

SPIRITUALITY AND SELF-MANAGEMENT OF TYPE 2

DIABETES AMONG PATIENTS WITH TYPE 2

DIABETES IN BENIN CITY

BY

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CERTIFICATION

This dissertation by Osifo Marvellous is accepted in its presented form as satisfying the dissertation requirement of the degree of Bachelor of Physiotherapy of the School of Basic Medical Sciences, College of Medical Sciences of the University of Benin.

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DEDICATION

This dissertation is dedicated to God and to my parents, Mr. and Mrs. Osifo, my siblings Mr. Joshua Osifo, and Mr. Isaac Osifo who made this work a reality.

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ABSTRACTS

Background: Diabetes accounts for increased mortality from comorbid diseases such as cardiovascular disease, stroke, chronic kidney disease, chronic liver disease, and cancer. Diabetic patients are exposed to chronic stress due to issues such as anxiety about diabetic complications. Diabetic patients are exposed to chronic stress due to issues such as anxiety about diabetic complications. little is known about spirituality, self-management activities, health-related beliefs, and lived experience with type 2 diabetes (T2D) especially in Benin City Nigeria

Aim: This study aims to explore the spirituality and beliefs of patients who are self-managing their type 2 diabetes to further understand the unique cultural factors influencing diabetes self-management.

Methods: Purposive sampling technique was used to select two (2) hospitals in Benin City. The total population of T2DM patients in a month were 200 in University of Benin Teaching Hospital and 100 Edo Specialist Hospital. The Tao Yamane formula was used to derive a sample size of 170 participants. Convenient sampling method was used to recruit participant. The use of Spirituality Questionnaire (SQ) and was Diabetes Self-Management Instrument Short Form(DSMI-20) used to obtain information from the respondents. Inferential statistics was used to summarize the data. Alpha level was 0.05.

Results: There was significant correlation between spirituality and diabetes self-management ($r=0.205$, $p=0.007$). there was no significant correlation between gender and comorbidities with spirituality and self management of T2DM.

Conclusion:. In conclusion, prayers, belief connected to a higher being, helps the diabetic patient rise above the limitations of the diabetic disease. This study showed that the tendency of individual practicing self-care, usually increases as they become more spiritually inclined.

Keywords: Spirituality, Type 2 diabetes, Self-management.

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Diabetes mellitus is a heterogeneous group of metabolic diseases characterized by chronic hyperglycemia (Koloverou et al., 2014; World Health Organisation, 2016) as a result of defects in insulin secretion, insulin action, or both and other metabolic disorders (Koloverou et al., 2014). Diabetes accounts for increased mortality from comorbid diseases such as cardiovascular disease, stroke, chronic kidney disease, chronic liver disease, and cancer (Bragg et al., 2017). The International Diabetes Federation (IDF) has released new figures showing that 537 million adults are now living with diabetes worldwide a rise of 16% (74 million) since the previous IDF estimates in 2019 (International Diabetes Federation Atlas, 2021). An estimated 44.7% of adults living with diabetes (240 million people) are undiagnosed. Over 4 in 5 (81%) of these people live in low- and middle-income countries (International Diabetes Federation Atlas, 2021). About 1 in 10 persons worldwide suffers from one type of the three diabetes including type 1 diabetes, type 2 diabetes mellitus, and gestational diabetes mellitus (Saeedi et al., 2019).

The rise in the number of people with this condition is driven by a complex interplay of socio-economic, demographic, environmental and genetic factors (IDF, 2021). Patients living with diabetes experience socio-economic challenges such as loss of a job, dependence on medical and nursing care, reduced social and family interactions and changes in lifestyle (Yang et al., 2019; Wit et al., 2020). This is because, unlike other disease conditions, where only medication is required to manage/cure, diabetes presents more complicated physiological, psychological and social conditions that make management very difficult (Chew, 2014; Darvyri et al., 2018; Jena, Kalra and Yeravdekar, 2018). Though, diabetes may be managed through medication and lifestyle modifications such as weight loss, diet, and exercise (Rise et al., 2013; American Diabetes Association, 2018) there is also a high

need for spiritual and psychological management (Darvyri et al., 2018; Jena, Kalra and Yeravdekar, 2018).

The most common symptoms of type 2 diabetes are polyuria, muscle weakness, hyperglycemia, severe muscle impairment, neuromuscular systems dysfunction, diabetic peripheral neuropathy which results in numbness, tingling sensation in the extremities, easy fatigability and poor exercise tolerance (Kayode et al.,2016). According to the American Diabetes Association, chronic hyperglycemia of diabetes is associated with long term damage of various organs such as the kidneys, heart, eyes, nerves and blood vessels (ADA, 2009).

Diabetic patients are exposed to chronic stress due to issues such as anxiety about diabetic complications (Reach et al.,2015), depression, misplaced illness beliefs, limited social support, lack of knowledge, and feelings of being overwhelmed by the everyday illness and its requirements(Hermanns.,2006).

Self management in the form of adherence to diet and drugs, blood glucose monitoring, exercise, foot care, recognition of symptoms is essential for the prevention of long term complications of type 2 diabetes. Interventions by healthcare practitioners focus more on the physical symptoms while the spiritual and psychological aspects of the patient have not been fulfilled (Darvyri et al., 2018). Research has found that religious practices can be useful in managing type 2 diabetes. Several religious practices such as praying, meditation, singing, reading the Koran, reciting Bible verses or even belonging to a faith based community can improve the health of persons with chronic diseases and illnesses. Patients with chronic illnesses can cope better when religious factors are present as they can provide them with hope, confidence, and support (Darvyri et al., 2018). Patients can benefit from religious practices in a variety of ways, including increased adherence to treatment all of which can lead to better self-management and treatment of type 2 diabetes (Duke and Wigley, 2016).

If clinicians hope to achieve effective outcomes in the management of type 2 diabetes, they must consider factors such as patients' comorbidities, gender, age, spirituality, physical activity level, as physical inactivity can lead to severe metabolic consequences (Koloveryou et al.,2014).

Spirituality is defined as related to the ideas of transcendence, meaning hope and cohesion (Darvyri et al.,2018).It includes religious practices such as praying, meditation, singing, reciting Bible verses, reading the Koran or even belonging to a faith based community (Darvyri et al., 2018). Results from a study shows that the spirituality of people with type 2 diabetes can have a profound influence on their diet, exercise and drug compliance (Duke and Wigley, 2016). There have been noteworthy arguments as to whether spirituality directly affects diabetes outcomes and well-being globally (Choi and Hastings, 2018). Spirituality can be a powerful coping strategy for persons with debilitating health conditions such as diabetes (Choi and Hastings, 2018). Several studies indicate that increased religiosity is associated with better outcomes in clinical and general populations (Wit et al.,2020). Spirituality generates a positive attitude towards life and life experiences, making the patient dominant against ill-fated life events including disease conditions (such as diabetes) and improving life with motivation and energy (Wit et al., 2020). The spiritual beliefs of patients living with diabetes are of paramount impact for the purpose of maintaining good mental health (Onyisi et al.,2021). Increases in diabetes-related complications and death in minority populations have been attributed to the individual's inability to effectively self-manage the disease (Magny-Normilus, Mawn and Dalton, 2019). Although spirituality can give people strength to cope with a chronic condition, it may result in poor diabetes care if they abandon self-management because they believe it is fate or the will of a deity for them to have diabetes (Duke and Wigley, 2016).

1.2 Statement of the Problem

Spirituality may fluctuate throughout life, it is unique to the individual, it forms part of the nature of being and incorporates meaning and purpose in life. Individual's dispositions influence coping styles, patient's self-management of diet, exercise and adherence to medicine. It is not also clear how spirituality account for the effective management of diabetic conditions. Furthermore, little is known about spirituality, self-management activities, health-related beliefs, and lived experience with type 2 diabetes (T2D) especially in Benin City Nigeria. Therefore, this study aims to explore the spirituality and beliefs of patients who are self-managing their type 2 diabetes.

1.3 Aim of Study

To explore how the spirituality of patients living with Type 2 Diabetes in Benin City influenced their coping strategies and self management of diet and exercise.

1.3.1 Specific Objectives

1. To investigate if there's significant correlation between spirituality and self-management.
2. To investigate if there's significant difference between spirituality and co-morbidities.
3. To investigate if there's significant difference between male and female participants and self-management.
4. To identify the challenges faced by Type 2 Diabetes patients in managing their disease so that health care providers such as physiotherapists can offer more effective diabetes care.

1.4 Hypothesis

1. There will be no significant association between spirituality and co-morbidities.
2. There will be no significant association between diabetes self-management and comorbidities.
3. There will be no significant association between spirituality and marital status
4. There will be no significant association between diabetes self-management and marital status.

5. There will be no significant association between spirituality and gender.
6. There will be no significant association between diabetes self-management and gender.
7. There will be no significant correlation between spirituality and diabetes self-management.

1.5 Research Questions

1. Will there be a significant correlation between spirituality and self-management?
2. Will there be a significant association between spirituality and co-morbidities?
3. Will there be a significant association between diabetes self-management and co-morbidities?
4. Will there be a significant association between gender and self-management?
5. Will there be a significant association between gender and spirituality?
6. Will there be a significant association between marital status and spirituality?
7. Will there be a significant association between marital status and diabetes self management?
8. What are the challenges faced by Type 2 Diabetes patients in managing their disease so that health care providers such as physiotherapists can offer a more effective diabetes care?

1.6 Significance of Study

1. Help the physiotherapists know the self-management needs of patients with T2DM and where physiotherapists can come in preferring good knowledge base about the condition to these patients population.
2. To know the influence of spirituality on self management of T2DM.
3. To ascertain the factors influencing self-management among type 2 diabetes patients in public hospitals in Benin City.

1.7 Delimitation of Study

This study is delimited to patients with T2DM attending outpatient clinic at the Endocrinology Unit, Department of Internal Medicine, University of Benin Teaching Hospital and Edo Specialist Hospital Benin-City, Edo State, Nigeria.

The instrument used in the study were the Diabetes Self-Management Instrument Short Form (DSM1-20) (Lee et al., 2016) and the Spirituality Questionnaire (SQ) (Parsian et al; 2009)

1.8 Definition of terms

Diabetes mellitus: It is a heterogeneous group of metabolic diseases characterized by chronic hyperglycemia as a result of defects in insulin secretion, insulin action, or both and other metabolic disorders (Kolooverou et al., 2014).

Spirituality: the state or quality of being dedicated to God, religion, or spiritual things or values, esp as contrasted with material or temporal ones (Collins dictionary).

Self Management: can be defined as the individual's role in managing chronic disease. This term is often associated with self-care and includes an array of activities needed to effectively manage one or more chronic conditions (Galdas et al., 2015).

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview

Diabetes mellitus is a heterogeneous group of metabolic illnesses characterized by persistent hyperglycemia (Kolooverou et al., 2014; Johnson et al., 2016)) as a result of insulin deficiency, insulin action, or both and other metabolic disorders (Kolooverou et al., 2014). Diabetes accounts for increased mortality from comorbid diseases such as cardiovascular disease, stroke, chronic kidney disease, chronic liver disease, and cancer (Bragg et al., 2017).

