prompt higher anxiety states (Faravelli, et al., 2012).

Depression and anxiety are known to activate the hypothalamic-pitutary-adrenal axis, stimulate the sympathetic nervous system, increase inflammatory and platelet aggregation responses and decrease insulin sensitivity, thereby contributing to poor glycaemic control and increasing the risk of complications. In addition, depressed and anxious individuals are

also less likely to comply with DM self-care recommendations and more likely to follow sedentary lifestyles, remain physically inactive, indulge in smoking and unhealthy diet eventually leading to poor diabetes control and clinical outcomes (Egede, 2005). The coexistence of anxiety and depression in people with type 2 DM is associated with worse diabetes outcomes, complications, poor quality of life and increase healthcare expenditures (Egede, 2002, Mosaku et al., 2008)

Prevalence of depression and anxiety among diabetic patients varies in developed and developing region. In a study to re-estimate the point prevalence of comorbid depression and anxiety in people with DM. The burden of comorbid depression was found to be higher than the burden of anxiety (23.36% vs. 17.58% respectively) globally (Hassan et al, 2016). There was a higher burden of comorbid depression in people living in developing regions while the burden of anxiety was higher in developed regions in people with Type 2 DM. However, there was no statistically significant differences observed due to gross heterogeneity across countries (Hassan et al, 2016). In an urban metropolis in India, the prevalence of depression and anxiety was 62% and 49%, respectively, while 39% of the subjects had comorbid anxiety and depression (Nagabhirava et al, 2016).

In a cross-sectional, multi-centre study in four out-patient clinics in Karachi, Pakistan the prevalence of depression and anxiety was 44% and 58%, respectively (Khuwaja et al, 2010). In Teran, 70.7% of the diabetic patients had depression while 69.6% had anxiety. In Malaysia, 40.3% of the diabetic patients had depression while 31.4% had anxiety (Ganasegerean et al, 2014). The study by Kodakhandla et al (2016) found the prevalence of depression and anxiety at 60.7% and 44.4%, respectively. A relatively lower prevalence

of both depression and anxiety was found in Saudi Arabia (22.4%, 28.5% respectively) (Aldurywish et al,2017), Ireland (22.4%, 32.0% respectively) (Collins et al, 2009), India (26.3%, 27.6% respectively) (Rajput et al, 2016). In Southwest Nigeria, the prevalence of depression and anxiety among DM patients was 20% each (Mosaku et al, 2008). The prevalence rate of comorbid depression and anxiety among diabetic patients in a tertiary care centre in Northern India was 21.0% (Rajput et al, 2016).

2.11 Factors associated with depression and anxiety among patients with type 2 diabetes mellitus

Anxiety and depression among patients with type 2 DM has been found to be associated with some socio-demographic, medical and psychosocial factors.

Socio-demographic factors- Some demographic factors such as sex, age, level of education, marital status, employment status and level of income were found to be associated with anxiety and depression among patients with type 2 diabetes.

Sex is strongly related to the occurrence of anxiety and depression. Studies have shown that the prevalence of depression and anxiety in diabetic patients were higher among women than men. Percentages of anxiety in diabetic women (62%) were three times higher in comparison to diabetic men (21%) and percentages of depression in diabetic women (41.4%) doubled that in diabetic men (17.8%) (Roupa et al, 2014). This is consistent with the findings in India where diabetic women had higher depression 17.1% and anxiety 17.6% compared to men (9.3% depression and 10.0% anxiety) (Rajput et al, 2016). Similarly, in Yazd diabetes research centre the frequency of anxiety and depression were 30% and 46% respectively for females while in males they were 7% and 22% respectively

(khadijeh et al, 2016) In addition, in Rawalpindi, depression was more prevalent in diabetic females (32.3%) than in diabetic males (21.8%) (Nadia et al, 2014). However, in South-Asian there was no difference between the diabetic males and females and the scores were comparable (Balhara et al, 2011).

Higher anxiety and depression prevalence were associated with older age (Nadia et al, 2014). There was a significantly higher anxious state among older patients compared with younger ones (Roupa et al, 2014). Comorbid depression and anxiety was found to be significantly associated with age 40–61 years (Roupa et al, 2014). Similarly, Thomas et al (2003) found that the comorbid depression and anxiety was significantly associated with age (45.16 years). In contrast, the correlations between anxiety and age, and depression and age were not statistically significant (khadijeh et al, 2016). Comorbid depression and anxiety was significantly associated with low level of education (Alduraywish et al, 2017, Nadia et al, 2014). However, in a study in India there was no significant association found with education level (Rajput et al, 2016).

Among diabetic patients, a significant higher proportion of depression and anxiety were found among unemployed patients in comparison to those employed (Rajput et al, 2016, Kaur et al, 2013). Anxiety and depression were more prevalent among retired compared with blue-collar and white-collar workers (Mikaliukstiene et al, 2014, Nadia et al, 2014). Thomas et al (2003) found a higher prevalence rate of comorbid depression and anxiety (36.0%) among low income adults with type 2 DM. Also, a significantly higher depression level was found in lower income patients (Ganasegerean et al, 2014, Rajput et al, 2016).

Marital status was associated with anxiety and depression prevalence (Nadia et al, 2014). Never married, divorced, widowed and separated were significantly associated with depression and anxiety among diabetic patients (Kaur et al, 2013). Being unmarried, widowers and divorced signify loneliness and lack of family support which is a risk factor for mood disorders, while marriage and companionship exerts a protective action on anxiety and depression (Roupa et al, 2014). The prevalence of anxiety and depression among unmarried people was 55.6% each, while among married people it was 36.9% and 25% respectively (Mikaliukstiene et al, 2014; Nadia et al, 2014).

MEDICAL FACTORS - Some medical factors such as duration of DM diagnosis, type of treatment, presence of comorbidity (such as hypertension, osteoarthritis), body mass index, poor glycaemic control, duration of DM, presence of complications were found to be associated with anxiety and depression among patients with type 2 diabetes.

Body mass index (BMI) has been found to be a risk factor for DM and has also been associated with an increased prevalence of depression and anxiety (WHO, 2015, Alduraywish et al, 2017). Roupa et al (2014) found a higher rate of both anxiety and depression among individuals with higher BMI. However, in studies in Pakistan and Saudi Arabia, BMI was independently associated with depression but not with anxiety (Alduraywish et al, 2017, Khuwaja et al, 2010). This is consistent with the findings by Nadia et al, (2014) in which the prevalence of depression was higher among obese (31.0%) than among overweight respondents (23.3%). However, the prevalence of anxiety in both obese and overweight patients were similar (40.3% each) (Nadia et al, 2014).

Increased duration of DM leads to increased DM complications and consequently leads to increased anxiety and depression because chronic complications of DM affect the emotional state of patients (Alduraywish et al, 2017). The prevalence of anxiety and depression symptoms were found to increase with increasing duration of the disease in Malaysia (Kaur et al, 2013). In a study in Rawalpindi the prevalence of anxiety and depression was higher among patients with complications (Nadia et al, 2014). This is consistent with the findings in the study in India (Rajput et al, 2016). Also, prevalence of anxiety and depression increased in the presence of comorbidities especially hypertension and ischaemic heart disease (Nadia et al, 2014).

Anxiety and depression was associated with physical inactivity (Kaur et al, 2013, Alduraywish et al, 2017). In Saudi Arabia, depression was significantly associated with not practicing sports (Alduraywish et al, 2017). Increased physical activity after Type 2 DM diagnosis was statistically significantly associated with lower prevalence of anxiety symptoms (Nadia et al, 2014).

Psychosocial factors - Some Psychosocial factors such as smoking, alcohol intake, negative life events, physical inactivity, social support were found to be associated with anxiety and depression among patients with type 2 diabetes. Significant association was found between smoking and anxiety in Saudi Arabia (Alduraywish et al, 2017). In contrast Nadia et al (2014) found no statistically significant association between smoking and prevalence of anxiety and depression. In Malaysia, anxiety and depression were found to be associated with negative life events and alcohol intake (Kaur et al, 2013).

2.12 Social support

Social support is defined as information leading the subject to believe that he or she is loved, esteemed, and belongs to a network of mutual obligation (Cobb, 1976). Social support is a strong determinant of thriving health and it has a major influence on the physical and mental health (Richmond et al., 2007). Family is an important source of social support especially the spouse, other sources are friends and significant others. A significant other is someone not necessarily related to the individual but that one feels closer to and can discuss personal issues with besides family and friends. Significant others could include church or mosque leaders or members, teachers, colleagues, neighbours, tribal or work association members.

Social support has been categorized into structural and functional support (Schaurer et al., 2012). Structural support refers to the extent to which a recipient is connected within a social network while functional social support includes emotional support or esteem support (refers to provision of warmth and nurturance that makes the individual know that he or she is valued). Tangible or instrumental support (refers to the provision of financial assistance, material goods, or services). Informational support (refers to the provision of advice, guidance, suggestions, or useful information to someone that has the potential to solve problem) (Schaurer et al., 2012).

Social support is an important factor for self-care, adherence to treatment and blood glucose control (Rad et al., 2013). Social support, especially family support is important in the management of DM because family members provide emotional support needed which make them feel safe; they share information with them and help in moments of crisis. A

narrative review showed that there was a positive relationship between social support and self-care behaviour (Rad et al., 2013). Also, in a systematic review it was found that there is a positive effect of social support, especially family support and more specifically from the spouse on controlling blood sugar level (Zang et al., 2015). This is consistent with a study in Nigeria, in which there is a significant relationship between social support and glycaemic control among type 2 diabetic patients (Odume et al., 2015). Similarly, in a study by Adetunji et al (2009) in Nigeria, patients with type 2 diabetes mellitus who had high perceived family support had good glycaemic control. In addition, low social support level, is associated with the presence of depression (Yildiz et al., 2015, Zang et al 2015). In a Nigerian family practice population, subjects with poor family support were almost two times more likely to have depression than subjects with good family support (Olanrewaju et al., 2007).

CHAPTER THREE

METHODOLOGY

3.0 Study setting

The study was carried out at the Medical Outpatients' Clinic of the Jericho Specialist Hospital, Ibadan, Oyo State. Jericho Specialist Hospital (JSH) is an accredited centre for residency training in Family Medicine. It is owned by Oyo state Hospital Management Board. JSH is located along Magazine road Jericho, Ibadan North West, Local Government area of Oyo State. It is a 30 bedded secondary health care level hospital managed by family physicians. It provides in-patient and out-patient services, in addition, emergencies and accidents cases are treated. JSH is also a National Health Insurance Scheme accredited hospital. It is affiliated to other Oyo State Hospitals such as Adeoyo Maternity Teaching Hospital, Ringroad State Hospital, Oni Memorial Children Hospital for the training of its resident doctors. The General outpatient serves as the point of entry for most patients presenting at JSH with both undifferentiated and differentiated conditions and the Medical outpatient (MOP) clinic for patients with chronic medical conditions. An average of 3 new and 297 old patients with DM are seen monthly at the MOP clinic. JSH has three resident Consultant Family Physicians and two supervising Consultant Family Physicians. There are fifteen resident doctors at various stages of training, interns and other members of health care team (Department of Human Resource JSH Record, 2016).

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3.1 Study design

This study was a cross-sectional survey involving questionnaire administration and physical examination of patients with type 2 DM.

3.2 Study Population

The study population were patients with type 2 DM who were 40years and above receiving care at the MOP clinic, JSH, Ibadan for at least 3months.

An adult who is 40years and above with or without symptoms of DM or its complications who had fasting plasma glucose of ≥7.0mmol/l (≥126mg/dl) or random plasma glucose is ≥11.1mmol/l (≥ 200mg/dl) [as documented in medical record] or had been on medication for DM is categorized as having type 2 DM (DAN, 2013).

Also, an adult who is 40years and above is categorized as having type 2 DM if he or she has been diagnosed and had been on medication for DM in other health care facility before presenting to JSH.

3.3 Inclusion criteria

The respondents selected into this study were:

All consenting adults 40years and above with type 2 DM; patients with type 2 DM who were receiving care at the MOP clinic of JSH for at least 3months or in other health facilities for at least 3months before presenting to JSH.

3.4 Exclusion criteria

The respondents excluded were:

Patients with type 1 DM; patients with type 2 DM who were receiving care at the MOP clinic of JSH for less than three months; patients presenting as medical emergencies; patients with cognitive impairment; pregnant women.

3.5 Sample size estimation

The sample size formula for single proportion was used:

$$n = \frac{Z\alpha^2 pq}{d^2}$$

Where n=sample size

$Z\alpha^2$= 1.96 (Standard normal deviation at 95% confidence level)

P= 20% (Prevalence of depression among diabetic patients attending Obafemi Awolowo Teaching Hospitals Complex, Ile-Ife, Osun State, Nigeria) (Mosaku et al,2008).

q= 1- p = 80% (prevalence of diabetic patients who do not have depression).

d= 0.05 (Precision level set at 5%).

$$n = \frac{1.962 \times 0.2 \times 0.8}{0.05^2}$$

n = 246

Adjusting for non-response by increasing sample size by 10%

$$N = \frac{n}{1-nr} = \frac{246}{1-0.1} = 273$$

Minimum sample size of 273 patients with type 2 DM were selected for the study.

3.6 Sampling technique

Participants for the study were selected from DM patients presenting at the MOP clinic. The data collection was over a period of eight weeks between 1st of August and 30th of September 2017. There were two clinic days in a week (Tuesdays and Thursdays) at the MOP clinic, implying that there was 16 clinic days over the period of data collection. The MOP clinic manages an average of 300 patients per month (4weeks) thus about 38 DM patients were attended to at each clinic visit. Therefore, the number of DM patients interviewed on each clinic day was obtained by dividing sample size by number of clinic days over the period of data collection =273/16 =18 patients. Participants were recruited using systematic random sampling technique. The sampling interval k was 2 (38/18 = 2.11 ≈ 2). The first person was selected from the first two patients with type 2 DM arriving the clinic by simple random sampling (balloting). Thereafter, every consenting second person was recruited until the required number was interviewed. The same process was repeated till the sample size of 273 patients with DM was attained.

3.7 Data collection instrument

Data collection was with the use of an interviewer-administered semi-structured questionnaire. The questionnaire had six sections namely section A to section F.

Section A:(Socio-demographic data) This section obtained the respondents' socio-demographic characteristics including age at last birthday, sex, marital status, type of family, highest educational qualification, employment status, occupation, religion, ethnic group and average monthly income.

Section B:(medical history) This section obtained information on the respondents' medical history of type 2 DM (duration of diagnosis and treatment, duration of attending

JSH). In addition, history of comorbidities such as hypertension, osteoarthritis, complications of DM such as peripheral neuropathy, erectile dysfunction and blood glucose control were retrieved from medical records of the participants.

Section C: (Psychosocial history) This section obtained information on the respondents' psychosocial history such as negative events in the last 6months, smoking status, alcohol intake and social support. The Perceived social support from family, friends or significant others was assessed using Multidimensional Scale of Perceived Social Support (MSPSS) that was developed by Zimet et al (1988). It is a 12-item, 7-point Likert-type scale instrument ranging from very strongly disagree (1) to very strongly agree (7). It has three social support subscales namely, family (FA), friends (FR) and significant other (SO), each containing 4 items. Items are summed, total score ranges from 12 to 84 and the total score is then divided by 12 to get the mean total scale score. Mean total scale score ranging from 1 to 2.9 is categorized as low support, scores of 3 to 5 is considered moderate support and scores from 5.1 to 7 is categorized as high support. The items on the MSPSS has good internal consistency (Cronbach's alpha = 0.84–0.92) and strong test-retest reliability (r = 0.72–0.85) (Zimet et al., 1988). It has been validated and used in studies in Nigeria (Ilori et al., 2016). The family subscale was used to assess the relationship between social support and glycaemic control among type 2 diabetic patients attending family medicine clinic in Nigeria (Odume et al., 2015).