Self-management of diet, exercise and adherence to medicine is influenced by the patients' beliefs, individual dispositions and coping styles (Duke et al., 2021). The spirituality of people with type 2 diabetes (T2DM) can have a significant impact on their diet, exercise and medicine adherence and although spirituality can give people strength to cope with a chronic condition, it may result in poor diabetes care if they abandon self-management because they believe it is fate or the will of a deity for them to have diabetes (Duke and Wigley, 2016). Family/friend support, self-monitoring, and effective dietary and medical advice are associated with improved self-management, metabolic control, and clinical health outcomes in Haitian immigrants (Magny-Normilus, Mawn and Dalton, 2019).

2.1.1 Epidemiology of Diabetes

The estimated number of people affected with diabetes globally is 537 million adults are— a rise of 16% (74 million) since the previous IDF estimates in 2019. Also an estimate of 44.7% of adults living with diabetes (240 million people) are undiagnosed. Over 4 in 5 (81%) of these people live in low- and middle-income countries (International Diabetes Federation, 2021). The rising global prevalence of deaths and disability-adjusted life-years due to diabetes is estimated to

be about 22.9 million. About 1 in 10 persons worldwide is suffering from one type of the three diabetes including type 1 diabetes, type 2 diabetes mellitus, and gestational diabetes mellitus (Saeedi et al., 2019). The latest IDF Diabetes Atlas report shows that the global prevalence of diabetes is estimated to be 10.5%, with over half (44.7%) of adults undiagnosed of the condition, also IDF projections show that by 2045, 783 million adults will be living with diabetes – or one in eight adults. (IDF, 2021)

The age-adjusted prevalence, high rates of T2DM in Nigeria among persons aged 20–79 years increased from 2.0% (95% CI 1.9% to 2.1%) in 1990 to 5.7% (95% CI 5.5% to 5.8%) in 2015, accounting for over 874 000 and 4.7 million cases, respectively. The pooled prevalence rate of impaired glucose tolerance is 10.0% (95% CI 4.5% to 15.6%), while impaired fasting glucose is 5.8% (95% CI 3.8% to 7.8%). Hospital admission rate for T2DM is 222.6 (95% CI 133.1 to 312.1) per 100 000 population with hyperglycaemic emergencies, diabetic foot and cardiovascular diseases being most common complications. The overall mortality rate is 30.2 (95% CI 14.6 to 45.8) per 100 000 population, with a case fatality rate of 22.0% (95% CI 8.0% to 36.0%). (Adeloye et al., 2017).

2.1.2 Types of Diabetes

The American Diabetes Association classified diabetes into type 1, type 2, gestational diabetes and specific types resulting from other causes (ADA, 2018). But there are two predominant forms; type 1 and type 2 diabetes.

2.1.3 Type 1 Diabetes Mellitus (T1DM)

It occurs as a result of autoimmune destruction of the beta cells leading to absolute insulin deficiency. There are several environmental factors that result in the destruction of the beta cells but these factors are yet to be traced. It was formerly known as juvenile onset diabetes mellitus or insulin dependent diabetes mellitus. It affects children, teens, young adults (Latent immune

disease in adults). The onset is usually fast and is characterized by hyperglycemia that forms for several days to week that is associated with weight loss, polyuria, fatigue, polydipsia, blurred vision (Petersmann et al.,2018). The hyperglycemic emergency and diabetic ketoacidosis (DKA) signifies total insulin deficiency which further leads to hyperglycemia, ketone body, dehydration and unrestrained lipolysis (Petersmann et al., 2018).

2.1.4 Type 2 Diabetes Mellitus (T2DM)

It is the most common type and it represent about 90%-95% of diabetes globally. It was initially called adult onset diabetes mellitus or non-insulin dependent diabetes mellitus. It majorly results from insulin resistance with relative insulin deficiency that further leads to a defect in the secretion of insulin with marked insulin resistance. This type of diabetes is usually seen in older patients of 45years and above, in overweight and obese. It is not associated with immunological factors and it has a slow onset. Clinical features are dyslipidemia, hypertension, central adiposity and these increases patient risk of developing cardiovascular diseases. In women of child bearing age, insulin resistance manifests as polycystic ovarian syndrome (Kerner and Bruckel, 2014; Galerneau and Inzucchi, 2004). T2DM is an age-related disease, caused by a combination of factors, including genetics, lifestyle, and aging influences, and leading causes of hyperglycemia in this population can be linked to impairment of beta-cell function, decline in insulin secretion, as well as peripheral insulin resistance (Lee and Halter, 2017). Older adults are at risk for DM complications which increases with age and duration of T2DM. T2DM increases the risk for vascular dementia and Alzheimer's disease. These complications lead to decreased functional autonomy and impaired cognition and may contribute to poor self-care and diabetes mellitus management. Goals for DM care should focus on not just preventing complications but also on extending disability-free life expectancy and improving quality of life (QOL) (Halter et al., 2014; Huang et al., 2014). Hyperglycemia in acute illness is associated with increased circulating counter-regulatory hormones and pro-inflammatory cytokines, interfering with glucose

metabolism, increased gluconeogenesis, and decreased glucose uptake in peripheral tissues (McDonnell and Umpierrez, 2012).

2.1.5 Gestational diabetes mellitus

This is diabetes mellitus that is diagnosed during pregnancy. It leads to fetalmacrosomia. Gestational diabetes mellitus is caused by insulin resistance due to the hormonal changes of the placenta in pregnant women. It is characterized by elevated blood glucose and slightly increased insulin levels. Environmental factors such as obesity and genetic factors, for example a first-degree relative who has T2DM, are responsible for its development. Gestational diabetes mellitus endangers both mother and foetus; it increases the chance of pre-eclampsia, and it may lead to stillbirth if untreated (Mack and Tomich, 2017; Galerneau and Inzucchi, 2004,).

2.1.6 Other Types

Specific types of diabetes are due to other causes, e.g., monogenic diabetes syndromes (such as neonatal diabetes and maturity-onset diabetes of the young [MODY]), diseases of the exocrine pancreas (such as cystic fibrosis and pancreatitis), and drug- or chemical-induced diabetes (such as with glucocorticoid use, in the treatment of HIV/AIDS, or after organ transplantation) (American Diabetes Association, 2018)

2.1.7 Symptoms of Type 2 Diabetes

Common symptoms of type 2 diabetes are

Hyperglycemia

Polyuria

Muscle weakness

Diabetic peripheral neuropathy

Severe muscle impairment

Poor exercise tolerance

Joint proprioceptive dysfunction in the lower extremities.

2.1.8 Risk Factors

Risk factors include tobacco use, an unhealthy diet, physical inactivity and excessive consumption of alcohol, advanced age, urban dwelling etc. (Gabarron et al., 2018).

2.1.9 Pathophysiology of Type 2 Diabetes Mellitus

The pathophysiology of T2DM is complex, with an alteration in the balance between insulin sensitivity and secretion as the most important determinant in the development of T2DM. T2DM results from the gradual fall in β cell function on a background of insulin resistance. Adolescents with glucose dysregulation are likely to have more impairment in insulin secretion compared with reduced sensitivity (Bacha et al. 2010). Studies of insulin secretion and glucose disposal in adolescents with glucose dysregulation have identified that, in impaired fasting glycaemia (IFG), the insulin stimulated glucose disposal is normal but first and second phase insulin secretion are approximately 50% and 30% lower, respectively (Bacha et al. (2010). In impaired glucose tolerance (IGT) the first phase insulin secretion is approximately 40% lower while second phase insulin secretion is preserved (Bacha et al. 2010). If IFG and IGT coexist, there is impairment in both phases – approximately 55% lower first phase insulin and 30% lower second phase insulin secretion. In T2DM, glucose disposal is impaired by ~30%, first phase insulin by ~ 75%, and second phase insulin by ~65% compared with children with normal glucose tolerance (Bacha et al. 2010). Furthermore, the deterioration in β cell function in youth with T2DM is more accelerated (~15% per year) than observed in adults (Wilmot and Idris, 2014). As such, those who have a combination of IFG and IGT are likely to have a higher risk of progression to T2DM compared with those with either IFG or IGT in isolation.

Insulin resistance is largely driven by obesity (D' Adamo et al 2011). However, it is not the degree of obesity which matters, rather the distribution of fat. A combination of high

intramyocellular lipid content, increased visceral, decreased subcutaneous and ectopic liver fat deposition is most likely to result in glucose dysregulation in both young adult and paediatric populations (D'Adamo et al. 2011).

2.1.10 Diagnosis

Diabetes may be diagnosed based on plasma glucose criteria, either the fasting plasma glucose (FPG) or the 2-h plasma glucose (2-h PG) value during a 75-g oral glucose tolerance test (OGTT), or A1C criteria. Glycosylated haemoglobin A1C (HbA1c) measurement has recently been approved for diagnosis and screening of diabetes. HbA1c has advantages over FPG and OGTT due to convenience without the need for fasting, and less affected by hyperglycaemic variability during stress and illness. However, HbA1c is not validated to be used for screening and diagnosis in children, adolescents and in pregnancy (Nguyen et al. 2018). HbA1c must be interpreted with caution in the setting of anaemia and other haemoglobinopathies (Nguyen et., al. 2018). It is worthy of note that these tests do not necessarily detect diabetes in the same individuals. The efficacy of interventions for primary prevention of type 2 diabetes has primarily been demonstrated among individuals who have impaired glucose tolerance (IGT) with or without elevated fasting glucose, not for individuals with isolated impaired fasting glucose (IFG) or for those with pre-diabetes defined by A1C criteria. The same tests may be used to screen for and diagnose diabetes and to detect individuals with pre-diabetes. Diabetes may be identified anywhere along the spectrum of clinical scenarios: in seemingly low-risk individuals who happen to have glucose testing, in individuals tested based on diabetes risk assessment, and in symptomatic patients. IFG is defined as FPG levels between 100 and 125 mg/dL (between 5.6 and 6.9 mmol/L) and IGT as 2-h PG during 75-g OGTT levels between 140 and 199 mg/dL (between 7.8 and 11.0 mmol/L) (Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus, 2003). It should be noted that the World Health Organization

(WHO) and numerous other diabetes organizations define the IFG cut off at 110 mg/dL (6.1mmol/L) as with the glucose measures.

2.1.11 Diagnostic criteria for diabetes mellitus

Random plasma glucose value of ≥ 200 mg/dL (≥ 11.1 mmol/L) or

Fasting plasma glucose value of ≥ 126 mg/dL (≥ 7.0 mmol/L) or 2-h oral glucose tolerance test (oGTT) value in venous plasma ≥ 200 mg/dL (≥ 11.1 mmol/L)

Impaired fasting glucose values: Impaired fasting glucose (IFG) for the interval of fasting glucose from 100 to 125 mg/dL (5.6–6.9 mmol/L) in venous plasma.

Impaired glucose tolerance: Impaired glucose tolerance (IGT) corresponds to a 2-h plasma glucose value in oGTT in the interval from 140 to 199 mg/dL (7.8–11.0 mmol/L) with fasting glucose values < 126 mg/dL (< 7.0 mmol/L). IFG and IGT are also present in many people with a glucose utilization disorder (American Diabetes Association 2018).