Section D: (Depression) Depression was assessed using Zung's Self Depression Rating Scale (ZSDS) (Zung, 1965). It is a 20-item 4-point Likert scale that covers affective, psychological, and somatic symptoms. Items 2, 5, 6, 11, 12, 14, 16, 17, 18, 20 are reverse scored. Depression is rated either by raw ZSDS score or by the scoring depression scale

(SDS) index, which was obtained by dividing the ZSDS raw score by 80, the maximum score. Minimum score obtained is 20. A score of less than 50 denotes no depression; a score of 50 to 59 (SDS 0.62–0.74) represents mild depression; a score of 60 to 69 (SDS 0.75–0.86) represents moderate depression; and a score of 70 and above indicates severe depression (Zung, 1965). A comparison between Zung's Depression Scale and DSM–IV criteria for the diagnosis of depression revealed a sensitivity of 97%, a specificity of 63%, a positive predictive value of 77%, and a negative predictive value of 95% (Zung, 1990). ZSDS has been validated and used in studies in Nigeria (Mosaku, 2008, Olanrewaju, 2007). It was used to determine the prevalence of depression among DM patients in Ile-Ife (Mosaku et al, 2008).

Section E: (Anxiety) Anxiety was assessed using Beck Anxiety Inventory (BAI) (Beck, 1988). BAI is a 21 item anxiety symptoms, with each question having a value between 0 and 3. The sum of the questions' score ranges from 0 to 63. The BAI has high internal consistency (Cronbach's $\alpha = 0.92$) and a test-retest reliability over one week of 0.75. A score of 16 or more indicate anxiety. Respondents with a BAI score of 8-15, 16-25, and $\geq$ 26 are classified as having mild, moderate, and severe anxiety respectively (Beck, 1988). It was used in a study to assess the relationship between anxiety and obesity in young adult Nigerians (Ejike et al, 2010).

Section F: (Physical Examination) This included measurements like height, weight. Respondents' body Mass Index (BMI) in kg/m2 was calculated using measured weight divided by height squared. The respondents were weighed with a standard analogue weighing scale, (PRESTIGE^{R} Mechanical bathroom scale, made in China). The measured weights were to the nearest 0.1kg in light clothing without any other accessories. The

weighing scale was adjusted for 'zero error' before each respondent was weighed. Standing height of respondents was measured, using a Seca model stadiometer with subject facing forwards, without headgear or footwear and measured to the nearest 0.1 centimeter. It was ensured that participant's heels touched the stadiometer. Body mass index was calculated using the formula, Body mass index (BMI) = Weight (Kg) / Height 2(m2). According to WHO global database on body mass index, study respondent's BMI was classified into four groups namely underweight with BMI less than 18.50kg/m2, normal weight with BMI between 18.5kg/m2 and 24.99kg/m2, overweight with BMI greater than or equal to 25kg/m2 and obesity with a BMI greater than or equal to 30kg/m2 (WHO,2004).

3.8 Data collection method

The questionnaire was pretested using 27 respondents (10% of the sample size) at MOP clinic of Adeoyo Ring road State Hospital to ensure content validity. It is a public health facility located at Ibadan South West Local Government. Analysis was carried out on the outcome of the pre-test and necessary corrections were made. Data was collected using the modified questionnaire (Appendix II).

A medical laboratory scientist intern with good command of English and the predominant local language (Yoruba) was trained as research assistant to assist the investigator in collecting data. The research assistant was trained on the purpose of the study, the content of the questionnaire and was informed that participation was voluntary and that confidentiality was important. The research assistant was also trained on how to be respectful and polite in approaching the respondents. Written consent was obtained from the randomly selected respondents by the researcher and the research assistant. The

research assistant administered the questionnaire to the participants, while the researcher completed the questionnaires from the medical record of patients and conduct the physical examination. Informal training, clarifications and support continued throughout the course of the research.

3.9 Study variables

Dependent variables:

The dependent variables in this study were depression and anxiety. Depression was categorized into two namely: - No depression and depression present based on the respondents' depression scores (A score of less than 50 denotes no depression). Anxiety was categorized into two namely: - No anxiety and anxiety present based on the respondents' anxiety scores (A score of 16 or more indicate anxiety).

Independent Variables:

The independent variables in this study were

Socio-demographic factors- including age (40-49, 50-59, >60), sex (male, female), employment (employed, unemployed), level of education (no, primary, secondary, tertiary), family type (monogamous, polygamous), marital status (married, widowed, single), occupation (class I=professional with university degree, class II= professional without university degree, class III= small scale entrepreneur, class IV= small scale farmer, class V=labourer, petty trader, class VI=unemployed, pensioner, full time housewife, clergy, muslim cleric (Borofkka and Olatawura) and average monthly income (living below and above poverty line) Poverty line for World Bank was $1.90/day at 2011

Purchasing Power Parity (PPP) which is equivalent to ₦18,500 per month (World bank 2011).

Medical factors - Duration of DM (<5yrs, 6-10yrs, >10yrs), type of treatment (oral hypoglycaemic agent OHA alone, insulin plus OHA), blood glucose control (≤110, >110mg/dl), presence of comorbidity (yes, no), complications (present, absent), body mass index (underweight, normal, overweight, obese).

Psychosocial factors- Social support (high, moderate, low), Physical activity was defined as having at least 30 minutes of exercise each day for five or more days of the last week (WHO,2017). Physical activity (active and inactive), negative life event in the last 6months (yes, no), monthly health care cost, smoking status (yes, no), current alcohol intake (yes, no).

3.10 Data management

The questionnaires were numbered serially, a coding guide was developed and used for coding the answered questionnaires. Data was entered into the Statistical Package for Social Sciences (SPSS) version 17. Thereafter, the data was cleaned.

Frequency tables were generated for relevant variables, descriptive statistics was used to summarize quantitative variables, while categorical variables were summarized with proportions and percentages. Chi- square test was used to test for associations between categorical variables such as presence of comorbidity and depression. Fisher's exact test was used for cells with expected frequency less than 5. Multivariate analysis (logistic regression) was used to predict factors associated with depression and anxiety and adjust for the effect of confounders. All analysis was done at 5% level of significance.

3.11 Ethical considerations

Ethical approval was obtained from the Oyo State Research Ethical Review Committee (AD13/ 479/ 511), Ministry of Health and permission was sought from the Head of the Jericho Specialist Hospital, Ibadan to carry out the study. Informed consent was obtained from each participant prior to data collection. Respondents were informed that participation was voluntary and refusal to participate will not affect care. The participants were assured that they were free to discontinue at any point during the process of the interview without effect on their care. The research was not harmful to the participants. The consulting room set apart for the interview was private and all interviews was conducted only if privacy was ensured. Confidentiality of the information given was ensured. The names of participants were not used in order to maintain confidentiality. Only serial numbers were allocated to the participants.

CHAPTER FOUR

RESULTS

Two hundred and seventy-three patients with type 2 diabetes mellitus who fulfilled the inclusion criteria were studied.

4.1 Demographic characteristics of respondents

The demographic characteristics of the respondents are shown in Table 4.1. The mean± SD age of the respondents was 62.1±10.2 years with a range of 40-93 years. The highest number of respondents 88 (32.2%) were in the age group 50-59 years while the least number of respondents 12 (5.2%) were in the age group 80 years and above.

There were 233 (85.3%) females with a male to female ratio of 1:5.8. Majority of the respondents were married 187 (68.5%) and were in monogamous marriage 178 (65.2%). One hundred and sixty-two (59.3%) of the respondents were Christians while the remaining 111 (40.7%) were Muslims. Almost all the respondents 247 (90.5%) belonged to the Yoruba ethnic group.

Table 4. 1: Demographic characteristics of the respondents

Variable	Frequency (N)	Percentage (%)
Age (years)		
40-49	28	10.3
50-59	88	32.2
60 -69	78	28.6
70-79	64	23.4
80 and above	15	5.5
Sex		
Male	40	14.7
Female	233	85.3
Marital status		
Married	187	68.5
Widowed	74	27.1
Others*	12	4.4
Family type		
Monogamous	178	65.2
Polygamous	95	34.8
Religion		
Christianity	162	59.3
Islam	111	40.7
Ethnic group		
Hausa	7	2.6
Ibo	11	4.0
Yoruba	247	90.5
Others**	8	2.9

Others*= single, living with partner, separated, divorced
Others**= Isan, Edo

4.2 Socioeconomic status of respondents

The socioeconomic status of respondents is shown in Table 4.2. Majority of the respondents 191 (70.0%) were currently employed. One hundred and fifty-seven (57.5%) respondents were in occupational class V which consists of petty traders and labourers, while 13 (4.8%) were in occupational class I which consists of professional with university degree. The average monthly income showed that the majority 184 (67.4%) of the respondents were living below the poverty line (less than $1.90/day equivalent to N18,500 per month), with 89 (32.6%) living above the poverty line. The majority of the respondents 214 (78.4%) had formal education while 59 (21.6%) had no formal education.

Table 4.2: Socioeconomic status of respondents

Variable	Frequency (N)	Percentage (%)
Employment status		
Currently employed	191	70.0
Unemployed	35	12.8
Retired	47	17.2
Level of education		
No formal education	59	21.6
Primary	100	36.6
Secondary	68	24.9
Post-secondary	46	16.9
Occupational class*		
Class I	13	4.8
Class II	10	3.7
Class III	34	12.4
Class IV	3	1.1
Class V	157	57.5
Class VI	56	20.5
Monthly income**		
Below the poverty line	184	67.4
Above the poverty line	89	32.6

*Occupational class by Borofkka and Olatawura. ** poverty line was earning < $1.90/day.

4.3 Prevalence of depression among respondents

Figure 4.1 shows the prevalence of depression among respondents. The prevalence of depression symptoms among the respondents was (75) 27.5%. Among the respondents that had depression symptoms, 10 (25.0%) were male while 65 (27.9%) were female. Seventy two (26.4%) of the respondents with depression had mild depression while 3 (1.1%) had moderate depression and no case of severe depression was found in the respondents. The mean ±SD depression score of the respondents was 46.7±5.7. Majority 30 (75.0%) of the male respondents had no depression followed by mild depression 9(22.5%) and then moderate depression 1(2.5%). Also, majority 168 (72.1%) of the female respondents had no depression, followed by mild depression 63 (27.0%) and 2 (0.9%) had moderate depression. The mean score±SD for male and female respondents were 46.6± 5.7 and 46.7±5.7 respectively.

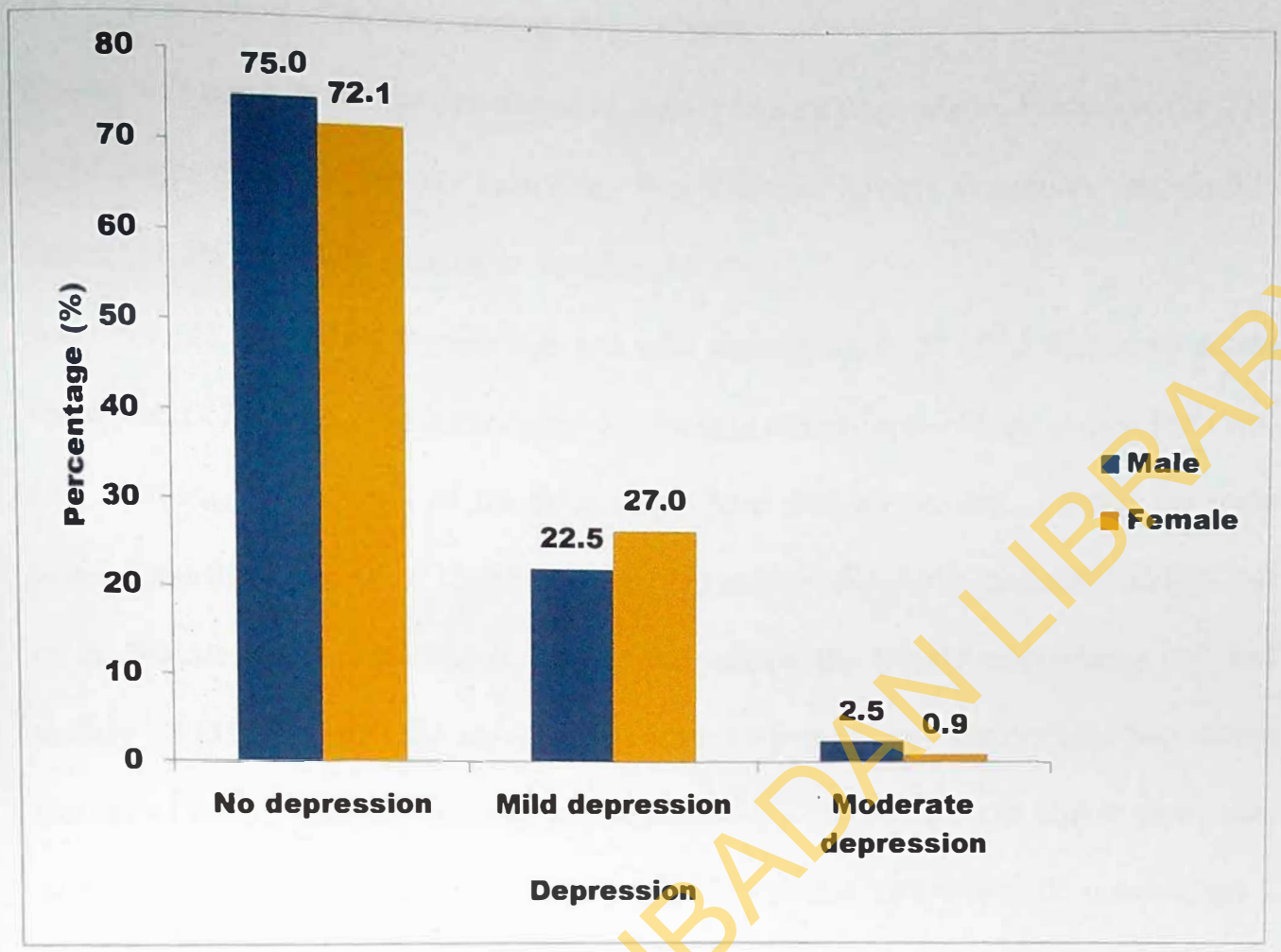
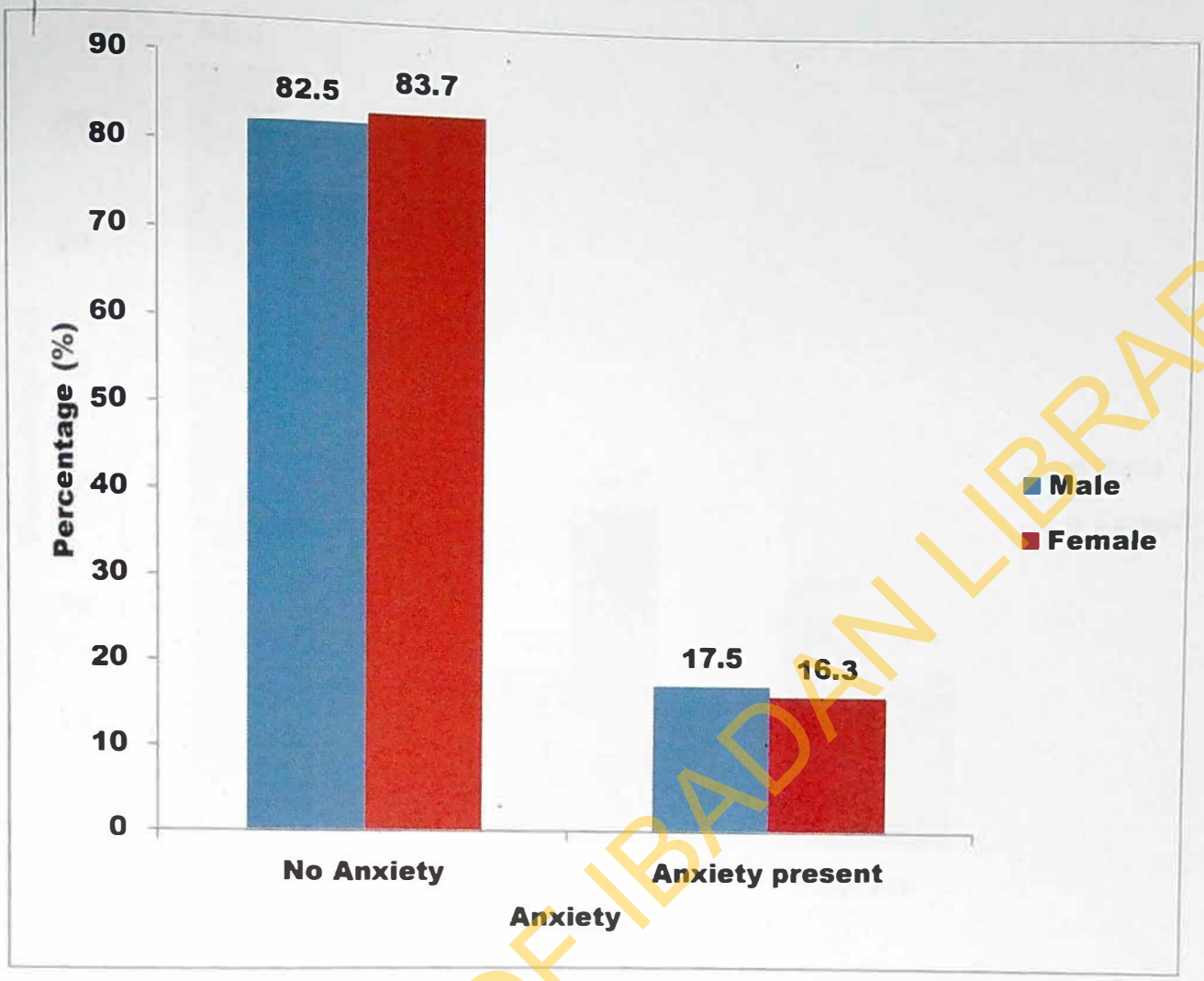