2.1.12 Management

1. Pharmacological Therapy

For type 1 diabetic patients the only treatment is insulin replacement that is administered via subcutaneous injection (insulin pump). Patients with type 2 diabetes are initially managed with a caloric-restricted diet, weight loss (if necessary) and exercise. Most patients don't get adequate glucose control with these interventions alone and pharmacotherapy is required. The first line medication of choice for treatment of type 2 diabetes is metformin due to efficacy, safety (including low risk of hypoglycaemia), and durability of glucose lowering effect (Dao-Tran et al., 2018). Adjunct medications such as aspirin, statin therapy, and RAS blockers are prescribed for primary and secondary cardiovascular disease prevention (Koloverou et al., 2015). Oral agent

such as DPP4-inhibitors, GLP-1 agonists, and SGLT-2 inhibitors are also recommended. GLP-1 agonists favours by some patients, particularly by helping in weight reduction.

2. Surgical Therapy

Bariatric surgery, in particular laparoscopic adjustable gastric banding (LAGB), may be acceptable to for achieving substantial weight loss and improvement in metabolic parameters including remission of diabetes mellitus. Cost, scarcity of publicly funded bariatric surgery, long waiting periods and difficulties in accessing follow up surgical care due to geographic location make it a less frequently used (Raveendran et al., 2018).

3. Non-Pharmacological Therapy

The primary intervention for diabetes mellitus includes moderate calorie restriction to achieve weight loss, change in dietary composition, and moderate physical activity. Optimal management of diabetes primarily targets adequate control of plasma glucose levels in the normal physiological reference range as in a healthy non-diabetic subject without causing the risk of hypoglycaemia. Normal plasma glucose levels in a healthy individual depend on the dietary intake of nutrients, physical activity and hormones that control glucose homeostasis, especially insulin. Therefore, diabetes management should target dietary interventions, modifications in lifestyle including physical activities and hormonal manipulation (mainly insulin) and/or its effects. Non-pharmacological interventions are also useful for the effective management of even type 1 diabetes mellitus when used along with insulin therapy especially in those with obesity. Nutritional interventions are important in achieving optimal glycaemic control in patients with T2DM. Most patients with T2DM are overweight or obese and, therefore, weight loss achieved through dietary restriction of energy helps in management of diabetes. Physical activity refers to any body movement that increases energy expenditure above the baseline, whereas exercise is a planned, structured and repetitive physical activity performed with the objective of improving

physical fitness. Physical activity improves insulin sensitivity, bodyweight, cardiovascular risk factors, physical fitness, lipid level, blood pressure and overall wellbeing, and reduces the risk of cardiovascular morbidity and mortality (Wilmot and Idris, 2014). Physical activity not only improves glycaemic control in patients with T2DM, but also reduces bodyweight and blood pressure. It improves the adverse lipid profile by reducing total cholesterol and low-density lipoprotein (LDL) cholesterol and increasing high-density lipoprotein (HDL) cholesterol (Reiner, 2013). These, in turn, reduce the risk of various cardiovascular events inherent to patients with T2DM (Raveendran, 2018).

4. Exercise and Lifestyle Modification

Exercise training in the form of resistance, endurance and combined training consisting of both, has been shown to improve glycaemic control and diabetes outcomes in patients with T2DM in a recent systematic review and meta-analysis (Röhling et al., 2016). Physiotherapists often prescribe walking as a form of exercise for improving cardiorespiratory endurance and plasma blood glucose control. Regular walking contributes to improvement in muscular strength, joint flexibility, and a protective mechanism for preventing secondary complications commonly seen in patients with type 2 diabetes (Kayode et al., 2016). However, we need to keep in mind that there is substantial risk of hypoglycaemia during and after exercise. At times, post-exercise hyperglycaemia is encountered in patients with T1DM because of a surge of counter-regulatory hormones during and after exercise. The insulin treatment may need modification in patients who do only occasional unaccustomed physical activities to prevent these complications. Patients with T2DM should engage in moderate- to high-intensity exercise for at least 150 minutes per week, spread over a minimum of 3 days a week (Raveendran et al., 2018; Bull et al., 2020). Adults should also perform muscle-strengthening exercises involving all major muscle groups for 2 or more days per week. All individuals should avoid prolonged sitting/sedentary activity by breaking every 30 minutes by briefly standing, walking or performing other activities

(Katzmarzyk et al., 2010). The benefits of exercise depend on factors such as frequency, duration, intensity, type of exercise, age of the patient and the adherence to the exercise programme. This is collectively termed as the FITT principle: Frequency (the number of times exercise is done), Intensity (the amount of effort for the exercise), Time (the duration of exercise) and Type (aerobic or resistance) (Mayl et al., 2020) It has recently been shown that both moderate-intensity continuous training (MICT) as well as different high-intensity interval training (HIIT) regimes can improve beta cell function in insulin resistance (Kirwan, Sacks and Nieuwoudt, 2017).

Diet plays a vital role in the etiology of diabetes and related co-morbidities. Improved glycaemic control through diet could minimize medications, lessen risk of diabetic complications, improve quality of life and increase life expectancy. Packaged foods and drinks that are high in fat and sugar-content should be avoided and take more of fresh fruits and vegetables. Low glycaemic index diets may increase insulin sensitivity by minimizing fluctuations in blood glucose levels and reducing the secretion of insulin over the day (Thomas and Elliot, 2009; 2010) Community initiatives such as regular family walking groups, health promotion in the community with sporting and arts festival and competitions, regular hunting trips, and appointment of a community member as sports and recreation officer may be beneficial (Tuomilehto, 2001; Jehan et al., 2018).

Smoking and alcohol consumption should be avoided, as they are risk factors for cardiovascular diseases and chronic kidney diseases (CKD) as well diabetes mellitus. Smoking and alcohol consumption also divert resources and leave little to spend on healthy diet. It is known that adults who maintain a physically active lifestyle can reduce their risk of developing impaired glucose tolerance, insulin resistance, and type 2 diabetes (Wei et al., 2000).

2.2 Self-Management/Self-Management Principles

Self-Management is defined in the National Chronic Disease Strategy and the WA Chronic Conditions Self-Management Strategic Framework as simply ‘the active participation by people in their own health care’. (Government of Western Australian Department of Health, 2015).

Self-management principles are activities that require a patient active participation in his/her care (Mogre et al., 2017). The shift from a paternalistic model of health care to a doctor-patient relationship whereby the doctor and patient make shared decisions requires an active involvement of patient who takes responsibilities. This fits more in the new definition for positive health, which “is the ability to adapt and to self-manage, in the face of social, physical and emotional challenges (Riel et al., 2019). The degree of patient participation in medical decisions varies widely across different models of the physician-patient relationship. According to the paternalistic model, the physician knows best what is in the patient's interest; patient participation is limited. This model clearly does not take into account patients' autonomy and desire for information appropriately. In contrast, the informative model claims that values are well-known to the patient while the physician's role is restricted to providing him with the necessary information. However, the assumption of fixed values may be challenged. Patients expect their doctors to be not only technical experts but also caring persons. In the interpretive model, the physician's task is to help the patient to identify and express his values. In the deliberative model, both physician and patient engage in an open discussion about the values the patient could and should pursue. The physician is allowed to present his own preferences, and conflicting values are discussed explicitly. Thus, the patient is empowered to choose between alternative preferences. This model forms the basis of shared decision making, which involves at least two participants who engage in a process of both mutual information and interactive discussion. Patient participation should result in a greater sense of personal control, more satisfaction with treatment, better compliance and transfer into the daily routine of disease management. This is why self-management by the patient with a chronic disease such as diabetes plays more of an

important role in patient care nowadays; however, the degree of self-management varies per patient in the sense that a patient with acute life-threatening myocardial infarction in the emergency department has minimal degree of self-management compared to patients with chronic diseases who are attending outpatient clinic may have varying degree of self-management as they can suggest to health professional what they research about their health condition as well as medication. To help stimulate patients in their self-management behaviour, it is necessary to use an adequate tool, and to educate patients and health professionals (Riel et al., 2019).

2.2.1 Diabetes and Self-Management (DSM)

Diabetes self-management education remains a critical element for care to promote healthier outcomes (CDC, 2017). Quality diabetes self-management includes knowledge, skills, and abilities necessary for improved health and quality of life. The evidence-based standards incorporate the needs, goals, and life experiences of the person with diabetes; however, the transition in demands of survival from being homeless to being housed are never considered in the guidelines. Embedded in the standards is the assumption that all people have similar experience and connection with the health care system. The standards support informed decision making, self-care behaviours, enhance problem solving, and collaboration with health care professionals (Funnell et al., 2011; Rovner, Casten, & Harris, 2013).

Theoretically, the seven domains thought to predict good health outcomes and support sustained diabetes self-management behaviours include: (a) healthy eating, (b) being active, (c) monitoring blood glucose, (d) taking medications, (e) good problem solving skills, (f) healthy risk-reduction behaviours, and (g) healthy coping skills (Collins-McNeil et al., 2012; Funnell et al., 2012; Shrivastava, Shrivastave, & Ramasamy, 2013). Religion and spirituality do not appear among the important diabetes self-management behaviours which might enhance balance,

awareness, and mindfulness toward wellness. The present study sought to explore how religion and spirituality impacted attitudes about self-management practices taking into account culture.

2.3 Self-care behaviours and prevalence of adherence

Most included studies, 16 of 27 investigated and reported on more than one self-care behaviour. (Mogre et al., 2019) of the 11 studies that reported on only one self-care behaviour, seven reported on medication taking only, two foot care practice only and one each reported on SMBG only, diet only and physical activity only. Items of the questionnaires were either author-designed (N = 6) or derived from previous studies (N = 5) or adopted existing scales (N = 16). Among studies that used existing questions, six used the summary of diabetes self-care activities questionnaire (SDSCA); four studies used the eight-item Morisky Medication Adherence Scale (8-MMAS) (all of which assessed medication taking only); two studies used the International Physical Activity Questionnaire (IPAQ); and one each used the diabetes self-management assessment tool (D-SMART), the self-care inventory tool and self-reported medication adherence and self-care dietary adherence scale.

Two studies combined adherence rates for all self-care behaviours investigated. Ayele et al., ([2012](#)) found 39.0% of a sample of 222 diabetes patients adhered to recommended self-care practices. Using the SDSCA to evaluate adherence to self-care behaviours among a sample of 230 type 2 diabetes patients from Nepal, Bhandari and Kim, (Bhandari & Kim, [2016](#)) reported a total mean (SD) adherence score of 3.6 (0.89) (maximum score = 7.0).

2.3.1 Diet

Fourteen studies have evaluated adherence to diet all of which evaluated diet with other self-care behaviours except for one study (Worku, Abebe, &Wassie, [2015](#)) that investigated diet only. These studies reported adherence in varied forms: (a) number of days participants performed a

recommended dietary behaviour/activity during the past week (N = 6); (b) percentage and/or number of participants adhering to a recommended diet, eating a particular type of food, or avoiding/limiting/minimizing the intake of particular diet(s) (N = 3); (c) number of times within a week participants followed a type of diet or meal (N = 1); and (d) percentage of participants having good, fair or poor dietary adherence based on cut-off scores generated from participants' responses to items of a self-care questionnaire, most of which were Likert scales (N = 4). The mean number of days participants adhered to their dietary recommendations ranged from 2.3 days per week to 4.6 days per week. Regarding the percentage of participants adhering to a recommended dietary practice, rates ranged from 29.9% of a sample of persons living with diabetes from South Western Nigeria reportedly having outstanding adherence (Adisa&Fakeye, [2014](#)) to 91.7% of Nepalese diabetes patients avoiding sweets (Baumann, Opio, Otim, Olson, & Ellison, [2010](#)). Among these studies the median adherence was 58.0% (IQR = 29.9%–88.4%). Dekker, Amick, Scholcoff, and Doobay-Persaud ([2017](#)) found a sample of persons living with diabetes from Belize eating fruits and vegetables an average of three times per week.

2.3.2 Medication use/taking

Studies have reported on diabetes medication, making it the most frequently reported self-care behaviour. Three studies reported adherence as the mean number of days participants adhered to their diabetes medication during the last 7 days, all of which found participants adhering at least 5 days a week. Medication adherence rates ranged from 26.0%–97.0% (median = 71%; IQR = 59.0%–83.0%). Regarding good/high/strict adherence, rates ranged from 59.0%–71.0%. Two studies investigated and reported treatment/anti-diabetic non-adherence (Kalyango et al., [2008](#); Piette et al., [2011](#)). The study by Kalyango et al. ([2008](#)) reported a non-adherence prevalence of 29.0%, while the study by Piette et al. ([2011](#)), Piette et al. ([2011](#)) found 85.0% of

persons with diabetes not adhering to their diabetes medication at least once during the past year. One study reported on the proportion of persons with diabetes using insulin only, insulin with oral agents, oral agents and those not using medication (Baumann et al., [2010](#)). This study did not investigate whether participants adhered or not

2.3.3 Exercise

Fourteen studies have evaluated patients' adherence to exercise. All these studies used self-reports. Adherence to physical activity or exercise was reported in varied forms including number of days of adhering to recommended exercise or physical activity in the last 7 or 3 days; and frequency/number of times participants engaged in physical activity or exercise within a week, percentage or number of participants engaging in exercise or type of physical activity. Six studies reported the number of days participants adhered to exercise in the last 7 days and most studies (N = 4) found participants engaging in physical/exercise for less than 3 days in a week. Adherence rates ranged from 26.7% of older persons with diabetes from Brazil reportedly being sufficiently active (Bueno et al., [2017](#)) to 69.0% of a sample of Nigerian type 2 diabetes individuals being physically active (Oyewole, Odusan, Oritogun, & Idowu, [2014](#)). The median adherence among these studies was 41.2% (IQR = 29.5–50.1%).

2.3.4 Self Monitoring Blood Glucose (SMBG)

Thirteen studies investigated SMBG from which six studies (Al-Amer, Ramjan, Glew, Randall, & Salamonson, [2016](#); Ashur, Shah, Bosseri, Fah, & Shamsuddin, [2016](#); Assah, Atanga, Enoru, Sobngwi, & Mbanya, [2015](#); Bhandari & Kim, [2016](#); Mogre, Abanga, Abanga, Tzelepis, Johnson, & Paul, [2017](#); Mosha & Rashidi, [2009](#)) reported the mean number of days participants performed SMBG in the last 7 days. The mean number of days on which SMBG was performed ranged from 0.2–2.2 days per week. Four studies reported on the percentage of participants that performed SMBG without indicating the number of times per day or within a week (Adisa & Fakeye, [2014](#);

Baumann et al., [2010](#); Huang, Zhao, Li, & Jiang, [2014](#); Musenge, Michelo, Mudenda, & Manankov, [2016](#)). These studies reported rates from 13.0–79.9% (median = 18.5%; IQR = 14.5–51.5%). Two studies investigated the number of times participants monitored their blood glucose in a day and/or within a week (Ayele et al., [2012](#); Mastura, Mimi, Piterman, Teng, & Wijesinha, [2007](#)). Ayele et al. ([2012](#)) found 18.0% of a sample of persons with diabetes from Ethiopia performing SMBG more than once a week. However, Mastura et al. ([2007](#)) reported 16.4% performing SMBG once per day, 47.1% more than once per week and 36.5% less than once a week

2.3.5 Foot care

Ten studies have evaluated foot care among diabetes patients from which two studies investigated foot care only. Six studies (Al-Amer et al., [2016](#); Ashur et al., [2016](#); Assah et al., [2015](#); Bhandari & Kim, [2016](#); Mogre, Abanga, et al., [2017](#); Mosha & Rashidi, [2009](#)) reported foot care adherence according to the mean number of days diabetes patients adhered to foot care recommendations; mean days ranged from 2.2–4.3 days in a week. Huang et al. ([2014](#)) reported a mean foot care practice score of 77.47% among Chinese persons with diabetes (higher scores indicate better self-perceived overall foot care). Three studies (Abdulrehman, [2015](#); Baumann et al., [2010](#); Desalu et al., [2011](#)) reported on regular feet inspection from which rates ranging from 37%–41% were reported. The study by Desalu et al. ([2011](#)), investigated a wide range of foot care practices including feet inspection, washing of feet with warm water and inspection of the inside of footwear. Responses from these were used to classify participants into good, fair and satisfactory foot care practice. They found only 10.0% of participants had good foot care practices. In a study among a sample of persons with diabetes from India, Chellan et al. ([2012](#)) reported a good foot care practice (with a different classification of factors considered to be good

practice) prevalence of 36.0% among those without diabetic foot ulcer and 17.0% among those with diabetic foot ulcer disease. The median adherence was 36.5 (IQR = 13.6–59.2%).

2.4 FACTORS AFFECTING SELF MANAGEMENT

2.4.1 Individual-level factors

At the individual level, motivation, time constraints and e health literacy were identified as factors influencing self-management. Motivation and time constraints have been well documented in the literature (Williamson et al. 2000; Brown et al. 2002; Murphy et al. 2011; Booth et al. 2013).

2.4.2 E-health literacy

Health literacy has been increasingly recognised as important to the self-management of T2DM (Kaufman et al. 2017). Providers reported that most of their patients with T2DM were elderly and lacked access to the Internet.

To effectively use e health information, patients need access to the Internet and skills in navigating the Internet and appraising health information. Only patients who said they had access to the Internet were included in this study. Speaking about their patients with T2DM in general, providers said that most of them were elderly and did not have access to the Internet. They said that these patients preferred to get their information through face-to-face appointments and hard copy resources. Providers stated that if patients did have access to the Internet, they did not know how to use it unless a family member helped the man that this help was not always available. (Dao et al., 2019)

2.4.3 Motivational factors

Patient motivation has been identified as important for engaging in self-management. A range of barriers and facilitators to patient motivation was described. Barriers. Most patients generally seemed motivated to self-manage and did not report barriers to motivation. Some patients have stated that the cold weather was sometimes demotivating in terms of exercise. (Dao et al., 2019)

2.4.4 Time constraints

Patients have reported that they lacked the time to prepare healthy meals, engage in exercise or take medications due to commitments such as work, study or caring for the family. (Dao et al., 2019)

2.4.5 Interpersonal-level factors

Family and friends

Patients' partners and families are more often described as facilitators than barriers by both patients and providers. Patients said that their family or partner assisted them in various self management activities, including taking medications, cooking and going to appointments. (Dao et al., 2019)

Patient education

Patients said that their main T2DM educational sources were the general practitioner and dietician, who both provided mostly dietary education. Some patients wanted more information on set meal plans, pre-packaged meals and healthy snack ideas. Most of these patients reported that they were struggling with their diet and lacked dietary support from their GP or a referral to a dietician. In terms of the mode of education, many patients said that they preferred face-to-face education, rather than reading information sources. They said it was more personal and tailored to their needs (Dao et al., 2019).

Patient–Provider Relationship

Many providers, described rapport as a key factor in building a positive patient–provider relationship. Providers stated that rapport resulted in their patients’ continued attendance, increased reception to education and treatment compliance. (Dao et al., 2019)

2.4.6 Organisational-level factors

Affordability

Providers have reported that they were aware that patients’ ability to pay was a common and significant issue for accessing allied or specialist care. Although many providers highlighted the cost benefits of the five allied health visits available under Medicare Team Care Arrangements, they argued that the number of visits covered was inadequate for a patient with a long-term condition (Dao et al., 2019).

Multidisciplinary Care

Many providers highlighted the benefits of collaborating with a multidisciplinary team based at their general practice or within reach. This not only provided convenient access to a range of allied health services for patients, but also allowed easier coordination between providers (Dao et al., 2019).

2.4.7 Community-Level Factors

Culture

Patients from Pacific Islander and Lebanese backgrounds explained how cultural practices made it difficult to eat healthily. Patients from both cultures stated that it was offensive to refuse meals prepared by the host. Several providers reported a lack of culturally tailored advice from dieticians and health information resources. There is evidence that tailoring diabetes interventions according to the culture, language, religion and health literacy skills of the patient group can

contribute to positive patient outcomes (Zeh et al. 2012). This highlights the need to culturally tailor self management resources, especially dietary education.

Self-management support resources

Some patients seek out self-management support resources such as websites, emails, seminars and magazines from the internet. These were considered useful in supporting self-management (Dao et al., 2019).

2.5 Religious/spiritual practices promoting diabetes self-management practice

Participation in religious services

Patients with diabetes in a study have reported that attendance to religious services helped to improve symptoms. Twenty-four participants (57%) participated in religious services in a house of worship, whereas, 15 participants (36%) participated in religious and spiritual activities when they were available. Eleven participants (26%) reported church attendance on Sundays, and five (12%) reported participation in religious and spiritual services during the week in addition to Sunday. Using media services was also reported as a type of religious activity. Ten participants (24%) used Christian television shows, online programs, and smart phone applications to support spiritual and religious practices in managing health.

2.5.1 Prayers

Prayer represents one of the most significant religious and spiritual activities used for physical, psychological, and spiritual well-being. Patients have reported that they usually pray for strength to cope with their health and that it has proven to be a powerful healing method.

Reading the Bible

The Bible also represents a spiritual coping method. Reading and studying the Bible serves as a coping strategy for self management.

2.5.2 Religion and Spirituality

Religion can be referred to as “an organized system of beliefs, practices, rituals, and symbols designed to facilitate closeness to the sacred or transcendent and to promote an understanding of a relationship with God or with a higher power. (Lundberg &Thrakul, 2013) . Religion is beneficial when it aids in the creation and perseverance of meaning/purpose in one’s life(Jafari et al.,2014). Spirituality can be concisely defined as “related to the ideas of transcendence, meaning, hope and cohesion” (Unantenne et al., 2013) and includes personal systems of beliefs referring to a higher power or existence as a dynamic, personal process and experience (Lynch et al., 2012). It is also defined as “the personal quest for understanding answers to ultimate questions about life, meaning and relationship to the sacred or transcendent” (Lundberg &Thrakul, 2013). It is a highly subjective notion, based on which every person discovers their own existential meaning of life (Unantenne et al., 2013) . Spirituality is focused on the internal status of our existence and may or may not concern religious structures or traditions (Casarez, Engebretson, & Ostwald,2010).Research has shown that religiosity and/or spirituality are a major determinant of quality of life, while it helps with coping with a chronic disease, promotes optimism and a positive will for life, prevents, depressive symptomatology and allows better coping with stress (Jafari et al.,2014) .

The religious dimension of spirituality includes participation in a series of activities based on faith, official religious activities, personal religious practices, as well as the feeling of spiritual cohesion with nature (Unantenne et al., 2013) . Spiritual beliefs may depend on whether people believe in a higher power and may include the feeling of having a relationship with such a power. When people do not believe in a higher power, spiritual beliefs are based on the meaning of their life experiences (Darvyri et al., 2018).