Figure 4.1 : Prevalence of depression among respondents

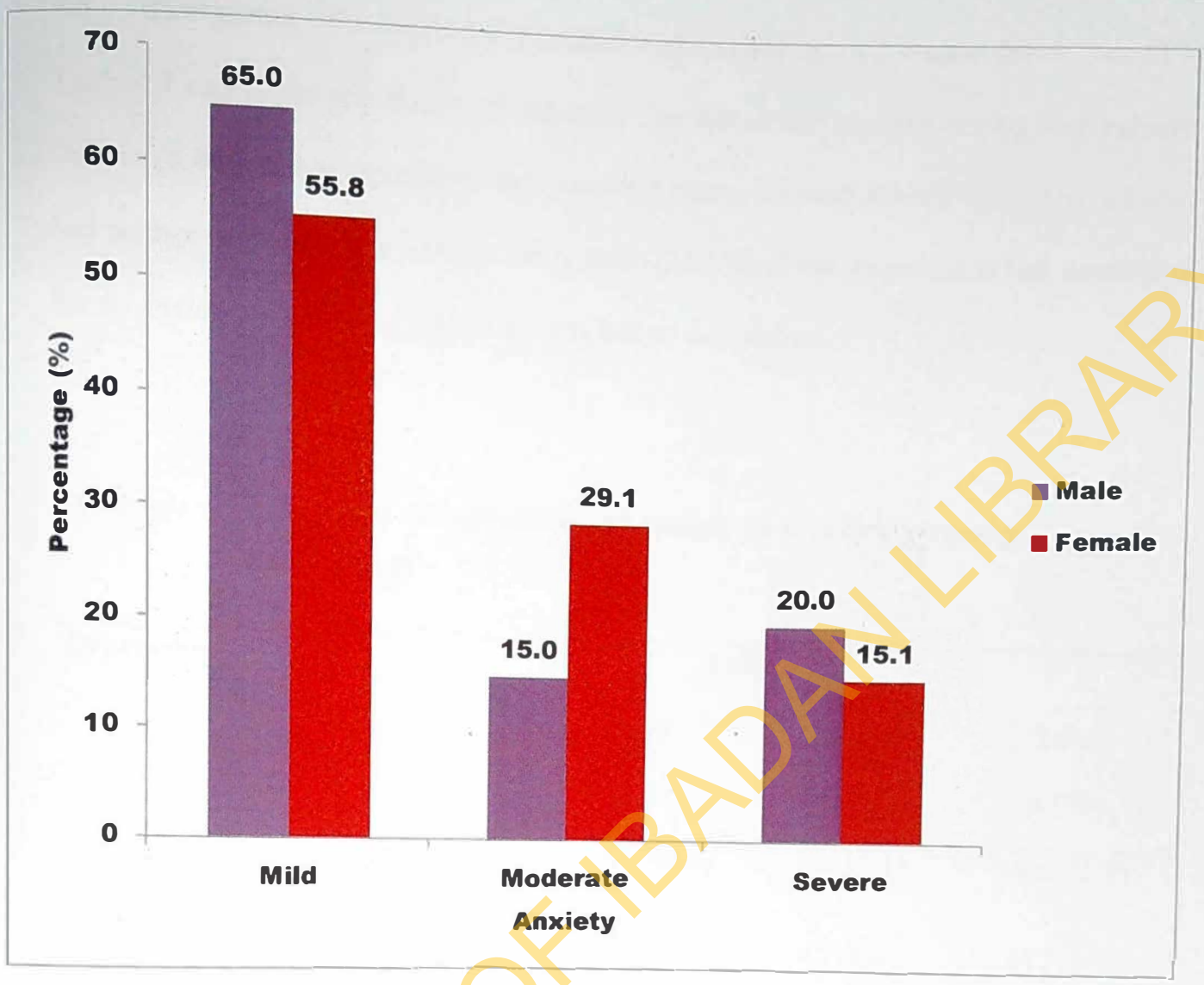
4.4 Prevalence of anxiety among respondents

Figures 4.2a and b shows the prevalence of anxiety among respondents. Forty five (16.5%) of the respondents had anxiety symptoms. Prevalence of anxiety symptoms was slightly higher (17.5%) in males compare to females (16.3%).

Sixty one (22.3%) of the respondents had mild anxiety while 28 (10.3%) had moderate anxiety and 17 (6.2) had severe anxiety. The median anxiety score of the respondents was 6.0. Majority 33 (82.5%) of the male respondents had no anxiety. Among the male respondents that had anxiety 13 (65.0%) had mild anxiety. Similarly, majority 195 (83.7%) of the female respondents had no anxiety and among the female respondents that had anxiety 48 (55.8%) had mild anxiety. Higher proportion of male respondents had severe anxiety 4 (20.0%) compare to female respondents 13(15.1%). Conversly, higher proportion of female respondents had moderate anxiety 25 (29.1%) compare to male respondents 3 (15.0). The median score for male and female respondents were 7.5 and 5.0 respectively.



Figures 4.2a: Prevalence of anxiety among respondents



Figures 4.2b: Prevalence of anxiety among respondents

4.5 Prevalence of comorbid depression and anxiety among respondents

Table 4.3 shows the prevalence of comorbid depression and anxiety among respondents. Twelve (4.4%) of the respondents had comorbid depression and anxiety while 165 (60.4%) had neither depression nor anxiety. Sixty-three (23.1%) of the respondents had depression but no anxiety and 33 (12.1%) had anxiety but no depression.

Table 4.3: Prevalence of depression and anxiety co-morbidity among Respondents

Depression	Anxiety		
	No	Yes	Total
	n (%)	n (%)	n (%)
No	165 (60.4)	33 (12.1)	198 (72.5)
Yes	63 (23.1)	12 (4.4)	75 (27.5)
Total	288 (83.5)	5(16.5)	273 (100.0)

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Table 4.3 shows the prevalence of comorbid depression and anxiety among respondents. Twelve (4.4%) of the respondents had comorbid depression and anxiety while 165 (60.4%) had neither depression nor anxiety. Sixty-three (23.1%) of the respondents had depression but no anxiety and 33 (12.1%) had anxiety but no depression.

Table 4.3: Prevalence of depression and anxiety co-morbidity among Respondents

Depression	Anxiety		
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No	165 (60.4)	33 (12.1)	198 (72.5)
Yes	63 (23.1)	12 (4.4)	75 (27.5)
Total	288 (83.5)	5(16.5)	273 (100.0)

4.6. Perceived social support of respondents

Table 4.4 shows the perceived social support of the respondents. One hundred and two (37.4%) respondents had high social support, while 153 (56.0%) had moderate and 18 (6.6%) had low social support. Higher proportion of female respondents (57.5%) had moderate social support compared to males (47.5%). Conversely, a higher proportion of male respondents (10.0%) had low social support compared to females (6.0%). The total mean score of the participants for MSPSS was moderate (4.6±1.3). The mean score ±SD for male and female respondents were 4.8 ± 1.4 and 4.6±1.3 respectively.

Majority 212 (77.7%) of the respondents had high social support from the family subscale of the perceived social support followed by significant other subscale 123 (45.1%) and then friend subscale 83 (30.4%), while 121 (44.3%) of the respondents had low social support from the friend subscale of the perceived social support followed by significant other subscale 79 (28.9%) and then family subscale 24 (8.7%). The mean score of the respondents for family, friends and significant others sub-scale of MSPSS scores were 5.9 ± 1.7, 3.6±2.1 and 4.4±2.1 respectively.

Table 4.4: Perceived social support of respondents

Variables	Male=40 n (%)	Female=233 n (%)	Total= 273 N (%)
Total scale score on MSPSS			
Low social support	4 (10.0)	14 (6.0)	18 (6.6)
Moderate social support	19 (47.5)	134 (57.7)	153 (56.0)
High social support	17 (42.5)	85 (36.5)	102 (37.4)
Family subscale			
Low social support	5 (12.5)	19 (8.2)	24 (8.7)
Moderate social support	3 (7.5)	34 (14.6)	37 (13.6)
High social support	32 (80.0)	180 (77.3)	212 (77.7)
Friend subscale			
Low social support	12 (30.0)	109 (46.8)	121 (44.3)
Moderate social support	15 (37.5)	54 (23.2)	69 (25.3)
High social support	13 (32.5)	70 (30.0)	83 (30.4)
Significant other subscale			
Low social support	10 (25.0)	69 (29.6)	79 (28.9)
Moderate social support	12 (30.0)	59 (25.3)	71 (26.0)
High social support	18 (45.0)	105 (45.1)	123 (45.1)

4.7 Medical history of the respondents

Tables 4.5a and 4.5b shows the medical history of the respondents. One hundred and thirty-eight (50.5%) of the respondents had type 2 diabetes mellitus (DM) for less than five years while 64 (23.4%) had type 2 DM for 10 years and above. The median duration of having type 2 DM was 4.0years. Eighty-one (29.7%) of the respondents were first diagnosed as having type 2 DM at JSH. One hundred and ninety-two respondents (70.3%) were receiving care at the MOP clinic of JSH for less than five years while 51 (18.7%) had been attending the clinic for 10 years and above. The median duration of JSH attendance was 3.0years.

All the respondents were on medication for type 2 DM, highest proportion of the respondents 267 (97.8%) were on oral hypoglycaemic agents alone. The median duration of medication use was 4.0years. Majority of the respondents 244 (89.4%) had other co-morbidities, 94(34.4%) had 3 and above co-morbidities. The commonest co-morbidity was hypertension 217 (79.5%) as shown in table 4.5b. One hundred and eighty-nine (69.2%) of the respondents had diabetic complication, the commonest complication reported was peripheral neuropathy 152 (55.7%). Among the male respondents 26 (65.0%) reported erectile dysfunction as shown in table 4.5b. Family history of mental disorder was reported by 9 (3.3%) of the respondents. One (0.4%) of the respondent had past history of mental disorder.

Table 4.5a: Medical history of the respondents

(N=273)

Variable	Frequency	Percentage
Duration of Diabetes Mellitus		
< 5 years	138	50.6
5 - 9 years	71	26.0
10 years and above	64	23.4
Place of diagnosis		
Jericho Specialist Hospital	81	29.7
Others	192	70.3
Duration of JSH attendance		
< 5 years	190	69.6
5 - 9 years	55	20.1
10 years and above	28	10.3
Type of treatment		
OHA only	267	97.8
OHA and insulin	6	2.2
Presence of co-morbidity		
None	29	10.6
1 – 2	150	55.0
3 and above	94	34.4
Presence of complications		
Yes	189	69.2
No	84	30.8
Family history of mental disorder		
Yes	9	3.3
No	264	96.7
Personal history of mental disorder		
Yes	1	0.4
No	272	99.6

Table 4.5b: Frequency of comorbidities and complications among respondents (N=273)

Variable	Yes n(%)	No n(%)
Medical comorbidities		
Hypertension	217 (79.5)	56 (20.5)
Osteoarthritis	122 (44.7)	151 (55.3)
Spondylosis	73 (26.7)	200 (73.3)
Asthma	3 (1.1)	270 (98.9)
Chronic obstructive airway disease	3 (1.1)	270 (98.9)
Epilepsy	2 (0.7)	271 (99.3)
peptic ulcer disease	37 (13.6)	236 (86.4)
cancers (breast, cervix, prostate)	0 (0.0)	273 (100.0)
Ocular disorders (cataract, refractive error)	114 (41.8)	159 (58.2)
Complications		
Ocular (blindness, retinopathy, macula oedema)	62 (22.7)	211 (77.3)
Nephrological (microalbuminuria, renal failure)	8 (2.9)	265 (97.1)
Neurological (peripheral neuropathy	152 (55.7)	121 (44.3)
Diabetic foot disorders, ulcer, amputations	14 (5.1)	259 (94.9)
Erectile dysfunction in male respondents only	26 (65.0)	14 (35.0)
Heart attack	1 (0.4)	272 (99.6)
Stroke	7 (2.6)	266 (97.4)

Multiple responses

4.8 Clinical profile of respondents

Clinical profile of respondents is shown in table 4.6. Seventy-nine (28.9%) of the respondents were obese with higher proportion of women (32.6%) compared to men (7.5%). However, among the 118 (45.0%) of the respondents who were overweight there was higher proportion of male (45.5%) compared to female (42.5%). The mean body mass index of the respondents was 29.5±22.2kg/m². One hundred and forty-one 141 (51.6%) respondents had their blood glucose controlled with a higher proportion in female compared to male. The mean fasting blood glucose of the respondents was 119.1± 40.6mg/dl.

Table 4.6: Clinical profile of respondents

Variable	Male=40 n (%)	Female=233 n (%)	Total= 273 N (%)
Fasting blood glucose control			
Controlled	16 (40.0)	125 (53.6)	141 (51.6)
Uncontrolled	24 (60.0)	108 (46.4)	132 (48.4)
Body Mass Index			
Underweight	0 (0.0)	3 (1.3)	3 (1.1)
Normal weight	18 (45.0)	55 (23.6)	73 (26.7)
Over weight	19 (47.5)	99 (42.5)	118 (43.3)
Obese	3 (7.5)	76 (32.6)	79 (28.9)

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Fasting blood glucose control			
Controlled	16 (40.0)	125 (53.6)	141 (51.6)
Uncontrolled	24 (60.0)	108 (46.4)	132 (48.4)
Body Mass Index			
Underweight	0 (0.0)	3 (1.3)	3 (1.1)
Normal weight	18 (45.0)	55 (23.6)	73 (26.7)
Over weight	19 (47.5)	99 (42.5)	118 (43.3)
Obese	3 (7.5)	76 (32.6)	79 (28.9)

4.9 Psychosocial characteristics of respondents

Tables 4.7a and 4.7b shows the psychosocial characteristics of respondents. Ten (3.7%) of the respondents reported having ever smoked cigarette or other substances. However, none of them was a current smoker. Minority of the respondents 5 (1.8%) reported current intake of alcohol and all were male. One hundred and eighty-two respondents undergone one form of exercise or the other as it was shown in table 4.7b. Majority of the respondents 168 (61.5%) were physically active. Those who were physically active were having at least 30 minutes of exercise per day on five or more days of the last week. Brisk walking was the commonest exercise undergone by the respondents as shown in table 4.7b. Seventy-five (27.5%) of the respondents reported stressful conditions or negative life event in the last six months. Common negative life event reported by the respondents included worry related event 29 (38.7%); bereavement 20 (26.7%) and saddening events 12 (16.0%) as shown in table 4.7b.

One hundred and fifty (55.0%) respondents spent less than ₦5,000 monthly on their health care, 86 (31.5%) spent ₦5,001- ₦1,000 and 37 (13.5%) spent >₦10,000 monthly on their health care.

Table 4.7a: Psychosocial characteristics of respondents

(N=273)

Variable	Frequency	Percentage
Physical activity		
Yes	168	61.5
Stressful conditions or negative life events (in the last 6 months)		
Yes	75	27.5
Ever smoked		
Yes	10	3.7
Current alcohol intake		
Yes	5	1.8
Social Support		
Low support	18	6.6
Moderate support	153	56.0
High support	102	37.4
Monthly health care expenditure in naira		
₦5000 and below	150	55.0
₦5001 to 10000	86	31.5
Greater than ₦10,000	37	13.5

Table 4.7b: Frequency of type of exercise and negative life events (in the last 6 months among the respondents

Variable	Frequency (n)	Percent (%)
Type of exercise		
Brisk walking	153	84.1
Gardening	14	7.7
Dancing	13	7.1
Swimming	1	0.5
Running	1	0.5
Total	182	100.0
Negative life events in the last 6 months		
Worry related	29	38.7
Bereavement	20	26.7
Saddening events	12	16.0
Loss related	6	8.0
Financial events	5	6.7
Family problem	3	4.0
Total	75	100.0

Multiple responses

4.10.1: Association between depression and socio-demographic characteristics of the respondents

Association between depression and socio-demographic characteristics of respondents is shown in table 4.8.1. There was a significant association between marital status and depression. Among the respondents in the age group 40-49 years 28.6% had depression followed by those 60 years and above (28.0%). Higher proportion of females 65 (27.9%) had depression compared to males 10 (25.0%). Although, these were not statistically significant.

Those who were widowed 25 (33.8%) had a higher proportion of respondents with depression, compared to those who were currently married 50 (26.7%) and others (single, divorced, separated) 0 (0.0%). Conversely, those who were others (single divorced, separated) 12 (100.0%) and currently married 137 (73.3%) had a higher proportion of no depression compared to those who were widowed. This was statistically significant at $\chi 2 = 6.075$, $p=0.048$.

Higher proportion of respondents who were Christian had depression 51 (31.7%) compared with those who were Muslim 24 (21.6%). However, this was not statistically significant.

Table 4.8.1 **Association between Socio-demographic factors and depression**

Variables	DEPRESSION				
	No Depression n (%)	Depression Present n (%)	Total n (%)	Chi-Square	P-Value
Age (years)					
40 – 49	20 (71.4)	8 (28.6)	28 (100.0)	0.120	0.942
50 – 59	65 (73.9)	23 (26.1)	88 (100.0)		
60 and above	113 (72.0)	44 (28.0)	157 (100.0)		
Sex					
Male	30 (75.0)	10 (25.0)	40 (100.0)	0.144	0.705
Female	168 (72.1)	65 (27.9)	233 (100.0)		
Marital Status					
Currently Married	137 (73.3)	50 (26.7)	187 (100.0)	6.075	0.048*
Widowed	49 (66.2)	25 (33.8)	74 (100.0)		
Others**	12 (100.0)	0 (0.0)	12 (100.0)		
Family type					
Monogamous	129 (72.5)	49 (27.5)	178 (100.0)	0.01	0.978
Polygamous	69 (72.6)	26 (27.4)	95 (100.0)		
Religion					
Christianity	111 (68.3)	51 (31.7)	162 (100.0)	3.32	0.068
Islam	87 (78.4)	24 (21.6)	111 (100.0)		

*significant at $p<0.05$

Others**= single, living with partner, separated, divorced

4.10.2. Association between depression and socioeconomic of the respondents

Association between depression and socio-economic characteristics of respondents is shown in table 4.8.2. Those with tertiary education had a higher proportion of respondents with depression 17 (37.0%) compared to those with no formal education 11 (18.6%). Conversely, those with no formal education had a higher proportion of no depression 48 (81.4%) compared to those with tertiary education 29 (63.0%). A higher proportion of respondents who were currently employed 55 (28.8%) had depression compared to those who were currently unemployed 20 (24.4%). However, these were not statistically significant.

Also, for occupational class, among those who were skilled 7 (30.4%) had depression compared to those who were unskilled 61 (28.6%). This was not statistically significant.

Table 4.8.2 Association between Socioeconomic factors and depression

Variables	DEPRESSION				
	No Depression n (%)	Depression present n (%)	Total n (%)	Chi-Square	P-Value
Employment Status					
Currently employed	136 (71.2)	55 (28.8)	191 (100.0)	0.559	0.455
Not employed	62 (75.6)	20 (24.4)	82 (100.0)		
Occupation*					
Skilled	16 (69.6)	7 (30.4)	23 (100.0)	1.605	0.448
Semiskilled	30 (81.1)	7 (18.9)	37 (100.0)		
Unskilled	152 (71.4)	61 (28.6)	213 (100.0)		
Educational level					
No formal education	48 (81.4)	11 (18.6)	59 (100.0)	5.540	0.136
Primary education	69 (69.0)	31 (31.0)	100 (100.0)		
Secondary education	52 (76.5)	16 (23.5)	68 (100.0)		
Tertiary education	29 (63.0)	17 (37.0)	46 (100.0)		
Average monthly					
Below poverty line	133 (72.3)	51 (27.7)	184 (100.0)	0.017	0.896
Above poverty line	65 (73.0)	24 (27.0)	89 (100.0)		

* **Skilled**= Class I (Professional with university degree) and Class II (Professional without university degree), **Semiskilled**= Class III (Small scale entrepreneur) and Class IV (Small scale farmer), **Unskilled**= Class V (Labourer, Petty trader) and Class VI (Unemployed, Pensioner, Full time housewife, Clergy, Muslim Cleric).

4.10.3 Association between depression and medical characteristics of respondents

Table 4.8.3 shows the association between depression and medical history of respondents. Among respondents who had type 2 DM for 10 years and above 22 (34.4%) had depression while 37 (26.8%) of those who had had type 2 DM for less than 5 years had depression. Among respondents using both OHA and insulin 33.1% had depression and 72 (27.1%) of those using OHA alone had depression. Higher proportion of respondents with other co morbidities 71 (29.1 %) had depression compared to those without co morbidities 4 (13.8%). However, among respondents without complication 26 (31.0%) had depression compared to those with complication 49 (25.9%). Although these were not statistically significant.

Slightly higher proportion of respondents with uncontrolled blood glucose 37 (28.0%) had depression compared to those with controlled blood glucose 38 (27.0%). Also, a higher proportion of respondents with abnormal body mass index (BMI) had depression 57 (28.5%) compared to those respondents with normal BMI 18 (24.7%). However, these were not statistically significant.

4.10.3 Association between depression and medical characteristics of respondents

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Slightly higher proportion of respondents with uncontrolled blood glucose 37 (28.0%) had depression compared to those with controlled blood glucose 38 (27.0%). Also, a higher proportion of respondents with abnormal body mass index (BMI) had depression 57 (28.5%) compared to those respondents with normal BMI 18 (24.7%). However, these were not statistically significant.

Table 4.8.3: Association between Medical history and depression

Variables	DEPRESSION				
	No Depression n(%)	Depression present n(%)	Total n(%)	Chi-Square	P-Value
Duration of DM					
< 5 years	101 (73.2)	37 (26.8)	138 (100.0)	2.429	0.297
5 - 9 years	55 (77.5)	16 (22.5)	71 (100.0)		
10 years and above	42 (65.6)	22 (34.4)	64 (100.0)		
Type of treatment					
OHA alone	194 (72.9)	72 (27.1)	266 (100.0)		0.665+
OHA plus Insulin	4 (66.7)	2 (33.3)	6 (100.0)		
Presence of co-morbidity					
Yes	173 (70.9)	71 (29.1)	244 (100.0)	3.047	0.081
No	25 (86.2)	4 (13.8)	29 (100.0)		
Presence of complications					
Yes	140 (74.1)	49 (25.9)	189 (100.0)	0.737	0.390
No	58 (69.0)	26 (31.0)	84 (100.0)		
Fasting blood glucose					
Controlled	103 (73.0)	38 (27.0)	141 (100.0)	0.040	0.842
Uncontrolled	95 (72.0)	37 (28.0)	132 (100.0)		
Body Mass Index					
Normal	55 (75.3)	18 (24.7)	73 (100.0)	0.396	0.529
Abnormal	143 (71.5)	57 (28.5)	200 (100.0)		

+ Fishers exact value

4.10.4 Association between depression and psychosocial characteristics of respondents

Association between depression and psychosocial characteristics of respondents is presented in table 4.8.4. Those respondents who were physically inactive had a higher proportion 36 (34.3%) of respondents with depression compared to those who were physically active 39(23.2%). Conversely, a higher proportion of respondents who were physically active had no depression 129 (76.8%) compared to those who were physically inactive 69 (65.7%). This was statistically significant at $\chi 2$= 3.975, p=0. 046. Among respondents who had ever smoked 3 (30.0%) had depression

Significantly, those respondents with low social support 12 (66.7%) had a higher proportion of the respondents with depression compared to those who had moderate and high social support (21.6% and 35.3% respectively). This was statistically significant at$\chi 2$= 6.119, p=0. 047.

Among respondents who spent >₦10,000 monthly on their health care, 13 (35.1%) had depression while 38 (25.3%) of those who spent less than ₦5,000 monthly on their health care had depression.

Table 4.8.4: Association between psychosocial factors and depression

Variables	DEPRESSION				
	No Depression n (%)	Depression present n (%)	Total n (%)	Chi-Square	P-Value
Physical activity					
Yes	129 (76.8)	39 (23.2)	168 (100.0)	3.975	0.046*
No	69 (65.7)	36 (34.3)	105 (100.0)		
Stressful or negative life events in the last 6 months					
Yes	53 (70.7)	22 (29.3)	75 (100.0)	0.180	0.672
No	145 (73.2)	53 (26.8)	198 (100.0)		
Ever smoked					
Yes	7 (70.0)	3 (30.0)	10 (100.0)		1.000+
No	191 (72.6)	72 (27.4)	263 (100.0)		
Current alcohol intake					
Yes	4 (80.0)	1 (20.0)	5 (100.0)		1.000+
No	194 (72.4)	74 (27.6)	268 (100.0)		
Social Support					
Low Support	6 (33.3)	12 (66.7)	18 (100.0)	6.119	0.047*
Moderate support	120 (78.4)	33 (21.6)	153 (100.0)		
High support	66 (64.7)	36 (35.3)	102 (100.0)		
Monthly health care expenditure in naira					
₦5000 and below	112 (74.7)	38 (25.3)	150 (100.0)	1.443	0.486
₦5001 to ₦10000	62 (72.1)	24 (27.9)	86 (100.0)		
Greater than ₦10000	24 (64.9)	13 (35.1)	37 (100.0)		

*significant at p<0.05
+Fishers exact value

4.11.1 Association between anxiety and socio-demographic characteristics of the respondents

Association between anxiety and socio-demographic characteristics of respondents is shown in table 4.9.1. There was a significant association between anxiety and religion. Among the respondents who were male 7 (17.5%) had anxiety compared to females 38 (16.3%). Higher proportion of respondents who were others (single, divorced, separated) 3 (25.0%) and widowed 14 (18.9%) had anxiety, compared to those who are currently married 28 (15.0%). A higher proportion of those in monogamous marriage 33 (18.5%) had anxiety compared to those in polygamous marriage 12 (12.6%). These were not statistically significant.

Respondents who were Christian had anxiety 33 (20.4%) compared with those who were Muslim 12 (10.8%), while a higher proportion of respondents who were Muslim 99 (89.2%) had no anxiety compared to those who were Christian 129 (79.6%). This was statistically significant at $\chi 2 = 4.372$, $p = 0.037$.

Table 4.9.1: Association between socio-demographic factors and anxiety

Variables	ANXIETY				
	No Anxiety n (%)	Anxiety present n (%)	Total n (%)	Chi-Square	P-Value
Age (years)					
40 – 49	23 (82.1)	5 (17.9)	28 (100.0)	0.386	0.824
50 – 59	72 (81.8)	16 (18.2)	88 (100.0)		
60 and above	133 (84.7)	24 (15.3)	157 (100.0)		
Sex					
Male	33 (82.5)	7 (17.5)	40 (100.0)	0.035	0.851
Female	195 (83.7)	38 (16.3)	233 (100.0)		
Marital Status					
Currently Married	159 (85.0)	28 (15.0)	187 (100.0)	1.261	0.532
Widowed	60 (81.1)	14 (18.9)	74 (100.0)		
Others**	9 (75.0)	3 (25.0)	12 (100.0)		
Family type					
Monogamous	145 (81.5)	33 (18.5)	178 (100.0)	1.570	0.210
Polygamous	83 (87.4)	12 (12.6)	95 (100.0)		
Religion					
Christianity	129 (79.6)	33 (20.4)	162 (100.0)	4.372	0.037*
Islam	99 (89.2)	12 (10.8)	111 (100.0)		

*significant at $p<0.05$

Others**= single, living with partner, separated, divorced

4.11.2 Association between anxiety and socioeconomic characteristics of the respondents

Association between anxiety and socioeconomic characteristics of respondents is shown in table 4.9.2. Those with tertiary education had a higher proportion of respondents with anxiety 8 (17.4%) compared to those with no formal education 9 (15.3%). Among respondents who were currently unemployed 15 (18.3%) had anxiety while 30 (15.7%) of those who were currently employed had anxiety. Also, for occupational class, a higher proportion of respondents who were unskilled 39 (18.3%) had anxiety compared to those who were semiskilled 5 (13.5%) and skilled 1 (4.3%). This was not statistically significant. Among respondents living above poverty line 19 (21.3%) had anxiety symptoms compared with those living below poverty line 26 (14.1%).