Religion and spirituality are often used as distinct but overlapping concepts in many studies (Dancy II, 2010; Lundberg &Tharkul, 2013). Spirituality is different from religiosity as it refers to the notion of coherence and life purpose and is independent from faith in a certain religion. Religiosity can

function as a foundation for spirituality, but at the same time, certain individuals may be spiritual based on their interpretation of experiences, even though they are not followers of a certain religion (Jafari et al., 2014) .

2.6 Diabetes and Spirituality

In the spirituality and health literature, spirituality is broadly defined with concepts of “transcendence, meaning, hope, and connectiveness,” (Unantenne et al., 2013). Based on these broad concepts of spirituality, researchers have sought to explore the role of religion and spirituality among diverse populations with chronic illnesses and life struggles. Religion and spirituality are deeply embedded in culture and tradition of many races for example African Americans and Asians (Moore-Thomas & Day-Vines, 2008).

Spirituality and religion play important roles in the lives of many as regard their health. Researchers have used multiple approaches to measure the role of spirituality and religion on health outcomes. In addition, researchers have studied the amount and type of influence spirituality and religion play on the association between coping and Type 2 diabetes; spirituality and religiosity emerged as important factors in maintaining general health and coping with disease (Samuel-Hodge et al., 2000). Spirituality and spiritual practices also have been found to positively influence Type 2 diabetes management, follow-up care, general health, and overall well-being (Unantenne et al., 2013), as well as indicate a positive association with improved health outcomes (Utz et al., 2006; Namageyo-Funa et al., 2013; Unantenne et al., 2013; Priya, Gupta and Anandarajah, 2014). It appears that religious faith, meditation, prayer, and religious service are used by many African Americans as mechanisms to cope with stressors caused by diabetes (Choi and Hastings, 2018). Moreover, many African Americans believe God plays a significant role in diabetes treatment, and supports individual self-management practices (Polzer& Miles, 2007). Spirituality, therefore, helps maintain hope, motivation, and cope with stigma associated with psychological well-being (Snodgrass, 2014).

In a study by Magny-Normilus, Mawn and Dalton in 2019, the participants in the study shared stories of their chronic disease as it related to religious/spiritual beliefs ingrained during their early years in Haiti. Despite strong feelings of self-reliance (internal locus of control), participants also expressed strong beliefs about the power of God (external locus of control) to help them manage their chronic illness. Spirituality is reported as a major source of strength in coping with and managing T2D. While a few commented that they prayed that God would take “it” (the disease) away from them, others indicated relief or comfort from God and described how God carried them through their daily management. Most regularly attended church services and social church gatherings as a source of support. In terms of self-management, the majority indicated caring for themselves with God as their primary support on a daily basis, even when family/relatives actively participated in their care.

It is important for healthcare practitioners to know the role which religion plays in the lives of diabetic patients and should take into cognisance religious factors in the development of health care programs.(Hendari et al.,2017). These may suggest the application of prayer or the use of biblical verses and texts(Nomageyo-Funa, Muilenburg&Wilson 2015)Thus, they may support and empower patients in making correct decisions(Heidari et al.,2017.,Rivera-Hernandez 2016).

Not only religion, but also spirituality may play an important role in the experience of life and management of a chronic disease, such as diabetes(Namageyo-Funa, Muilenburg&Wilson 2015). Religious and spiritual strategies for improving diabetes outcomes are faith in God, reading of the Bible or other religious books, prayer and seeking help from religious or spiritual people.Social support by members of the church and their religious beliefs may be associated with aspects of diabetes care(Newlin et al .,2008;Rivera-Hernandez,2016).

2.7 Empirical Review of Influence Of Spirituality On Self-Management Practices Among Patients With Type 2 Diabetes

This research involves literature review on the influence of spirituality on self-management practices among patients with type 2 diabetes in Benin City. A study by Choi and Hastings in 2018 highlighted the importance of spirituality, religious beliefs, and coping strategies in diabetes self-management practices in 42 African Americans. Spirituality has been found to positively influence Type 2 diabetes management, follow-up care, general health, overall well-being, with improved health outcomes (Unantenne et al., 2013). Research has shown that spirituality is a major determinant of quality of life as it assists with coping with a chronic disease, allows better coping with stress, promotes a positive will for life and prevents depressive symptoms (Darvyri et al., 2018).

Author and Year	Title	Sample size	Aim of Study	Result	Conclusion
(Choi and Hastings, 2018)	Religion, spirituality, coping, and resilience among African Americans with diabetes	42 African Americans older than 18 years.	Urban setting	resilience themes emerged. While participants recognized diabetes as an illness requiring professional treatment, the context of balancing treatment with religion and spiritual practices mattered	The study findings highlight the importance of spirituality, religious beliefs, and coping strategies in diabetes self-care activities..

(Magny-Normilus, Mawn and Dalton, 2019)	Self-Management of Type 2 Diabetes in Adult Haitian Immigrants: A Qualitative Study	16 participants (mean age 56;12 females; an average of 11 years living in the United States; mean hemoglobin A1c 8.1%)	The purpose of this study was to explore and describe the lived experience of adult Haitian immigrants managing T2D living in the United States	Four themes emerged: self-reliance, spirituality, nostalgia for home, and a desire for positive patient-provider relationships. Cultural influences and health beliefs may affect individual self-management of T2D in this population	These results may assist clinicians in identifying factors that contribute to suboptimal self-management in Haitian immigrants and help patients reach glycemic control.
(Darvyri et al., 2018)	On the Role of Spirituality and Religiosity in Type 2 Diabetes Mellitus Management—A Systematic Review	search included 26 publications. This study includes papers which aspired to examine the relation between spirituality/religiosity and the outcomes of T2DM, such as glucemic control or depression	To evaluate the impact of spirituality/religiosity on T2DM management.	The results show a positive relation between religiosity/spirituality and improved T2DM management	findings add to the growing evidence that demonstrates the important role of spirituality/religiosity in T2DM management.
(Dao et al., 2019)	Factors influencing self-management in patients with type 2	Overall, 14 GPs, 6 PNs and 68 patients with poorly controlled T2DM(HbA1c >7%,blood pressure>130/80m	to investigate the factors influencing self-management of T2DM in general practice.	Factors influencing self-management occurred on four levels of the socio-ecological model: individual,	Multi-level self-management strategies are needed to address these factors. These include tailoring health

	diabetes in general practice: a qualitative study	mHg, body mass index >30 or high lipids) from 11 general practices in SWS participated in the larger study.		interpersonal, organisational, community level	education and resources to e-health literacy and culture
(Onyishi et al., 2021)	Impact of spiritual beliefs and faith-based interventions on diabetes management		To discuss the impact of spiritual beliefs and FBIs in the management of diabetes, from relationship and efficacy studies that report outcomes from experimental procedures of related interventions.	The spiritual beliefs of patients living with diabetes are of paramount impact for the purpose of maintaining good mental health of the patient	There is a tendency of spiritual beliefs to be linked with the acceptance and management of diabetes conditions and FBIs can be useful in diabetes management.
(Dao-Tran et al., 2018)	Factors associated with self-management among Vietnamese adults with type 2 diabetes A cross-sectional study design	198 participants aged 18 years and older with T2DM for at least 6 months in a diabetes outpatient clinic of the tertiary practice and training hospital in the South of Vietnam	The study described diabetes self-management (DSM), diabetes knowledge, family and friends' support, healthcare providers' support, belief in treatment effectiveness and diabetes management self-efficacy, and	Vietnamese adults with T2DM performed DSM limitedly in certain aspects. They had strong belief in treatment effectiveness, good family and friends support, limited diabetes knowledge, healthcare professional support and self-efficacy	Vietnamese adults with T2DM performed DSM inactively. They have limited diabetes knowledge, good family and friends' support, very limited healthcare professionals' support, a strong belief in treatment effectiveness

			explored DSM's associations among Vietnamese adults with type 2 diabetes mellitus (T2DM)		and inadequate diabetes management self-efficacy.
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CHAPTER THREE

METHOD AND MATERIALS

3.1. Study Setting

This study will be conducted at:

University of Benin Teaching Hospital (UBTH)

Edo Specialist Hospital

The University of Benin Teaching Hospital is a government owned hospital located in Benin City, Edo State, Nigeria and it provides both inpatient and out patients service. The hospital is a tertiary health care facility that caters for the health care needs of the generality of people in Benin City as well as referrals from neighbouring state. It also provides necessary facilities for training of high and middle-level work force for the health industry and spearheads research opportunities for lectures in the University and other interested parties with economic morbidity burden and research question(s)

Edo Specialist Hospital is a 200 bed multi specialist hospital wholly owned by the Edo State Government and operated by a leading private sector management consulting firm. It is a tertiary healthcare facility and is located at Sapele road, Benin City, Edo State, Nigeria.

3.2. Study Design

The study is a descriptive cross-sectional study design aimed to investigate the influence of spirituality on self management among type 2 diabetic patients.

The research design is the blue print that enables the researcher to come up with a solution to the research problem(Nachmias et al,1996).

3.3. Population of Study.

The participants in this study will be female and male patients who are 18 years and above with type 2 diabetes mellitus going for expert management in the Endocrinology Department of the University of Benin Teaching Hospital Benin City, and Edo Specialist Hospital respectively.

3.4 Inclusion Criteria

The following participants will be included in the study:

1. Patients should be 18 years and above.
2. Patients free from cognitive impairments and mental disorder.

3.4.1 Exclusion criteria

1. T2DM patients not attending the endocrinology department of University of Benin Teaching Hospital and Edo Specialist Hospital.
2. Type 1 diabetic patients of University of Benin Teaching Hospital and Edo Specialist Hospital.

3.5 Materials

3.5.1 Apparatus/instruments: The research instrument to be used in the course of study are the Diabetes Self-Management Instrument Short Form (DSMI-20) (Lee et al.,2016), and the Spirituality Questionnaire (SQ) (Parsian et al.,2009).

3.5.2 Research Instruments: The research instrument to be used in the course of study are the Diabetes Self-Management Instrument Short Form (DSMI-20) (Lee et al.,2016), and the Spirituality Questionnaire (SQ) (Parsian et al.,2009)

3.5.3 Diabetes Self-Management Instrument Short Form (DSMI-20)

The questionnaire will be from a study that was conducted by Lin, Anderson, Chang, Hagerty, and Loveland-Cherry in 2008. The researchers developed and validated the questionnaire. The questionnaire initially contained 35-items, the factor of “adherence to the recommended regimen” was removed leaving the questionnaire with a total of 20-items questionnaire comprising of four sections and was used to obtain response from the participants. The diabetes self-management instrument short form is used to measure the level self management behavior (Lee et al.,2016). The instrument contains 20 items, each of which are rated on a 4-point scale (1-4), with 1 = never, 2 = occasionally, 3 =usually, and 4 = always. The DSMI contains four sections.

Section A: Self Awareness this section will be used to collect information about participant communication with health care providers. This section has 6-items.

Section B: this section will be used to collect The sections are as follows: information on participant level of self-integration and it has 4-items

Section C: this section will be used to collect information about participant level of self-monitoring of blood glucose and it has 5-items.

Section D: this section will be used to collect information on participant level of problem-solving and it had 5-items. (Robert Anderson, et al 2015).