Table 4.9.2: Association between Socioeconomic factors and Anxiety

Variables	ANXIETY				
	No Anxiety n (%)	Anxiety present n (%)	Total n (%)	Chi-Square	P-Value
Employment Status					
Currently employed	161 (84.3)	30 (15.7)	191 (100.0)	0.279	0.598
Not employed	67 (81.7)	15 (18.3)	82 (100.0)		
Occupation*					
Skilled	72 (95.7)	1 (4.3)	23 (100.0)	3.214	0.201
Semiskilled	32 (86.5)	5 (13.5)	37 (100.0)		
Unskilled	174 (81.7)	39 (18.3)	213 (100.0)		
Educational level					
No formal education	50 (84.1)	9 (15.3)	59 (100.0)	0.116	0.990
Primary education	53 (83.0)	17 (17.0)	100 (100.0)		
Secondary education	57 (83.8)	11 (16.2)	68 (100.0)		
Tertiary education	38 (82.6)	8 (17.4)	46 (100.0)		
Average monthly					
Below poverty line	158 (85.9)	26 (14.1)	184 (100.0)	2.270	0.132
Above poverty line	70 (78.7)	19 (21.3)	89 (100.0)		

* **Skilled**= Class I (Professional with university degree) and Class II (Professional without university degree), **Semiskilled**= Class III (Small scale entrepreneur) and Class IV (Small scale farmer), **Unskilled**= Class V (Labourer, Petty trader) and Class VI (Unemployed, Pensioner, Full time housewife, Clergy, Muslim Cleric).

4.11.3 Association between anxiety and medical characteristics of the respondents

Table 4.9.3 shows the association between anxiety and medical characteristics of respondents. Among respondents who were diagnosed as having type 2 DM for 10 years and above 16 (25.0%) had anxiety while 20 (14.5%) of those who had had type 2 DM for less than 5 years had anxiety. Among respondents using both OHA and insulin 2 (33.3%) had anxiety. Higher proportion of respondents with other co morbidities 42 (17.2 %) had anxiety compared to those without co morbidities 3 (10.3%). Also, higher proportion of respondents with complication 34 (18.0%) had anxiety compared to those without complication 11 (13.1%). However, these were not statistically significant.

Higher proportion of respondents with uncontrolled blood glucose 25 (18.9%) had anxiety compared to those with controlled blood glucose 20 (14.2%). Conversely, a higher proportion of respondents with controlled blood glucose 121 (85.8%) had no anxiety compared to those with uncontrolled blood glucose 107 (81.1%). Although, this was not statistically significant. Among respondents with abnormal body mass index (BMI) 34 (17.0%) had anxiety while 11 (15.1%) of those with normal BMI had anxiety.

4.11.3 Association between anxiety and medical characteristics of the respondents

Table 4.9.3 shows the association between anxiety and medical characteristics of respondents. Among respondents who were diagnosed as having type 2 DM for 10 years and above 16 (25.0%) had anxiety while 20 (14.5%) of those who had had type 2 DM for less than 5 years had anxiety. Among respondents using both OHA and insulin 2 (33.3%) had anxiety. Higher proportion of respondents with other co morbidities 42 (17.2 %) had anxiety compared to those without co morbidities 3 (10.3%). Also, higher proportion of respondents with complication 34 (18.0%) had anxiety compared to those without complication 11 (13.1%). However, these were not statistically significant.

Higher proportion of respondents with uncontrolled blood glucose 25 (18.9%) had anxiety compared to those with controlled blood glucose 20 (14.2%). Conversely, a higher proportion of respondents with controlled blood glucose 121 (85.8%) had no anxiety compared to those with uncontrolled blood glucose 107 (81.1%). Although, this was not statistically significant. Among respondents with abnormal body mass index (BMI) 34 (17.0%) had anxiety while 11 (15.1%) of those with normal BMI had anxiety.

Table 4.9.3 Association between Medical characteristics and Anxiety

Variables	ANXIETY				
	No Anxiety n (%)	Anxiety present n (%)	Total n (%)	Chi-Square	P-Value
Duration of DM					
< 5 years	118 (85.5)	20 (14.5)	138 (100.0)	4.517	0.105
5 - 9 years	62 (87.3)	9 (12.7)	71 (100.0)		
10 years and above	48 (75.0)	16(25.0)	64 (100.0)		
Type of treatment					
OHA alone	224 (83.8)	43 (16.2)	267 (100.0)		0.259+
OHA plus Insulin	4 (66.7)	2 (33.3)	6 (100.0)		
Presence of co-morbidity					
Yes	202 (82.8)	42 (17.2)	244 (100.0)		0.437+
No	26 (89.7)	3 (10.3)	29 (100.0)		
Presence of complications					
Yes	155 (82.0)	34 (18.0)	189 (100.0)	1.012	0.314
No	73 (86.9)	11 (13.1)	84 (100.0)		
Fasting blood glucose					
Controlled	121 (85.8)	20 (14.2)	141 (100.0)	1.120	0.290
Uncontrolled	107 (81.1)	25 (18.9)	132 (100.0)		
Body Mass Index					
Normal	62 (84.9)	11 (15.1)	73 (100.0)	0.145	0.703
Abnormal	166 (83.0)	34 (17.0)	200 (100.0)		

+ Fishers exact value

4.11.4 Association between anxiety and psychosocial characteristics of respondents

Association between anxiety and psychosocial characteristics of respondents is presented in table 4.9.4. There was no significant association found between anxiety and any of the psychosocial variables. Among respondents who were physically inactive, 18 (17.1%) had anxiety while 27(16.1%) those who were physically active had anxiety. Also, among respondents who had negative life event in the last six months 16 (21.3%) had anxiety and 29 (14.6%) of those who had no negative life event in the last six months had anxiety. Those respondents with high level of social support, 20 (19.6%) had anxiety while 25 (16.3%) of those who had moderate social support had anxiety and none of the respondents who had low social support had anxiety.

Table 4.9.4 Association between Psychosocial factors and Anxiety

Variables	ANXIETY				
	No Anxiety n (%)	Anxiety present n (%)	Total n (%)	Chi-Square	P-Value
Physical activity					
Yes	141 (83.1)	27 (16.1)	168 (100.0)	0.054	0.949
No	87 (82.9)	18 (17.1)	105 (100.0)		
Stressful or negative life events in the last 6 months					
Yes	59 (78.7)	16 (21.3)	75 (100.0)	1.707	0.184
No	169 (85.24	29 (14.6)	198 (100.0)		
Ever smoked					
Yes	9 (90.0)	1 (10.0)	10 (100.0)	0.317	0.573
No	219 (83.3)	44 (16.7)	263 (100.0)		
Current alcohol intake					
Yes	4 (80.0)	1 (20.0)	5 (100.0)		0.597+
No	224 (83.6)	44 (16.4)	268 (100.0)		
Social Support					
Low Support	18 (100.0)	0 (0.0)	18 (100.0)	4.278	0.118
Average support	128 (83.7)	25 (16.3)	153 (100.0)		
High support	82 (80.4)	20 (19.6)	102 (100.0)		
Monthly health care expenditure					
₦5000 and below	126 (84.0)	24 (16.0)	150 (100.0)	0.085	0.959
₦5001 to ₦10000	71 (82.6)	15 (17.4)	86 (100.0)		
Greater than ₦10000	31 (83.8)	6 (16.2)	37 (100.0)		

+Fishers exact value

4.12 Logistic regression of factors influencing depression among respondents

Logistic regression of significant variables on depression is presented in the table 4.10 below. Variables significant on the chi square analysis were put into the logistic regression model using the enter method. Respondents who were physically inactive were about 1.7 times more likely to have depression compared to those who were physically active (OR=1.726; 95%CI=1.007-2.959). This was the only statistically significant variable found.

Table 4.10: Logistic regression of factors influencing depression among respondents

Variables	OR	CI	P-Value
Marital Status			
Widowed	1.398	0.782 – 2.498	0.258
Currently Married *(Ref)*	1		
Physical Inactivity			
Yes	1.726	1.007 – 2.959	0.047*
No *(Ref)*	1		
Social Support			
Low	1.091	0.378 – 3.151	0.872
Moderate	0.550	0.192 – 1.576	0.266
High *(Ref)*	1		

*significant at p<0.05

4.13 Logistic regression of factors influencing anxiety among respondents

Logistic regression of significant variables on anxiety is presented in the table 4.11 below. Significant variable on the chi square analysis and some important known associated factors were put into the logistic regression model using the enter method. Respondents who were Christian were about 2.3 times more likely to have anxiety compared to those who were Muslim (OR=2.251; 95%CI=1.100-4.605). This was statistically significant.

Table 4.11: Logistic regression of factors influencing anxiety among respondents

Factors	OR	CI	P-Value
Religion			
Christian	2.251	1.100 – 4.605	0.026*
Islam	1		
Sex			
Male	0.999	0.406-2.458	0.998
Female	1		
Age in years			
40-49	1.295	0.441-3.802	0.637
50-59	1.325	0.654-2.685	0.435
60 and above	1		

*significant at p<0.05

CHAPTER FIVE

DISCUSSION

This study highlights the associations between depression and anxiety and socio-demographic characteristics, medical factors and psychosocial factors of the respondents. It further describes the perceived social support of the respondents.

5.1 Socio-demographic characteristics of respondents

Majority of the respondents in this study were middle aged adults and elderly. The mean age of the respondents was 62.1 ±10.2 years. This finding is similar to that of Adibe et al., in which more than half of patients with type 2 DM were elderly (Adibe et al., 2017). This is due to the fact that type 2 DM had been shown to increase with age (Ayah et al, 2013). The mean age found in this study was high compared to 33.4 ±11.6 years reported by Ayah et al, in a population-based study in urban slum of Nairobi, Kenya. This could be a reflection of the fact that the study was carried out in a medical outpatient clinic of family medicine practice where there is continuous care of patients.

There is a female preponderance in this study. This is consistent with findings in other studies on patients with type 2 DM in Nigeria (Adibe et al., 2017, Ayah et al, 2013, Chinenye et al, 2012). The higher number of female respondents in the study may be a reflection of higher clinic attendance of females than males. In a study on the role of gender in compliance and attendance at an outpatient clinic, it was reported that more women attended the clinic than men (Babwah et al. 2006). Also, life expectancy is higher in women than in men (National Bureau of Statistics, 2016) thus this female preponderance could be associated with possible early deaths in men. In addition, health care in Nigeria is majorly

out-of-pocket. Women are more likely to be supported financially by relations, friends, loved ones and even their husbands toward hospital visits than men. However, in a study among DM patients with diabetic foot in Enugu, Nigeria, more than half of the respondents were male (Young et al, 2016).

Majority of the respondents in this study were currently married, which is similar to the findings in South west and South east Nigeria in which 69% and 69.4% of the patients with type 2 DM respectively were married (Kayode et al, 2015, Adibe et al., 2017). This can be explained by the increasing prevalence of DM with age and that young respondents would constitute the single group (DAN, 2013).

About two thirds of respondents in this study were in the monogamous marriage while nearly a third was in polygamous relationships. It is similar to a study among type 2 DM in Nigeria in which majority were monogamy. In addition, the culture of this environment favours men practicing polygamy. The predominant ethnic group among all respondents was Yoruba, which was a reflection of the dominant tribe in the Ibadan population studied. Majority of the respondents live below poverty line, because higher proportion of the respondents were elderly and were not in the labour force in Nigeria, which is within the age range of 15-64 years. This is consistent with the report that slightly above half and three-quarter of Nigerians live below the poverty level of $1.9 and $3.1 per day respectively (World bank, 2011). Proportion of respondents who had some form of education was the same with that reported by Adibe et al, in which about three quarter of the participants had formal education (Adibe et al., 2017). Less than one fifth of the respondents in this study had tertiary education even though, literacy level was high. This is responsible for one fifth of the respondents belonging to occupational class 1. Majority

of the respondents belonged to occupational class V. This finding compares with reports by Kayode et al. in which only 14.3% of the patients with type 2 DM who were employed were engaged in skilled/professional employments (Kayode et al, 2015).

Majority of the respondents were currently employed and about one fifth were retired This is similar to finding in Eastern Nigeria in which almost one fifth of the type 2 DM were retired (Okoronkwo, et al, 2016). However, in all these socioeconomic characteristics (level of education, employment status, type, occupational class and monthly income) women had a lower proportion compared with men because there are socio-cultural practices that limit women in their access to education, information and employment.

5.2 Prevalence of depression among respondents

Twenty-seven point five percent of the respondents had depression. This is consistent with the finding, that depression affect up to one-third of people with DM (Holt et al, 2014). This finding may be due to the fact that there is bidirectional relationship between DM and depression in which the incidence of depression is increased in patients with DM and the incidence of DM increased in patients with depression (Mezuk et al, 2008, Nouwen et al, 2010). Absence of severe depression among respondents in this study is consistent with findings by Mikaliukštiene et al. The prevalence of depression in this study is higher than that observed previously in Nigerian with type 2 DM by Agbir, and Ibrahim. This is due to differences in depression assessment method. In this present study, self-report questionnaire was used while in previous studies standardized diagnostic interviews were used. In a large cross-sectional multicentre study involving four different types of clinics, family medicine, internal medicine, specific diabetes care and endocrine clinics in Pakistan

a self-report questionnaire was used and the prevalence of depression was 43.5% (Khuwaja, et al. 2010). This prevalence of depression is higher than that found in this present study possibly because it was carried out in a single centre of family medicine practice and also different self-report questionnaire was used. In a study at Ile-Ife Southwest Nigeria using Zung's Self-Rating Depression Scale. The prevalence of depressive symptoms was 20.0%. The difference observed in prevalence could be because almost one sixth of the study participants at Ile-Ife had type 1 DM (Mosaku et al., 2008). Depression is still cause for concern because these will increase risk of mortality, reduce life expectancy and decrease quality of life among the diabetic patients. There is urgent need for intervention that will reduce the consequences by addressing modifiable risk factors such as physical inactivity.

Substantial percentage (26.4%) of the respondents with depression had mild depression. In a community-based sample of adult patients with type 2 DM recruited by simple random sampling, and using Zung's Self-Rating Depression Scale in China. The prevalence of depressive symptoms was 35.1%; mild, moderate, and severe depressions were 28.2%, 6.7%, and 0.2% respectively (Sun et al, 2016). The minute difference could be due to difference in methodology. The prevalence of depression symptoms was higher in female compare to male respondents. This is consistent with the findings by Rajput et al., in which diabetic women had higher depression (17.1% vs. 9.3%) than men. Also, Khuwaja et al., reported that 57.5% of diabetic female had depression while 42.5% of male had depression. A possible explanation for this is that women are more emotional than men and depression is a mood disorder.

5.3 Prevalence of anxiety among respondents

The prevalence of anxiety found in this study was 16.5%. This is consistent with the finding in Ethopia among patients with DM (Mossie et al, 2016). Anxiety may be due to fear of serious complications accompanying DM and worry about possibility of hypoglycaemia (Grisby et al, 2002). In a systematic review and meta-analysis to determine whether people with DM are more likely to have anxiety disorders or elevated anxiety symptoms than people who do not have DM, it was found that patients with DM had an excess risk of anxiety disorders and elevated anxiety symptoms compared to those without DM (Smith et al, 2013).

The prevalence of anxiety in this study is lower than that reported previously among patients with DM at Ile-Ife in Osun State, Nigeria (Mosaku et al., 2008). This could be due to difference in self-report questionnaire used. In this present study Beck anxiety inventory (BAI) scale was used while Mosaku et al used State Trait Anxiety Inventory scale (STAI). STAI has two scales, the state anxiety and the trait anxiety. Anxiety is measured as a state, which is a transitory experience and the time frame for the state anxiety questionnaire is "right now," BAI is not a measure of trait or state anxiety but assess symptoms occurring over the last week. In addition, almost one sixth of the study population at Ile-Ife had type 1 DM (Mosaku et al., 2008).

The prevalence of anxiety in studies varies even among type 2 DM, it was reported as low as 27% in Taiwan and high as 57.9% in Karachi, Pakistan (Wu et al., 2013, Khuwaja et al, 2010). This is probably due to differences in methodology. In a study in Tehran among type 2 DM the prevalence of anxiety symptoms was higher (69.7%) even though the same

self-report questionnaire Beck anxiety inventory was used with the present study (Paligzir et al, 2016). This could be due to difference in the age of the study population. Comorbid anxiety is of clinical importance to people with DM because it has been shown to be associated with increased DM burden, increased DM complications, worsened blood glucose levels, reduced quality of life, increased depression, increased body-mass index, and greater disability (Smith et al, 2013).

The prevalence of mild, moderate and severe anxiety in this study is similar to that reported in Ethiopia using the same self reported questionnaire (BAI) (Mossie et al, 2017). The minute difference could be due to difference in methodology. The study participants in Ethiopia were 18years and above who were being followed up for 6months or more and they were recruited from two public hospitals while in the present study, respondents were 40years and above attending clinic for at least 3months.

5.4 Prevalence of comorbid depression and anxiety among respondents

This prevalent rate of comorbid depression and anxiety in this study is comparatively lower than that found in studies in Indian participants by Rajput et al, and Nagabhirava et al. Similarly, it was lower than that reported by Mosaku et al. in Southwest Nigeria. This is because the prevalence of depression and anxiety found in this study were lower than those found in the studies above. Also, this study was carried out among type 2 DM attending secondary health care while others were in tertiary healthcare. In addition, different self-report questionnaires were used in all the studies to assess depression and anxiety.

Comorbidity of anxiety and depression could be explained by shared genetic risk factors, the fact that there is a considerable overlap between symptoms of anxiety and depression.

Also, is the role of stressful life events and HPA Axis provoking symptoms in either condition (Faravelli et al,2012).

5.5 Perceived social support of the respondents

The level of perceived social support (SS) among the participants in this study was good and most of the SS was provided by families. Among the respondents 56% had moderate SS while 37.4% of the respondents had high social support and 6.6% had low social support. This finding is similar to that reported by Yillmaz et al. in a tertiary health centre in Turkey using the same social support scale, in which the total mean score of the participants for MSPSS was moderate and also most of the SS was provided by families. In the family subscale, 77.7% of the respondents had high social support and 8.7% had low support. Similarly, in a study among type 2 DM attending outpatient clinic of the National Hospital, Abuja, Nigeria, in the family sub-scale of MSPSS, 6.9% of the respondents had low support (Odume et al.2015)

This shows family as the major source of social support and family has been found to be a useful unit of intervention for glycaemic control (Adetunji et al., 2009). In a systematic review it was found that there is a positive effect of social support, especially family support and more specifically from the spouse on controlling blood sugar level (Zang et al., 2015). The kinship system, the extended family system widely practiced in Africa including Nigeria are important contributors to having high family support.

In this study, male respondents had a higher proportion of high family support compared to females, possibly because a higher proportion of males were married and were in monogamous setting compared to females. Omosanya et al. reported a significant positive

association between family support and monogamous family structure and being married (Omosanya et al. 2012).

5.6 Medical history of the respondents

Physical co-morbidities were common among the respondents as it was found among type 2 DM patients attending tertiary clinic in Benin, Nigeria (James et al., 2010). This could be explained by the fact that more than half of the respondents were elderly, an age in which people are prone to multiple chronic diseases such as osteoarthritis, cataract, spondylosis. In addition, DM is a risk factor for cardiovascular disease. Hypertension was the most common co-morbid illness found in this study, this is consistent with a study in Lagos, Nigeria (Kayode et al, 2015). This may be because hypertension and DM patients have similar risk factors such as age, obesity and physical inactivity. Two third of the respondents had chronic complication, this is because the risk of diabetic related complication increases with age, duration of DM and comorbid hypertension. Individuals with both hypertension and DM are at high risk for both microvascular and macrovascular complications of DM (Unadike et al, 2011). Peripheral neuropathy and eye complications were the commonest chronic complications in this study. This is consistent with a multicenter study across seven tertiary health centers in Nigeria among type 2 DM in which the frequency of complication was also high and more than half of the respondents had peripheral neuropathy (Chinenye et al, 2012). However, in a study in Lagos Nigeria, even though the frequency of chronic diabetic complications was also high the commonest was eye complication (Kayode et al, 2015). This difference may be because eye screening is not done routinely for all the type 2 DM patients attending the clinic.

Among the respondents 72.2% were either obese or overweight and there was higher proportion of women compared to men in this study. This is consistent with the findings in Southwest Nigeria in which majority (83%) of the type 2 diabetic patients either were obese or overweight and the female patients were significantly more obese than the males (Fadupin et al 2004). Obesity is a risk factor for type 2 DM and females are more obese, this could be responsible for the female preponderance in this study (WHO, 2016, Oputa, 2015). The proportion of respondents with controlled blood glucose was similar to that reported in Benin, Nigeria (James et al., 2010). However, it was lowered than those reported in a study in Eastern Nigeria (Pascal &Nkwa, 2016). This is because in this study blood glucose is said to be controlled if fasting blood glucose is ≤ 110mg/dl whereas in the study in Eastern Nigeria, patient was said to have a good blood glucose control if the fasting blood glucose was 70-130 mg/dl. There is a significant relationship between social support and glycaemic control among type 2 diabetic patients (Odume et al., 2015). Similarly, in a study by Adetunji et al (2009) in Nigeria, patients with type 2 DM who had high perceived family support had good glycaemic control. Thus, in this study, half of the respondents had moderate social support and half of the respondents had good blood glucose control.

5.7 Psychosocial support of respondents

Similar to findings in a multicenter study in Nigeria, majority of the respondents had never smoked, were not taking alcohol currently and none was a current smoker (Chinenye et al., 2012). However, this proportion is lower than that reported in a study in Ethiopia among type 2 DM (Tiki et al, 2017). The differences in these findings could be because the respondents in this present study are managed by Family Physicians who are educators and counselor and contacts of the respondents with these health personnel could have increased

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their knowledge and the resultant change in lifestyle such that none was a current smoker. Almost two third of the respondents in this study were physically active. This is contrary to the finding in a multicenter study in Nigeria where 35.9% of patients reported regular exercise (Chinenye et al., 2012). Probable reasons for the high prevalence of physical activity among the respondents in this study could be because of the regular counselling on life style modification usually giving in the clinic.

Since most of the social support was provided by families which is the most basic relational unit and intimate social environment in our society, therefore, more than half of the respondents had moderate social support. More than half of the respondents spent less than N 5,000 monthly on their health care, this is in contrast to finding in Ethopia where majority reported high health care cost (Habtewold et al., 2014). The mean monthly expenditure for the treatment of DM reported in a study in Nigeria was ₦56,245.11 (Okoronkwo, et al, 2016). The could be because the study was carried out in a tertiary health institution while the present study was in a secondary health care. Also, the cost of care in tertiary health institution included direct medical cost both at and outside the facility and direct nonmedical cost while in the present study only direct medical cost was considered.

5.8 Factors associated with depression among the respondents

In this study there is a statistical significant association between depression and marital status, physical activity and social support. Higher proportion of widowed had depression compared to those who were currently married and single diabetic patients and this was significant. This is consistent with findings of studies in China and luthania (Sun et al, 2016, Mikaliukštiene et al., 2014). The explanation for this is that feeling of loneliness by

widows/widowers is a risk factor for depression while being married provide companionship, exerts a protective action and provide social support that is protective against depression. However, this finding is in contrast with the study in which marital status was not associated with depression (Kodakandla,et al, 2016).

The prevalence of depression is slightly higher in females than male although, there was no statistical significant association. This is consistent with the finding by Kodakandla et al. It is well known that being female is significantly associated with depression among people with diabetes (Roupa et al, 2014, Rajput et al., 2016, Khadijie et al., 2016). The percentages of depression in diabetic women doubled that in diabetic men (Roupa et al, 2014). This sex difference could be attributable to gender-specific issues such as pregnancy, menstrual cycle changes, postpartum. Also, there is genetic, environmental factors and lifestyle differences. Women are more likely to be physical inactive compared to male and physical inactivity has been found to be associated with depression.

Respondents in age group 40 and 49 years had highest proportion of depression followed by age above 60 years however, this was not statistically significant. This is consistent with the findings of Kodakandla et al. Those between the age 40 and 49 years are more likely to have stressful experience such as responsibilities at work and home, caring for children. Also, their duration of diagnosis of having type 2 DM is likely to be shorter, hence adherence to specific dietary guidelines, medications and attending regular medical check-up could stress them predisposing them to depression.

Studies have documented increased age as an independent factor for depression (Sun et al., 2016, Khuwaja, et al. 2010, Rajput et al., 2016). The elderly (>60 years) have many

challenges such as isolation, having other physical comorbidities and disabilities hence making them more prone to developing psychological conditions as depression. Among respondents with abnormal BMI there was higher proportion of depressions compared to those respondents with normal BMI. Obesity is a risk factor for DM and it has also been associated with an increased prevalence of depression (DAN, 2013; Roupa et al., 2009; Balhara & Sagar, 2011).

Protective effect of physical activity on depression has been reported, regular exercise by those with type 2 DM is important in the control of body weight and blood glucose levels (Balhara and Sagar, 2017). In this study there was statistically significant association between depression and physical activity, in that among respondents who were physically inactive there was a higher proportion of depression compared to those who were physically active. Low social support level has been found to be associated with the presence of depression (Yildiz et al., 2015, Zang et al 2015). In this study, higher proportion of respondents with low social support had depression compared to those who had moderate social support. This is consistent with the findings of a study carried out in Quassim (Al-mohaimeed, 2017). Social support from family, friends and significant others could be structural, emotional, tangible and informational support. It is an important factor for self-care, adherence to treatment and there is a significant relationship between social support and glycaemic control among type 2 diabetic patients (Odume et al., 2015).

5.9 Factors associated with anxiety among the respondents

In this study there was statistical significant association between anxiety and religion. Higher proportion of respondents who were Christian had anxiety compared to those who were Muslim. This could be because there were lesser Muslim respondents in this study or because the data collection for this study was immediately after the Ramadan fast. It was reported that Muslims are optimistic about their well-being when fasting during Ramadan (Lee et al, 2017). Thus, do not need to be anxious.

Respondents who were unemployed and unskilled had higher anxiety symptoms respondents compare to employed and skilled respondents this is because financial difficulties, poverty and other economic problems could cause feelings of insecurity, thereby increasing the risk of developing anxiety symptoms. Respondents with tertiary education having more anxiety is contrary to findings in other studies (Alduraywish et al., 2015, Paligzir et al., 2013, Bezykornoviene et al., 2014), although, there was no statistical significant association. A possible explanation is that those with higher educational level has better understanding and knowledge about the complications, treatment procedure, the challenge of diabetes and outcome of DM thus increased likelihood of developing anxiety. Also, males having slightly higher anxiety symptoms than female is contrary to findings in other studies (Alduraywish et al., 2015, Paligzir et al., 2013, Bezykornoviene et al., 2014), although, there was no statistical significant association. A possible explanation is that majority of the male respondents in this study had erectile dysfunction as a complication of type 2 DM. Erectile dysfunction has impacts on mood state, interpersonal functioning, and overall quality of life. Thus causing anxiety in them.

Respondents diagnosed to have type 2 DM for 10 years and above were more anxious compared to those who had type 2 DM for less than 5 years. This is because increased duration of diabetes could lead to increase diabetic complications and consequently increased psychological disorder including anxiety. Although this finding was not statistically significant. Similarly, in a study by Palizgir et al. there was no statistically significant association between duration of DM and anxiety. However, in the studies in China and Lithuania this similar finding was statistically significant (Sun et al, 2016, Mikaliukštiene et al., 2014). Higher proportion of respondents using both OHA and insulin having more anxiety compared to those using OHA alone, is because type 2 DM patients who were not controlled or had complication were placed on insulin. However, in China insulin use did not affect the states of anxiety. Higher proportion of respondents with uncontrolled blood glucose and physically inactivity had anxiety The explanation for this is that majority of respondents in this study were elderly, having multiple physical comorbidities and living below poverty line, thus unable to afford health care cost which is usually out of pocket in Nigeria. These findings were not statistically significant. It is consistent with a study in China that found that glycaemic control was not related to anxiety symptoms (Sun et al.2016).

5.10 Factors influencing depression and anxiety among respondents

The predictor for depression identified in this study wis physical inactivity. Respondents who were physically inactive were 1.72 times more likely to have depression compared to those who were physically active. This is consistent with findings from a review of 12 studies (10 cross-sectional, two trials) to determine the association between physical activity and depressed mood in Type 2 DM. It was found that in adults with Type 2 DM,

the inactive are 1.72 to 1.75 times more likely to be depressed than the more active (Lysy et al, 2008). Physical activity has been found to have protective effect on depression and acts as a buffer against the development of psychological disorders. There are different hypotheses supporting this. The endorphin hypothesis predicts that during exercise there is an increased release of β-endorphins and brain neurotransmitters which enhanced sense of well-being and improve mood. In addition, Physical activity improves blood glucose control in type 2 DM, reduces cardiovascular risk, contributes to weight loss and improves well-being thereby, reducing the risk of depression (Craft and Perma, 2004).

The predictors for anxiety in this study was religion. Religion is related to health in various ways., it influences the patient's ability to cope with illness and other stressful life changes. Religion beliefs affect patients' medical decisions, it may conflict with medical treatments, influence compliance with treatments and influence response to treatment. In this study, respondents who were Christian were about 2 times more likely to have anxiety compared to those who were Muslim. It has been reported that Muslims are optimistic about their well-being when fasting during Ramadan (Lee et al,) Also, anxiety score was observed to significantly decreased during Ramadan fasting when compared with baseline values (Amin, et al, 2016).

5.11 Limitations of the study

Findings from this study need to be interpreted carefully based on the following limitations. This study was a cross-sectional survey and as such inferences on the observed associations may not be causal. It was a clinic-based study; the study sample is only representative of patients with type 2 DM attending MOP clinic which may not be a reflection of the picture

in the general populace. Self-report instruments were used to assess anxiety and depression in this study. It is possible that some participants were misclassified therefore, standardized diagnostic interview should be utilized for clinical diagnosis.