3.5.4 Description of Spirituality Questionnaire (SQ)

The questionnaire will be from a study that was conducted by Nasrin Parsian and Trisha Dunning in 2009. The scores of each item will be rated on a Likert scale of 1-4 where

1. represents strongly disagree
2. represents disagree
3. represents agree
4. represents strongly agree

This section includes ten items and reflects information about how people view themselves.

Section B: The Importance Of Spiritual beliefs

This includes four items which refer to people's opinions about the importance of spiritual beliefs to their life.

Section C: Spiritual Practices

This section contains six items and focuses on spiritual experiences.

Section D: Spiritual Needs

This section includes nine items and includes the search for purpose and meaning in life. (N Parsian et al 2009).

3.6 METHODS

3.6.1 Sample size and sampling technique

Sample Size

The sample size of this study comprised of type 2 diabetic patients of University of Benin Teaching Hospital, Central Hospital Benin, and Edo Specialist Hospital Benin City.

The sample size was determined using the formula :

$$n = \frac{N}{1 + Ne^2}$$

$$N = \frac{N}{1 + N(e)^2}$$

Where N is the population size

n is the sample size

and e is the chance allowed for error or the level of significance (5%)

The total population of type 2 diabetic patients in a month were 200 in University of Benin Teaching Hospital, and 100 in Edo Specialist Hospital Benin City making a total population of 300 Given the total population to be 300 and the significance level of 5% (0.05)

$$N = \frac{N}{1 + N(e)^2}$$

$$n = 170$$

Therefore, a sample size of one hundred and seventy (170) was randomly selected for the study.

A purposive sampling technique was used to select the 2 hospitals.

University of Benin Teaching Hospital (UBTH)

Edo Specialist Hospital

3.6.2 Procedure for Data Collection

Convenient sampling was used to recruit the participants. A self-report questionnaire was used to collect data. The two (2) questionnaires were administered to participants on direct contact at the hospital and will be collected by direct contact as well. After obtaining informed consent, the questionnaire was read to the subjects and their responses were recorded.

3.6.3 Ethical Consideration

Ethical approval was sought from the Research Ethics Committee of the University of Benin Teaching Hospital, and Edo Specialist Hospital and due consent and permission was taken from the Head Of Department Endocrinology University Of Benin Teaching Hospital, and Edo Specialist Hospital Benin City. Also due consent was sought from the patients.

3.6.4 Data Analysis

Data was collected and transferred into the IBM software for Statistical Package of Social Sciences (SPSS version 26) software and was analyzed using inferential statistics and was summarized using central tendencies such as mean, mode, frequency, percentages, and standard deviation (p value set at 0.05). Chi-square test of association was used to determine the association between spirituality and self management of Type 2 Diabetes.

CHAPTER FOUR

RESULT

4.1 Description of participants

4.1.1 Sociodemographic characteristics of the respondents

Shown in table 1. 123 (72.4%) of the respondents in this study were female. 166 (97.6%) were married. 97.6 % of the respondents were Christians. 122(71.6%) were self-employed. Majority of participants had hypertension 147(86.5). More than half of the participants had only SSCE 142(83.5). The duration of diagnosis of 1-5 years was the highest 138(81.2%). Majority of the participants engage in physical activity 138(81.2).

Shown in table 2. The mean age of respondents was 60.09 years (± 10.00). The minimum age is 36 years and the maximum age is 86 years.

4.1.2 Association of gender with spirituality and diabetes self-management

Shown in table 3. There is no statistical significant association between gender and spirituality ($U=2525$, $p=0.201$). There is no statistical significant association between gender and diabetes self-management ($U=2820$, $p=0.806$).

Table 1: Sociodemographic characteristic of the respondents I **N = 170**

	Frequency	Percentage
Gender		
Male	47	27.6
Female	123	72.4
Marital status		
Single	4	2.4
Married	166	97.6
Religion		
Christianity	166	97.6
Islam	4	2.4
Occupation		

Student	1	0.6
Self employed	122	71.6
Civil servant	10	5.9
Retired	33	19.4
Not employed	4	2.4
Comorbidity		
Hypertension	147	86.5
Cataract	13	7.6
Heart Disease	10	5.9
Highest Education qualification		
SSCE	142	83.5
HND/BSC	24	14.1
MSC	3	1.4
PHD	1	0.6
Duration of diagnosis		
1-5	138	81.2
6-10	28	16.5
11-15	4	2.4
Membership		
Yes	7	4.1
No	163	95.9
Physical activity		
Yes	138	81.2
No	32	18.8

Table 2: Sociodemographic characteristics of the respondents

	Min	Max	Mean±SD
Age	36	86	60.09±10.00

Table 3: Association of gender with spirituality and self management using Mann-Whitney U test

	Gender	N	Mean Rank	U	p
SQ	Male	47	93.28	2525.00	0.201
	Female	123	82.53		
DSMI	Male	47	86.99	2820.50	0.806
	Female	123	84.93		

4.1.3 Association of marital status with spirituality and diabetes self-management

Shown in table 4. There is no statistical significant association between gender and spirituality (U=242, p=0.356). There is no statistical significant association between gender and diabetes self-management (U=235, p=0.319).

4.1.4 Association of comorbidities with spirituality and diabetes self management

Shown in table 5; There is no statistical significant association between comorbidities and spirituality ($X^2(2) = 235$, p=0.645). There is no statistical significant association between comorbidities and diabetes self-management ($X^2(2) = 1.916$, p=0.384).

Table 4: Association of marital status with spirituality and self-management using Whitney U test

	Marital status	N	Mean Rank	U	p
SQ	Married	166	86.04	242.50	0.356
	Single	4	63.13		
DSMI	Married	166	84.092	235.50	0.319
	Single	4	109.63		

Table 5: Association of comorbidities with spirituality and self-management using Kruskal-Wallis test

	Comorbidities	N	Mean Rank	X²	p
SQ	Hypertension	147	86.86	0.878	0.645
	Cataract	13	74.96		
	Heart disease	10	79.20		
DSMI	Hypertension	147	86.86	1.916	0.384
	Cataract	13	74.96		
	Heart disease	10	79.20		

4.1.5 Correlation between spirituality and diabetes self- management

Shown in table 9. There was a significant correlation between spirituality and diabetes self-management ($r=0.205$, $p=0.007$).

Table 6: Correlation between spirituality and diabetes self-management using spearman's rank order correlation coefficient

	N	r	p
SQ*DSMI	170	0.205	0.007

4.2 HYPOTHESES TESTING

Hypothesis 1: The hypothesis stated that there is no statistical significant association between gender and spirituality.

Alpha level: 0.05

Test statistic: Mann-Whitney U

Observed: $p = 0.201$

Since the observed p value was less than 0.05 Alpha level. The hypothesis was therefore NOT REJECTED.

Hypothesis 2: The hypothesis stated that there is no statistical significant association between gender and diabetes self-management.

Alpha level: 0.05

Test statistic: Mann-Whitney U

Observed: $p = 0.806$

Since the observed p value was less than 0.05 Alpha level. The hypothesis was therefore NOT REJECTED.

Hypothesis 3: The hypothesis stated that there is no statistical significant association between marital status and spirituality.

Alpha level: 0.05

Test statistic: Mann-Whitney U

Observed: $p = 0.356$

Since the observed p value was less than 0.05 Alpha level. The hypothesis was therefore NOT REJECTED.

Hypothesis 4: The hypothesis stated that there is no statistical significant association between marital status and diabetes self-management.

Alpha level: 0.05

Test statistic: Mann-Whitney U

Observed: $p = 0.319$

Since the observed p value was less than 0.05 Alpha level. The hypothesis was therefore NOT REJECTED.

Hypothesis 5: The hypothesis stated that there is no statistical significant association between comorbidities and spirituality.

Alpha level: 0.05

Test statistic: Kruskal-Wallis

Observed: $\rho = 0.645$

Since the observed ρ value was less than 0.05 Alpha level. The hypothesis was therefore NOT REJECTED.

Hypothesis 6: The hypothesis stated that there is no statistical significant association between comorbidities and diabetes self-management.

Alpha level: 0.05

Test statistic: Kruskal-Wallis

Observed: $\rho = 0.384$

Since the observed ρ value was less than 0.05 Alpha level. The hypothesis was therefore NOT REJECTED.

Hypothesis 7: The hypothesis stated that there is no significant correlation between spirituality and diabetes self-management.

Alpha level: 0.05

Test statistic: Kruskal-Wallis

Observed: $\rho = 0.007$

Since the observed ρ value was less than 0.05 Alpha level. The hypothesis was therefore REJECTED.

CHAPTER FIVE

DISCUSSION

5.1 Introduction

Spirituality provides insights into self-management barriers as well as resources for improving chronic illnesses like cardiovascular disease, diabetes and arthritis. Spirituality and self-management/care are psychosocial factors linked to optimal recovery. Every individual, at some point in time, relies on his or her spiritual essence for support. This study was aimed at evaluating the influence of spirituality on self-management among patients with type 2 diabetes in Benin City, Nigeria. Majority of the respondents in this study were within the age bracket of 36-86 years. This age range is usually that which is reported among diabetic patients in the literature (Polzer and Miles 2005; Harvey 2006; Lynch 2012). The study included more females than males, with majority of respondents being Christians, married and self-employed. Hypertension was the most common co-morbidity among respondents with type 2 diabetes. Most respondents were diagnosed of having diabetes less than five years ago and they do engage in physical activity.

5.2 Correlation between Spirituality and Self-management among diabetes patients

This study shows a positive correlation between spirituality and diabetes self-management among the respondents. This suggests that there is a tendency to practising self-care as the individual become more spiritually inclined. The current result is supported by Polzer and Miles (2007), concluding that spirituality played a significant role in diabetes self-management among African Americans with diabetes. Similarly, several studies have discovered positive relationships between spirituality and well-being (Crabtree and Pelham 2009; Yi et al., 2006; Rebecca et al., 2017). A recent study identified a positive link between spirituality and a healthier diet among the study population (Underwood and Powell 2006). The findings from the study are further supported by a meta-analysis of 37 studies, in which 25 of them found a significant positive correlation between

spirituality and increased physical activity (Choi 2009). However, this result conflicts with a systematic literature review on factors influencing self-care among type 2 diabetes (T2DM) patients, which indicated that individuals with higher levels of spirituality had worse self-care than patients who were less spiritual or non-spiritual. Meaning that more spiritual T2DM patients rely on prayer and other forms of spirituality rather than adhering to or practicing self-care (Abraham 2011).

Samuel et al (2008), also agreed with the fact that T2DM patients with higher spirituality had worse self-management and coping skills. They explained that this could imply that persons with low spirituality may not have a clear concept of the purpose of life and as a result, individuals do not actively engage in self-care/management. According to Mazlom et al (2013), the positive relationship between spirituality and self-care was discovered to be the identification of God or divine power as a source of power, hope, and inspiration in their self- management. Yet again, the significant association may be attributed to the fact that when diabetics is seemed spiritual, these patients do have a strong sense of meaning in life. This perception enables individuals to see their situation as a challenge that must be overcome and this mindset enables people to participate in adequate self-management. This is supported by a previous study in which patients with a sense of meaning were able to better manage their illness, redefine their lives, and face their illness with optimism and a "fighting spirit" (Yi et al., 2006).