Conclusions

This study was conducted to determine the prevalence of depression and anxiety, assess the level of social support perceived and identify factors associated with depression and anxiety among patients with type 2 DM, attending the MOP clinic, JSH Ibadan. Based on the results in the study, the following can be concluded:

Depression and anxiety were quite common among type 2 DM patients attending the MOP clinic, JSH, Ibadan. However, comorbidity of depression and anxiety was less common. The level of the perceived social support was moderate. Families provided most of the social support while friends provided the least social support. In this study depression among type 2 diabetic patients was associated with being widowed, having low social support and being physically inactive. Christianity was associated with anxiety among patients with type 2 DM. The predictor of depression was physical inactivity while the predictor of anxiety in type 2 DM respondents was religion.

Recommendations

Based on the results the following recommendations are made

1. To provide holistic care for patients with type 2 DM, there is need for clinicians to include the screening for depression and anxiety as part of evaluation of patients with type 2 DM since there are various convenient, easy to understand self-report questionnaires with good psychometric properties available. This will ensure early detection and early initiation of treatment thereby improving their quality of life.
2. There is need for necessary preventive intervention strategy to be part of health care programme. Regular moderate intensity exercise which could enhance the achievement and maintenance of ideal body weight thereby reducing the risk of depression should be emphasized in the management of type 2 DM patients. This is because obesity has been associated with DM and depression.
3. Larger community-based studies are needed to identify the magnitude of these problems and their associated factors.

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APPENDIX 1

INFORMED CONSENT FORM

My name is ILORI TITILAYO H; a postgraduate student of the Clinical Epidemiology, Department of Epidemiology and Medical statistics, Faculty of Public Health, University of Ibadan, Oyo State, Nigeria. I am interviewing adults having diabetes and coming to the medical outpatient clinic, Jericho Specialist Hospital, Ibadan for treatment. I want to find out, how many of them have depression and anxiety and factors associated with it. I will need to ask you some questions, which will be about your health and the diabetes as well as some personal data. Please note that your answers will be kept confidential. The information you and other people give me will help the doctors in the Jericho Specialist Hospital manage you better. During this exercise, medical examination will be carried out on you to determine your state of health. There are no physical risks associated with participation in this study. Your honest answers to the questions will be greatly appreciated. You are free to refuse to take part in this study. You have the right to withdraw at any given time if you choose to and this will not affect the quality or standard of care you will receive subsequently. Your help in responding to this study will be greatly appreciated and acknowledged.

CONSENT: Now that the study has been well explained to me and I fully understand the content of this study process. I will be willing to take part in the program.

....

Signature/Thumb print Signature of Interviewer/Date Witness's name/sign

Refusal to participate..... Signature/ Thumb print

APPENDIX 1I

QUESTIONNAIRE

DEPRESSION AND ANXIETY AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS ATTENDING OUTPATIENT CLINIC, JERICHO SPECIALIST HOSPITAL, IBADAN.

INTRODUCTION

Thank you for agreeing to be interviewed. My name is DR ILORI TITILAYO. H., a Postgraduate Student of the Department of Epidemiology and Medical statistics, Faculty of Public Health, College of Medicine, University of Ibadan. The purpose of this study is to find out the number of adults with diabetes that have depression and anxiety and the factors associated with it. The information obtained will provide objective data to support the need for routine screening for depression and anxiety among patients with diabetes and commencement of effective treatment to improve health outcome. Your identity and responses will be kept strictly confidential and will be used for the purpose of this research only. Try to give honest answers to the questions as much as your maximum co-operation will assist in making this research a success.

Identification: Serial No: _____ Hospital No: _____

SECTION A: SOCIO-DEMOGRAPHIC DATA

1. Age (as at last birthday)_____ (years)
2. Sex 1. Male 2. Female ☐
3. Marital Status:
   1. Single 2. Married 3. Living with partner (cohabiting) ☐
   4. Divorced 5. Separated 6. Widowed.
4. Family Type.
   1. Monogamous 2. Polygamous 3.Single parent ☐
5. Highest level of education attained:
   1. No formal education 2. Primary 3. Secondary (Up to JSS 111)
   4. Secondary School completed (SS111) 5. Post secondary ☐
6. Current employment status
   1. Employed 2. Unemployed 3. Retired ☐

7. If employed, type of employment
1.Government employee 2. Non-government (company) employee
3. Self employed 4. Others specify _____
8. Occupation _____
9. Average monthly income _____
10.Religion:
1. Christianity 2. Islam 3. Traditional 4. Others (specify) _____
11.Ethnic group
1. Hausa 2. Ibo 3. Yoruba 4. Other (specify)_____

SECTION B: (MEDICAL HISTORY)

12 (a) How long have you been diagnosed to have diabetes? _____
(b)Where were you first diagnosed as having diabetes? _____
(c) Have you ever been on medication for diabetes? 1. Yes 2. No
If yes to Q12c, duration for use of medication for diabetes _____
(d)How long have been attending and receiving treatment in Jericho Specialist Hospital?-----

13 (a) Presence of other medical co-morbidities 1. Yes 2. No
13(b) If yes name them

OTHER MEDICAL CO-MORBIDITIES	YES	NO
Hypertension		
Osteoarthritis		
Spondylosis		
Asthma		
Chronic obstructive airway disease		
Epilepsy		
Peptic ulcer disease		
Cancers (breast, cervix, prostate etc.)		
Cataract		
Glaucoma		
Refractive error		

Others specify (i). _____, (ii). _____
(iii)_____ (iv)_____ (v)_____

14(a) Presence of complications 1. Yes 2. No

14(b) If yes name them

COMPLICATIONS	YES	NO
MICROVASCULAR		
EYE (blindness-retinopathy, macula oedema etc.)		
KIDNEY(microalbuminuria, renal failure etc.)		
NERVES (peripheral neuropathy- numbness, paraesthesia)		
Diabetic foot disorders (ulcer, Foot or leg amputation)		
Erectile dysfunction (impotence)		
MACROVASCULAR		
Cardiovascular (heart attack)		
Stroke		

Others specify (i). _____, (ii). _____
(iii)_____ (iv)_____ (v) _____

15(a). Do you have a past history of any mental disorder?
1. Yes 2. No 3. Don't know

15(b). If yes , which ones?

MENTAL DISORDERS	YES	NO
Depression		
Anxiety		
Mania		
Schizophrenia		

Others specify (I) _____ (2) _____

16(a). Do you have a family history of any mental disorder?
1. Yes 2. No 3. Don't know

16(b). If yes, which ones?

MENTAL DISORDERS	YES	NO
Depression		
Anxiety		

Mania		
Schizophrenia		

Others specify (I) ---------- (2) ----------

17. Physical activity

(17a) Do you do exercise 1. Yes 2.No. ☐

(17b) If yes, which type?

TYPE OF EXERCISE	YES	NO
Brisk Walking		
Jogging		
Cycling		
Swimming		
Gardening		
Running		

Others specify_____

(17c) If yes, for how long in minutes? ----------,

(17d) How many times per week do you exercise? _____

SECTION C: (PSYCHOSOCIAL HISTORY)

18(a). Have you ever smoked cigarettes or other substances? 1. Yes 2. No

18(b). If yes to Q18a, are you currently smoking cigarettes or other substances?

1. Yes 2. No ☐

18(c). If yes to Q 18b, please quantify (cigarette sticks /day) _____

18(d). Duration of smoking cigarettes or other substances _____

19. Do you take alcohol currently? 1. Yes 2. No ☐

If yes, quantify_____ Duration_____

If no, when did you stop?_____

20(a) Have you been under any stressful condition or has negative life events (in the last 6 month)? 1. Yes 2. No ☐

(b) If yes, which type?

	EVENTS	YES	NO
a	Saddening Events - sudden unexpected events (e.g., crime, disasters, car accidents, and wartime events)		

b	Loss-related -loss or robbery of a valuable object		
c	Worry-related- severe illness of self or close family member, physical abuse, emotional abuse and neglect		
d	Bereavement- death of a close friend, close family member (child, spouse) or significant others		
e	Financial events -facing major financial difficulties, unemployment		
f	Family/ Sexual Problems - sexual abuse, negative events with relationships		

Others specify (I) ---------- (2) ----------
(3)----------

21. How much do you spend on health care monthly?----------.

MULTIDIMENSIONAL SCALE OF PERCEIVED SOCIAL SUPPORT

Read each statement carefully. Indicate how you feel about each statement.
Circle the "1" if you Very Strongly Disagree
Circle the "2" if you Strongly Disagree
Circle the "3" if you Mildly Disagree
Circle the "4" if you are Neutral
Circle the "5" if you Mildly Agree
Circle the "6" if you Strongly Agree
Circle the "7" if you Very Strongly Agree

		1	2	3	4	5	6	7	
22	There is a special person who is around when I am in need.								SO
23	There is a special person with whom I can share my joys and sorrows								SO
24	My family really tries to help me.								Fam
25	I get the emotional help and support I need from my family.								Fam
26	I have a special person who is a real source of comfort to me.								SO
27	My friends really try to help me.								Fri
28	I can count on my friends when things go wrong.								Fri
29	I can talk about my problems with my family.								Fam

b	Loss-related -loss or robbery of a valuable object		
c	Worry-related- severe illness of self or close family member, physical abuse, emotional abuse and neglect		
d	Bereavement- death of a close friend, close family member (child, spouse) or significant others		
e	Financial events -facing major financial difficulties, unemployment		
f	Family/ Sexual Problems - sexual abuse, negative events with relationships		

Others specify (I) ---------- (2) ----------
(3)----------

21. How much do you spend on health care monthly?----------.

MULTIDIMENSIONAL SCALE OF PERCEIVED SOCIAL SUPPORT

Read each statement carefully. Indicate how you feel about each statement.

Circle the "1" if you Very Strongly Disagree
Circle the "2" if you Strongly Disagree
Circle the "3" if you Mildly Disagree
Circle the "4" if you are Neutral
Circle the "5" if you Mildly Agree
Circle the "6" if you Strongly Agree
Circle the "7" if you Very Strongly Agree

		1	2	3	4	5	6	7	
22	There is a special person who is around when I am in need.								SO
23	There is a special person with whom I can share my joys and sorrows								SO
24	My family really tries to help me.								Fam
25	I get the emotional help and support I need from my family.								Fam
26	I have a special person who is a real source of comfort to me.								SO
27	My friends really try to help me.								Fri
28	I can count on my friends when things go wrong.								Fri
29	I can talk about my problems with my family.								Fam

30	I have friends with whom I can share my joys and sorrows.								Fri
31	There is a special person in my life who cares about my feelings.								SO
32	My family is willing to help me make decisions.								Fam
33	I can talk about my problems with my friends								Fri

SCORE

SECTION D: DEPRESSION

For each item below please place a check mark in the column which best describes how often you felt or behaved this way during the past several days.

		A little of the time	**Some of the time**	**Good part of the time**	**Most of the time**
34	I feel down-hearted and sad				
35	Morning is when I feel the best				
36	I have crying spells or feel like it				
37	I have trouble sleeping at night				
38	I eat as much as I used to				
40	I still enjoy sex				
41	I noticed that I am losing weight				
42	I have trouble with constipation				
43	My heart beats faster than usual				
44	I get tired for no reason				
45	My mind is as clear as it used to be				
46	I find it easy to do the things I used to				
47	I am restless and can't keep still				
48	I feel hopeful about the future				
49	I am more irritable than usual				

50	I find it easy to make decisions				
51	I feel that I am useful and needed				
52	My life is pretty full				
53	I feel that others would be better off if I were dead				
54	I still enjoy the things I used to do				

SCORE

Section E: ANXIETY

Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

		0	1	2	3
		Not at all	**Mildly but it didn't bother me much**	**Moderately it wasn't pleasant at times**	**Severely- it bothered me a lot**
55	Numbness or tingling				
56	Feeling hot				
57	Wobbliness in legs				
58	Unable to relax				
59	Fear of worst happening				
60	Dizzy or lightheaded				
61	Heart pounding/racing				
62	Unsteady				
63	Terrified or afraid				

64	Nervous				
65	Feeling of choking				
66	Hands trembling				
67	Shaky / unsteady				
68	Fear of losing control				
69	Difficulty in breathing				
70	Fear of dying				
71	Scared				
72	Indigestion				
73	Faint / lightheaded				
74	Face flushed				
75	Hot/cold sweats				
SCORE					

SECTION F: PHYSICAL EXAMINATION AND CLINICAL INVESTIGATIONS

76. General Examination:

Weight.....kg

Height.....metres

BMI.....kg/m2

77. 1st blood pressure.....mm/Hg 2nd blood pressure .....mm/Hg.

Average.....mm/Hg

78. Fasting blood glucose in the last 3 visits (1),,,,,,,,,,,,,,,,, (2)..... (3).....

Average.....Mg/dl (a) Controlled (b) Uncontrolled

Thank you for your time

64	Nervous				
65	Feeling of choking				
66	Hands trembling				
67	Shaky / unsteady				
68	Fear of losing control				
69	Difficulty in breathing				
70	Fear of dying				
71	Scared				
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SCORE					

SECTION F: PHYSICAL EXAMINATION AND CLINICAL INVESTIGATIONS

76. General Examination:

Weight.....kg

Height.....metres

BMI.....kg/m2

77. 1st blood pressure.....mm/Hg 2nd blood pressure .....mm/Hg.

Average.....mm/Hg

78. Fasting blood glucose in the last 3 visits (1),,,,,,,,,,,,,,,,, (2)..... (3).....

Average.....Mg/dl (a) Controlled (b) Uncontrolled

Thank you for your time

APPENDIX 11I

IWE IGBASE

Oruko mi ni ILORI TITILAYO H; akeko giga ti Clinical Epidemiology, ni Depatimenti Epidemiology and Medical statistics, Faculty of Public Health, Univasiti ti Ibadan, Ipinle Oyo, Nigeria. Mo n se iforowanilenuwo fun awon agbalagba ti o ni ito-suga ti o si n wa si medical outpatient clinic, Jericho Specialist Hospital, Ibadan fun itoju. Mo fe se iwadi iye won ti o ni irewesi okan ati ijaya (saniyan) ati awon okunfa ti o so mo won.

Mo ma nilo lati beere awon ibeere kooka ti o niise pelu ilera yin ati ito-suga ati awon ibere miran nipa ara yin. E ni igbekele wipe gbogbo idahun yin ni o pamo gege bi asiri. Gbogbo idahun tie yin ati awon tokun yin yoo funmi ni yo se iranwo fun awon dokita ni Jericho Specialist Hospital lati toju yin daradara. Ninu iwadi yi, ao se ayewo ilera lati mo ipo ti alaafia yin wa. Ko si si aburu kan bi o ti wu ko mo pelu kikopa ninu iwadi yi. A fe ki gbogbo idahun yin ko je pelu otito patapata. E si le ko lati kopa ninu iwadi yi to ba wuyin. Ni igbakugba ti eba fe, ele ko lati tesiwaju pelu iwadi yi, eyi ko si ni di itoju yin lowo lonakona. Ao mo riri iranwo yin lati dahun gbogbo ibeere wonyin.

IJEHUN: Nisisiyi ti won ti salaye iwadi naa funmi ti o si ti yemi yege, O wunmi lati kopa ninu re.

....

Ibuwolu Ibuwolu asebeere/Ojo Oruko/Ibuwolu Eleri

Ko wunmi lati kopa ---------- Ibuwolu/Iteka ----------

APPENDIX 1V

IWE IBEERE
TO DA LORI
IREWESI OKAN ATI IPORURU LARIN AWON ALARUN ITO-SUGA TI WON N MA N WA FUN ITOJU NI ILE-IWOSAN AKANSE JERICHO, IBADAN

IFAARA

E seun ti e gba lati kopa ninu iwadi yi. Oruko mi ni DR ILORI TITILAYO. H., akeko giga ti Clinical Epidemiology, ni Depatimenti Epidemiology and Medical statistics, Faculty of Public Health, Univasiti ti Ibadan, Ipinle Oyo, Nigeria. Idi iwadi yi ni lati mo iye awon agbalagba pelu ito-suga ti o ni irewesi okan ati ijaya (s'aniyan) ati awon okunfa ti o so mo won. Awon idahun ti a ba ri gba yoo pese alaye to peye lati ran ayewo onigbadegba irewesi okan ati ijaya lowo larin awon to ni ito-suga ati lati bere itoju to peye lati ran ilera lowo. Gbogbo idanimo ati idahun yin ni ao pamo gege bi asiri ati fun iwadi yi nikan. E gbiyanju lati dahun awon ibeere wonyi ni otito gege bi e ti mope ifowosowopo yin yo ran aseyori iwadi yi lowo.

Idanimo: Onka idanimo: _____ Onka ile iwosan: _____

IPA A: IBEERE ARA-ENI

1. Omo odun melo niyin (ni ojo-ibi ti e se gbeyin) _____ (odun)
2. Se Okunrin niyin abi Obirin 1. Okunrin 2. Obinrin ☐
3. Se o ni Oko tabi Aya:
   1. Mi o ni Oko/Aya 2. Mo ti se igbeyawo 3. Mo n gbe pelu afesona
   4. A ti jawe fun arawa 5. A ko gbe papo mo 6. Oko/Aya ti ku ☐
4. Iru idile wo loni
   1. Oko kan pelu aya ka 2. Oko kan pelu aya pupo 3.Baba ndagbe/Iya ndagbe ☐
5. Ipele eko wo ni o ko pari:
   1. Mi o kawe rara 2. Iwe alako bere 3. Girama (Titi de JSS 111)
   4. Girama (SS 111) 5. Ile eko giga ☐
6. Se o nise lowo
   1. Mo nise lowo 2. Mi ko nise lowo 3. Mo ti feyin ti ☐
7. Ti o b anise lowo, iru ise wo ni
   1. Osise ijoba 2. Osise ti kii se tijoba
   3. Ise aladani 4. Omiran *(daruko)* _____ ☐
8. Ise wo gan lo n se _____
9. Bi elo ni owo osu re (Naira) _____
10. Elesin wo ni o ☐

1. Kristeni 2. Musuluni 3. Elesin abalaye 4. Omiran *(daruko)* _____

11. Ibile wo loti wa

1. Hausa 2. Ibo 3. Yoruba 4. Omiran *(daruko)* _____ ☐

IPA B: ITAN ETO ITOJU

12 (a) O tito igbawo si igbawo ti o ti gba ayewo ito-suga? _____ ☐

(b) Nibo ni won ti koko sofun o wipe o ni ito-suga? _____

(c) Nje oti l'oogun tabi gba itoju ri fun ito-suga? 1. Beeni 2. Beeko ☐

Ti oba je Beeni si Q12c, bawo ni itoju naa se pe to _____

(d)Odun melo ni o ti nwa lati gba itoju ni Jericho Specialist Hospital? _____

13 (a) Yato si ito-suga, nje o ni aisan miran lara 1. Beeni 2. Beeko ☐

(b) Ti o ba je beeni, daruko won

AWON AISAN MIRAN	**Beeni**	**Beeko**
Eje riru (Haipatensonu)		
Awoka tabi Aromoleegun		
Ailere opa eyin		
Iko ife (Asthma)		
Aarun Edoforo		
Warapa (Epilepsies)		
Ogbe inu (Ulcer)		
Jerere (Cancer)		
Kokoro Oju (Cataract)		
Aarun Oju (Glaucoma)		

Omiran *(daruko)* (i). _____, (ii). _____

(iii)----------. (iv)---------- (v)----------.

14(a) Nje o ni inira 1. Beeni 2. Beeko

14(b) Ti o ba je Beeni, Daruko won

ORISI INIRA	**Beeni**	**Beeko**
MICROVASCULAR		

OJU (blindness-retinopathy, macula oedema etc.)		
KIDIRIN (microalbuminuria, renal failure etc.)		
ESO (NERVE) (peripheral neuropathy- numbness, paraesthesia)		
INIRA ESE (ogbe inu, ese gige, etc)		
AILESEDEDE OMOKUNRIN/OBIRIN (impotence)		
MACROVASCULAR		
Aarun okan (heart attack)		
Opopo (Stroke)		

Omiran (daruko) (i). _____, (ii). _____
(iii)---------- (iv)---------- (v)----------.

15(a). Nje o ti ni aisan opopo kankan ri?
1. Beeni 2. Beeko 3. Mikomo ☐

15(b). Ti o ba je beeni, ewo ni pato?

AISAN OPOLO	**Beeni**	**Beeko**
Irewesi okan		
Ijaya (Aniyan sise)		
Aare opopo (Mania)		
Aarun opolo		

Omiran (daaruko) (I) ---------- (2) ----------

16(a). Nje o ni molebi ti o ni aisan opolo ri? 1. Beeni 2. Beeko 3. Mi o mo

16(b). Ti o ba je beeni, iru ewo?

AISAN OPOLO	**Beeni**	**Beeko**	**MENTAL DISORDERS**	**YES**	**NO**
Irewesi okan			**Depression**		
Ijaya (Aniyan sise)			**Anxiety**		
Aare opopo (Mania)			**Mania**		

Aarun opolo			**Schizophrenia**		

Omiran (daaruko) (I) ---------- (2) ----------

17. Idaraya

(17a) Nje o ma n se ere idaraya 1. Beeni 2. Beeko ☐

(17b) If yes, which type?

ORISIRISI ERE IDARAYA	**Beeni**	**Beeko**
Yiyara rin		
Ere sisa diedie		
Keke wiwa		
Odo wiwe		
Gardening		
Ere sisa		

Omiran daruko_____

(17c) Ti o ba je beeni, fun iseju melo? ----------,

(17d) Igba melo lose ni o ma n se ere idaraya? _____

IPA C: ITAN IWUWASI ATI IRORI

18(a). Nje o ti fa siga tabi ohun miran ri? 1. Beeni 2. Beeko ☐

18(b). Ti o ba je Beeni si Q18a, nje o n fa siga tabi ohun miran lowolowo bayii?

1. Beeni 2. Beeko

18(c). Ti o ba je Beeni si Q 18b, kinni odiwon re (igi siga melo lojumo)

_____

18(d). Igba melo ni o ma n fa siga tabi ohun miran _____

19. Nje o ma n mu oti lile? 1. Beeni 2. Beeko ☐

Ti o ba je beeni, kinni odiwon re? Igba melo _____

Ti o ba je beeko, igba wo lo paa ti? ----------

20 (a) Nje isele buburu Kankan sele si o ri (ni osu mefa seyin)? 1. Beeni 2. Beeko ☐

(b) Ti o ba je beeni, iru isele wo?

	AWON ISELE	Beeni	Beeko
a	Isele ojiji at airotele (e.g., ajalu, ijanmba oko, ati isele ogun		
b	Ipadanu ohun to se iyebiye si owo awon ole tabi olosa		
c	Arokan- aisan to po gan ti ara eni tabi ti molebi to sun moni, ibanije, tabi ikosile		
d	Ofo- Iku ore to sunmoni, molebi to sunmoni (omo, oko/aya) tabi elomiran to se pataki.		
e	Isoro nipa eto isuna, ailowolowo tabi ainiselowo		
f	Isoro pelu idile, ibalopo tabi isele tikodara nipa ajosepo pelu elomiran		

Omiran (daruko) (I) ---------- (2) ----------
(3)----------

21. Elo ni o n na lori itoju ara re losoosu? ----------.

OPO IBEERE NIPA ERONGBA RE MULTIDIMENSIONAL SCALE OF PERCEIVED SOCIAL SUPPORT

Jowo ka awon atele yi daradara. Kio si so bi o ba se lero nipa ikookan awon gbolohun wonyi.

Mu "1" ti o ko ba Faramo gidigidi gan
Mu "2" ti o ba Faramo gidigidi
Mu "3" ti o ko ba faramo die
Mu "4" ti o ko ba faramo tabi lodi sii
Mu "5" ti o ba faramo die
Mu "6" ti o ba faramo gidigidi
Mu "7" ti o ba faramo gidigidi gan

		1	2	3	4	5	6	7	
22	Enikan to se Pataki wa ni tosi nigbati mo ba wa ninu aini.								SO
23	Enikan to se Pataki wa ni tosi ti mo le pin ayo ati ibanuje mi pelu								SO
24	Idile mi gbiyanju lopolopo lati ranmilowo								Fam
25	Mo ma n ri atileyi ati iranwo ti okan gba lati odo awon idele mi								Fam

26	Mo ni eni Pataki kan ti o je orison itura fun mi								SO
27	Awon ore mi gbinyanju pupo lati ranmilowo								Fri
28	Mo le sinmi le awon ore mi nigbati nkan ba lojupo								Fri
29	Mo le ba awon molebi mi soro nipa isoro mi								Fam
30	Mo ni awon ore ti mole pin ayo ati ibanuje mi pelu								Fri
31	Eniyan pataki kan wa ninu aye mi ti o mo riri mi								SO
32	Awon idile mi setan lati ranimilowo lati gbe igbese								Fam
33	Mo le baa won ore mi soro nipa isoro mi								Fri

OHUN TI O GBA =

IPA D: IREWESI OKAN

F For each item below please place a check mark in the column which best describes how often you felt or behaved this way during the past several days.

		Nigba kookan	**Nigba die**	**Lopo igba**	**Ni gbogbo igba**
34	Mo na n ni ibanuje				
35	Ni owuro ni mo ma n dunnu ju				
36	O ma n semi bi kin n ma sukun				
37	Mo ni isoro pelu riri orun sun lale				
38	Mo ma n jeun to bi mo se ma n jeun tele				
40	Mo si feran ibalopo				
41	Mo sakiyeyi wipe mo ti n jo tabi ja omi ara sile				
42	Mo ni isoro pelu arunsu				
43	Okan ni na n yara mi helehel ju ti tele lo				
44	O ma n remi laini idi				
45	Okan mi mo bi o ti ma n ri tele				
46	O rorun funmi lati se awon nkan ti mo n se tele				
47	Ara mi o bale mi o si le joko je.				

26	Mo ni eni Pataki kan ti o je orison itura fun mi								SO
27	Awon ore mi gbinyanju pupo lati ranmilowo								Fri
28	Mo le sinmi le awon ore mi nigbati nkan ba lojupo								Fri
29	Mo le ba awon molebi mi soro nipa isoro mi								Fam
30	Mo ni awon ore ti mole pin ayo ati ibanuje mi pelu								Fri
31	Eniyan pataki kan wa ninu aye mi ti o mo riri mi								SO
32	Awon idile mi setan lati ranimilowo lati gbe igbese								Fam
33	Mo le baa won ore mi soro nipa isoro mi								Fri

OHUN TI O GBA =

IPA D: IREWESI OKAN

F For each item below please place a check mark in the column which best describes how often you felt or behaved this way during the past several days.

		Nigba kookan	**Nigba die**	**Lopo igba**	**Ni gbogbo igba**
34	Mo na n ni ibanuje				
35	Ni owuro ni mo ma n dunnu ju				
36	O ma n semi bi kin n ma sukun				
37	Mo ni isoro pelu riri orun sun lale				
38	Mo ma n jeun to bi mo se ma n jeun tele				
40	Mo si feran ibalopo				
41	Mo sakiyeyi wipe mo ti n jo tabi ja omi ara sile				
42	Mo ni isoro pelu arunsu				
43	Okan ni na n yara mi helehel ju ti tele lo				
44	O ma n remi laini idi				
45	Okan mi mo bi o ti ma n ri tele				
46	O rorun funmi lati se awon nkan ti mo n se tele				
47	Ara mi o bale mi o si le joko je.				

48	Mo ni ireti ojo ola				
49	Mo ni ikorira ju ti tele lo				
50	O rorun funmi lati se ipinnu				
51	Mo ro pe mo wulo won si nilo mi				
52	Aye mi kun fun ohun daradara				
53	Mo ro pea won eniyan to kun yo dara sii ti mo ba ku				
54	Mo si n gbadun awon nkan ti mo ma n se tele				

OHUN TI O GBA =

Section E: IJAYA

Jowo ka ikookan atele yi daradara. kio si so bi awon amin naa se yo o lenu to ni osu kan seyin, ati ojo on pelu, nipa mimu onka ti o sodo mo ohun ti o lero nipa awon aami atele yi.

		0	1	2	3
		Ko ri bee rara	**Die, sugbon ko yo mi lenu**	**O po die, o n yomi lenu nigba miran**	**O po gan, o ma n yomi lenu lopo igba**
55	Ailegbese				
56	Ara gbigbona				
57	Ese gbigbon				
58	Aile sinmi				
59	Eru isele ti ko dara ju				
60	Oju susu tabi ori fufuye				
61	Okan mimi helehele				
62	Aile farabale				
63	Ijaya tabi eru				
64	Aniyan sise				

65	Ero wipe nkan nmu o				
66	Owo gbigbon				
67	Ara gbigbon				
68	Eru siso ijanu eni nu				
69	Isoro pelu mimi				
70	Eru iku				
71	Ifoya				
72	Ibinu				
73	Didaku / ori fufuye				
74	Oju sisu				
75	Aagun gigbona tabi tutu				
	OHUN TI O GBA				

IPA F: AYEWO ARA ATI IWADI ISEGUN OYINBO

76. Ayewo gbogbogbo:

Owon……kg

Giga……metres

Odiwon isanra……kg/m2

77. Ayewo Ifupa kinni……mm/Hg Ayewo Ifupa keji……mm/Hg.

Idaji.....mm/Hg

78. Ayewo eje suga ni igba meta (1),,,,,,,,,,,,,,,,, (2)---------- (3)----------

Idaji.....Mg/dl

(a) Ni isakoso (b) Koni isakoso

E seun fun asiko yin

APPENDIX V

ETHICAL APPROVAL

TELEGRAMS.....

TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to

the Honorable Commissioner quoting

Our Ref. No AD 13/ 479/ 511

31st July, 2017

The Principal Investigator,
Department of Epidemiology and Medical Statistics,
Faculty of Public Health,
College of Medicine,
University of Ibadan,
Ibadan.

Attention: Ilori Titilayo

ETHICAL APPROVAL FOR THE IMPLEMENTATION
OF YOUR RESEARCH PROPOSAL IN OYO STATE

This is to acknowledge that your Research Proposal titled: "Prevalence and Factors Associated with Depression and Anxiety among Patients with Type 2 Diabetes Mellitus Attending Jericho Specialist Hospital, Ibadan, Oyo State" has been reviewed by the Oyo State Ethical Review Committee.

2. The committee has noted your compliance. In the light of this, I am pleased to convey to you the full approval by the committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations, in line with this, the Committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of findings as this will help in policy making in the health sector.

Wishing you all the best.

Dr. Abbas Gobir
Director, Planning, Research & Statistics
Secretary, Oyo State Research Ethical Review Committee

APPENDIX V

ETHICAL APPROVAL

TELEGRAMS.....

TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

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31st July, 2017

The Principal Investigator,
Department of Epidemiology and Medical Statistics,
Faculty of Public Health,
College of Medicine,
University of Ibadan.
Ibadan.

Attention: Ilori Titilayo

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Director, Planning, Research & Statistics
Secretary, Oyo State Research Ethical Review Committee