5.3 Association of comorbidities with self-management and spirituality

This current study reports no significant association in self-management and spirituality between the different groups with diabetes comorbidities. This implies that all respondents in this study including those with hypertension, heart disease and cataract all engage in adequate self-management, and does not affect their individual spirituality. Spirituality provides support for people who suffer from chronic illnesses, and studies have shown that spiritual practices, specifically prayer and Bible reading, aid in self-management (Rebecca et al., 2017). Spiritual belief appears to enhance life in an

altruistic approach, which in turn aids in the management of diabetes as stress levels are decreased. This contradicted the findings of patients who felt that God was punishing them for their misdeeds (Unantenne et al., 2013).

Another study recommended that people with T2DM look to spirituality as a source of hope or strength to help them deal with the disease and comorbidities (Gupta and Anandarajah, 2014). From another study, positive coping skills and high intrinsic-extrinsic religiosity/spirituality were linked to improved treatment outcomes in people with diabetes complicated with hypertension, foot ulcer, heart disease and depression (Amadi et al., 2011). A study conducted by Al-Ozairi et al (2019), showed that spirituality affects people with diabetes, especially when it comes to reducing their level of depression, anxiety, and food disorder which helps to control their blood sugar. A person's good spirituality has an impact on their emotional control and intelligence. A study conducted by Saffari et al (2013) showed that someone with reasonable emotional control has a lower average blood glucose level for the last two to three months (HbA1c).

5.4 Association of Gender with self-management and spirituality

Gender is a predictor of adhering to healthy lifestyle modifications (Abraham 2015). Findings from this study showed no significant association in self-management and spirituality between gender group. This is in contrary to the findings of McAuley et al (2000), who reported that women in their study managed their arthritis pain medication according to “brainstorms,” which were thoughts out of the ordinary that came from God. A recent study contradicts our findings, which indicated that older women perform a variety of self-management behaviors ranging from combining modalities to coping with chronic illness and till date, older African American women’s spiritual experiences occurred in the context of a traditional religious setting (Idethia 2020). This author also reported that women were able to develop a belief system that allowed them to comprehend their experiences and take charge of their own illness management than the males (Idethia 2020).

The anchor for this belief system found in this study would be the perception that the body is a gift from God and that only God has ultimate control over what happens to the body. These finding is supported by Chin et al (2000) who found that all respondents in his study with gender difference believed God directed their lives and justified their use of self-management, by using the analogy that God works through others. It was also concluded that African elders acknowledge that God worked through them to control their illness through the use of prayer (Chin et al., 2000). A previous study found that women with low socio-economic status have greater rates of religiosity/spirituality and reduced levels of depression, resulting in better diabetes control, which was not seen in the male population. (Lynch et al., 2012).

5.5 Association of marital status with spirituality and self-management

This study found no significant association in spirituality and self-management between married and single diabetes patients, that means patients marital status did not affect their spirituality and rate of self-management. Rapaport (1998), stated that diabetes management is enhanced when couples can work together as a team. Efforts to help couples improve their capacity for teamwork may require a change in their spiritual coping style as well. Family support and spirituality are two psychosocial factors linked to optimal self-care (Ampofo et al., 2022). Ampofo et al (2022) concluded that when people have strong motivations to live (family, children, and job), they are more likely to take actions or engage in activities (glucose monitoring, healthy diet, and fitness) that would increase their chances of living longer. This is consistent with a study of pregnant women with gestational diabetes, where implementing dietary advice was highly correlated with both social and familial support, among those married and single (Nicklett and Liang 2010).

Also, the finding is in line with a study by Fisher et al (2000), where strong family support appears to have a positive impact on Glycemic control and or self-management behaviors. This shows that the more diabetics receive support from their family members (not necessarily couples), the more likely

they engaged in self-care practices. Couples who stay connected to one another experience an empowering connection with the transcendent that enables them to consider alternative possibilities. They appear to be better equipped to actively create solutions to their problems and deal with stress. In some cases, they actually are able to use the illness to create new opportunities for growth (Nicklett and Liang 2010).

5.6 CONCLUSION

Given a meaning of spirituality as belief or connectedness with your creator, engaging in little prayer or being prayerful or having meaning in life, we can conclude that prayer, meaning, belief connected to higher being helps the diabetic patient rise above the limitations of the diabetes disease. This study showed that the tendency of individual practising self-care usually increases as they become more spiritually inclined. This study concluded that comorbidities among people with diabetes didn't affect their engagement in adequate self-management and does their individual spirituality. Conclusively, gender and marital status was not a predicting factor to changes in self-care and spirituality in this study, as all respondents practised it indifferently.

5.7 RECOMMENDATION

This research has significant implications for current policies and programs aimed at improving diabetic self-management. Self-management measures that are primarily medical in nature and do not include psychosocial support may not result in best possible diabetes management. It is therefore recommended that the Nigeria Health Service and the Ministry of Health give rise the development of a comprehensive diabetes management program that includes psychosocial variables. In order to satisfy the spiritual needs of diabetic patients, spiritual leaders should once more be included in the care of diabetes. This is because respondents to this study identify with a particular form of spirituality, demonstrating the importance respondents place on their spiritual life. It is advised that

spiritual leaders, counselors, social workers, and health professionals organize programs that assist the patient in discovering their spiritual essence so they might transcend their illness. The Nigeria Diabetes Federation should step up its diabetes education efforts to raise awareness and encourage patients to adopt healthy habits.

REFERENCES

- Abraham M. (2011) Self-Care in type 2 Diabetes: A Systematic Literature Review on Factors Contributing to Self-Care among Type 2 Diabetes Mellitus Patients. *Unpublished master's dissertation, School of Health and Caring Sciences Linnaeus University*.
- Adeloye, D., Ige, J.O., Aderemi, A.V., Adeleye, N., Amoo, E.O., Auta, A. and Oni, G. (2017). Estimating the prevalence, hospitalisation and mortality from type 2 diabetes mellitus in Nigeria: *a systematic review and meta-analysis*. 7(5), p.e015424.
- Al-Ozairi E, AlAwadhi MM, Al-Ozairi A, Taghadom E, Ismail K. A prospective study of the effect of fasting during the month of Ramadan on depression and diabetes distress in people with type 2 diabetes. *Diabetes Res Clin Pract*. 2019;153:145–9.
- Al-Ozairi E, AlAwadhi MM, Al-Ozairi A, Taghadom E, Ismail K. A prospective study of the effect of fasting during the month of Ramadan on depression and diabetes distress in people with type 2 diabetes. *Diabetes Res Clin Pract*. 2019;153:145–9.
- Amadi, K. U., Uwakw, R., Odinka, P. C., Ndukuba, A. C., Muomah, C. R., &Ohaeri J. U. (2016). Religion, Coping and Outcome in Out-Patients with Depression or Diabetes Mellitus. *Acta Psychiatrica Scandinavica*, 133, 489-496. <https://doi.org/10.1111/acps.12537>
- Amadi, K. U., Uwakw, R., Odinka, P. C., Ndukuba, A. C., Muomah, C. R., &Ohaeri J. U. (2016). Religion, Coping and Outcome in Out-Patients with Depression or Diabetes Mellitus. *Acta Psychiatrica Scandinavica*, 133, 489-496. <https://doi.org/10.1111/acps.12537>
- American Diabetes Association (2018). 4. Lifestyle Management: Standards of Medical Care in Diabetes—2018. *Diabetes Care*, [online] 41(Supplement 1), pp.S38–S50. Available at: http://care.diabetesjournals.org/content/diacare/41/Supplement_1/S38.full.pdf?fbclid=IwAR1FiLta7JpRXq_6edggrukqWLAvdGkIqGg3R1ek5rw9Gdk937PUrvwinQ8.

Bragg, F., Holmes, M.V., Iona, A., Guo, Y., Du, H., Chen, Y., Bian, Z., Yang, L., Herrington, W., Bennett, D., Turnbull, I., Liu, Y., Feng, S., Chen, J., Clarke, R., Collins, R., Peto, R., Li, L. and Chen, Z. (2017). *Association Between Diabetes and Cause-Specific Mortality in Rural and Urban Areas of China*. *JAMA*, 317(3), p.280.

Casarez, R. L. P., Engebretson, J. C., & Ostwald, S. K. (2010). Spiritual Practices in Self-management of Diabetes in African Americans. *Holistic Nursing Practice*, 24(4), 227–237. doi:10.1097/hnp.0b013e3181e903c6

Casarez, R. L. P., Engebretson, J. C., & Ostwald, S. K. (2010). Spiritual Practices in Self-management of Diabetes in African Americans. *Holistic Nursing Practice*, 24(4), 227–237. doi:10.1097/hnp.0b013e3181e903c6

Cattich, J., & Knudson-Martin, C. (2009). *Spirituality and Relationship: A Holistic Analysis of How Couples Cope With Diabetes*. *Journal of Marital and Family Therapy*, 35(1), 111–124. doi:10.1111/j.1752-0606.2008.00105.x

Cattich, J., & Knudson-Martin, C. (2009). Spirituality and Relationship: A Holistic Analysis of How Couples Cope With Diabetes. *Journal of Marital and Family Therapy*, 35(1), 111–124. doi:10.1111/j.1752-0606.2008.00105.x.

Chew, B.-H. (2014). Psychological aspects of diabetes care: Effecting behavioural change in patients. *World Journal of Diabetes*, [online] 5(6), p.796. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4265866/>.

Chin, M. H., Polonsky, T. S., Thomas, V. D., & Nerney, M. P. (2000). Developing a conceptual framework for understanding illness and attitudes in older urban African Americans with diabetes. *Diabetes Educator*, 26(3), 439-449.

Chin, M. H., Polonsky, T. S., Thomas, V. D., & Nerney, M. P. (2000). Developing a conceptual framework for understanding illness and attitudes in older urban African Americans with diabetes. *Diabetes Educator*, 26(3), 439-449.

Choi SE. Diet-specific family support and glucose control among Korean immigrants with type 2 diabetes. *The Diabetes Educator*. 2009;35(6):978-85.

Choi SE. Diet-specific family support and glucose control among Korean immigrants with type 2 diabetes. *The Diabetes Educator*. 2009;35(6):978-85.

Choi, S.A. and Hastings, J.F. (2018). Religion, spirituality, coping, and resilience among African Americans with diabetes. *Journal of Religion & Spirituality in Social Work: Social Thought*, 38(1), pp.93–114.

Collins English Dictionary. [online] Available at: <https://www.collinsdictionary.com/dictionary/english/spirituality> [Accessed 23 Nov. 2021].

Crabtree S & Pelham B. World Gallup Poll, Religion Provides Emotional Boost to World's Poor, Gallup; 2009.

Darvyri, P., Christodoulakis, S., Galanakis, M., Avgoustidis, A.G., Thanopoulou, A. and Chrousos, G.P. (2018). On the Role of Spirituality and Religiosity in Type 2 Diabetes Mellitus Management—A Systematic Review. *Psychology*, 09(04), pp.728–744.

Duke, N. and Wigley, W. (2016). Literature review: The self-management of diet, exercise and medicine adherence of people with type 2 diabetes is influenced by their spiritual beliefs - DiabetesontheNet. [online] <https://diabetesonthenet.com>. Available at: <https://diabetesonthenet.com/Journal-diabetes-nursing/literature-review-the-self-management-of->

[diet-exercise-and-medicine-adherence-of-people-with-type-2-diabetes-is-influenced-by-their-spiritual-beliefs/](#).

Fisher L, Chesla CA, Skaff MM, Gilliss C, Mullan JT, Bartz RJ, Kanter RA, Lutz CP. The family and disease management in Hispanic and European-American patients with type 2 diabetes. *Diabetes Care*. 2000;23(3):267-72

Fisher L, Chesla CA, Skaff MM, Gilliss C, Mullan JT, Bartz RJ, Kanter RA, Lutz CP. The family and disease management in Hispanic and European-American patients with type 2 diabetes. *Diabetes Care*. 2000;23(3):267-72

Galdas, P., Fell, J., Bower, P., Kidd, L., Blickem, C., McPherson, K., Hunt, K., Gilbody, S. and Richardson, G. (2015). The effectiveness of self-management support interventions for men with long-term conditions: *a systematic review and meta-analysis*. *BMJ Open*, [online] 5(3), pp.e006620–e006620. Available at: <https://bmjopen.bmj.com/content/5/3/e006620> [Accessed 9 Aug. 2019].

Gupta, P. S., &Anandarajah, G. (2014). The Role of Spirituality in Diabetes Self-Management in an Urban, Underserved Population: A Qualitative Exploratory Study. *Rhode Island Medical Journal*, 97, 31-35.

Gupta, P. S., &Anandarajah, G. (2014). The Role of Spirituality in Diabetes Self-Management in an Urban, Underserved Population: A Qualitative Exploratory Study. *Rhode Island Medical Journal*, 97, 31-35.

Harvey, I. S. (2006). Self-Management of a Chronic Illness: An Exploratory Study on the Role of Spirituality Among Older African American Women. *Journal of Women & Aging*, 18(3), 75–88. doi:10.1300/j074v18n03_06

Harvey, I. S. (2006). Self-Management of a Chronic Illness: An Exploratory Study on the Role of Spirituality Among Older African American Women. *Journal of Women & Aging*, 18(3), 75–88. doi:10.1300/j074v18n03_06

International Diabetes Federation (2021). *IDF news*. [online] www.idf.org. Available at: <https://www.idf.org/news/240:diabetes-now-affects-one-in-10-adults-worldwide.html>.

Jena, B., Kalra, S. and Yeravdekar, R. (2018). Emotional and psychological needs of people with diabetes. *Indian Journal of Endocrinology and Metabolism*, [online] 22(5), p.696. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6166557/>.

Koloverou, E., Esposito, K., Giugliano, D. and Panagiotakos, D. (2014). The effect of Mediterranean diet on the development of type 2 diabetes mellitus: A meta-analysis of 10 prospective studies and 136,846 participants. *Metabolism*, [online] 63(7), pp.903–911. Available at: <https://www.sciencedirect.com/science/article/pii/S0026049514001188>.

Lynch, C. P., Hernandez-Tejada, M. A., Strom, J. L., &Egede, L. E. (2012). Association between Spirituality and Depression in Adults with Type 2 Diabetes. *The Diabetes Educator*, 38, 427-435. <https://doi.org/10.1177/0145721712440335>

Lynch, C. P., Hernandez-Tejada, M. A., Strom, J. L., &Egede, L. E. (2012). Association between Spirituality and Depression in Adults with Type 2 Diabetes. *The Diabetes Educator*, 38, 427-435. <https://doi.org/10.1177/0145721712440335>

Magny-Normilus, C., Mawn, B. and Dalton, J. (2019). Self-Management of Type 2 Diabetes in Adult Haitian Immigrants: A Qualitative Study. *Journal of Transcultural Nursing*, [online] p.104365961984158. Available at: <https://journals.sagepub.com/doi/10.1177/1043659619841586>.

Mazlom N, Afkhami-Ardekani M, Dadgari A. Relationship between the religion orientation and coping with diabetes in patients with type 2 diabetes. *Iranian Journal of Diabetes and Obesity*. 2013;5(1):33-9

Mazlom N, Afkhami-Ardekani M, Dadgari A. Relationship between the religion orientation and coping with diabetes in patients with type 2 diabetes. *Iranian Journal of Diabetes and Obesity*. 2013;5(1):33-9

McAuley W, Pecchoni J, Grant L. Personal account of the role of God in health and illness among older African American and White residents. *J Cross-Cult Geronto*. 2000;15:13-35

McAuley W, Pecchoni J, Grant L. Personal account of the role of God in health and illness among older African American and White residents. *J Cross-Cult Geronto*. 2000;15:13-35

Nicklett EJ, Liang J. Diabetes-related support, regimen adherence, and health decline among older adults. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*. 2010;65(3):390-9.

Nicklett EJ, Liang J. Diabetes-related support, regimen adherence, and health decline among older adults. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*. 2010;65(3):390-9.

Onyishi, C.N., Ilechukwu, L.C., Victor-Aigbodion, V. and Eseadi, C. (2021). Impact of spiritual beliefs and faith-based interventions on diabetes management. *World Journal of Diabetes*, 12(5), pp.630–641.

Polzer RL, Miles MS. Spirituality in African Americans with diabetes: Self-management through a relationship with God. *Qualitative Health Research*. 2007;17(2):176-88.

Polzer RL, Miles MS. Spirituality in African Americans with diabetes: Self-management through a relationship with God. *Qualitative Health Research*. 2007;17(2):176-88.

Polzer, R., & Miles, M. S. (2005). Spirituality and Self-Management of Diabetes in African Americans. *Journal of Holistic Nursing*, 23(2), 230–250. doi:10.1177/0898010105276179

Polzer, R., & Miles, M. S. (2005). Spirituality and Self-Management of Diabetes in African Americans. *Journal of Holistic Nursing*, 23(2), 230–250. doi:10.1177/0898010105276179

Rise, M.B., Pellerud, A., Rygg, L.Ø. and Steinsbekk, A. (2013). Making and Maintaining Lifestyle Changes after Participating in Group Based Type 2 Diabetes Self-Management Educations: *A Qualitative Study*. PLoS ONE, [online] 8(5), p.e64009. Available at: <https://dx.doi.org/10.1371%2Fjournal.pone.0064009>.

Saeedi, P., Petersohn, I., Salpea, P., Malanda, B., Karuranga, S., Unwin, N., Colagiuri, S., Guariguata, L., Motala, A.A., Ogurtsova, K., Shaw, J.E., Bright, D. and Williams, R. (2019). Global and Regional Diabetes Prevalence Estimates for 2019 and Projections for 2030 and 2045: Results from the International Diabetes Federation Diabetes Atlas, 9th Edition. *Diabetes Research and Clinical Practice*, 157(157), p.107843.

Saffari M, Pakpour AH, Naderi MK, Koenig HG, Baldacchino DR, Piper CN. Spiritual coping, religiosity and quality of life: A study on muslim patients undergoing haemodialysis. *Nephrology*. 2013;18(4):269–75.

Saffari M, Pakpour AH, Naderi MK, Koenig HG, Baldacchino DR, Piper CN. Spiritual coping, religiosity and quality of life: A study on muslim patients undergoing haemodialysis. *Nephrology*. 2013;18(4):269–75.

Samuel-Hodge CD, Watkins DC, Rowell KL, Hooten EG. Coping styles, wellbeing, and self-care behaviors among African Americans with type 2 diabetes. *The Diabetes Educator*. 2008;34(3):501-10

Samuel-Hodge CD, Watkins DC, Rowell KL, Hooten EG. Coping styles, wellbeing, and self-care behaviors among African Americans with type 2 diabetes. *The Diabetes Educator*. 2008;34(3):501-10

Unantenne, N., Warren, N., Canaway, R., & Manderson, L. (2013). The Strength to Cope: Spirituality and Faith in Chronic Disease. *Journal of Religion and Health*, 52, 1147-1161. <https://doi.org/10.1007/s10943-011-9554-9>

Unantenne, N., Warren, N., Canaway, R., & Manderson, L. (2013). The Strength to Cope: Spirituality and Faith in Chronic Disease. *Journal of Religion and Health*, 52, 1147-1161. <https://doi.org/10.1007/s10943-011-9554-9>

Underwood SM, Powell RL. Religion and spirituality: influence on health/risk behavior and cancer screening behavior of African Americans. *ABNF Journal*. 2006;17(1).

Underwood SM, Powell RL. Religion and spirituality: influence on health/risk behavior and cancer screening behavior of African Americans. *ABNF Journal*. 2006;17(1).

Wit, M., Trief, P.M., Huber, J.W. and Willaing, I. (2020). State of the art: understanding and integration of the social context in diabetes care. *Diabetic Medicine*, 37, pp.473–482.

Yang, J.J., Yu, D., Wen, W., Saito, E., Rahman, S., Shu, X.-O., Chen, Y., Gupta, P.C., Gu, D., Tsugane, S., Xiang, Y.-B., Gao, Y.-T., Yuan, J.-M., Tamakoshi, A., Irie, F., Sadakane, A., Tomata, Y., Kanemura, S., Tsuji, I. and Matsuo, K. (2019). Association of Diabetes With All-Cause and Cause-Specific Mortality in Asia. *JAMA Network Open*, 2(4), p.e192696.

Yi MS, Mrus JM, Wade TJ, Ho ML, Hornung RW, Cotton S, Peterman AH, Puchalski CM, Tsevat J. Religion, spirituality, and depressive symptoms in patients with HIV/AIDS. *Journal of general internal medicine*. 2006;21(S5): S21-7.

Yi MS, Mrus JM, Wade TJ, Ho ML, Hornung RW, Cotton S, Peterman AH, Puchalski CM, Tsevat J. Religion, spirituality, and depressive symptoms in patients with HIV/AIDS. *Journal of general internal medicine*. 2006;21(S5): S21-7.

APPENDIX A

INFORMED CONSENT FORM

TITLE OF STUDY: Spirituality And Self-Management Of Type 2 Diabetes Among Patients With Type 2 Diabetes In Benin City.

INSTITUTIONN: Department of Physiotherapy, University of Benin

PRINCIPAL INVESTIGATOR: Osifo Marvellous

PARTICIPATION: Participation in this study is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue your participation at any time without penalty or loss of benefits. The principal investigator may decide to withdraw you from the study if we are unable to obtain the necessary information.

INTRODUCTION: I'm interested in assessing the influence of Spirituality on Self management practices among patients living with Type 2 Diabetes in Benin City.

PROCESURES TO BE FOLLOWED: I will be taking the socio-demographic data of the participants, as well as interviewing the participants on their experience with Type 2 diabetes using the spirituality questionnaire and diabetes self management instrument short form (DSMI-20) questionnaire.

QUESTIONNAIRE: If you agree to participate, I will ask you questions about your age. Sex, religion, what you know about Spirituality and Self management of Type 2 Diabetes.

BENEFITS: You will be enlightened on the effects on physical activity on diabetes self management in case you were not aware.

COMPENSATION: There is no compensation to volunteers for their participation.

WHO CAN PARTICIPATE IN THIS STUDY: All patients living with type 2 diabetes in UBTH from 18yrs and above.

ASSURANCE OF CONFIDENTIALITY OF VOLUNTEER'S IDENTITY: Records relating to your participation in the study will remain confidential. Your name will not be used in any report resulting this study. All questionnaires, computerized records, and analysis of data will contain only a unique study number, not your name.

PERSONS AND PLACES FOR ANSWERS REGARDING YOUR RIGHTS AS A RESEARCH SUBJECT: If during the course of this study you have questions concerning the nature of the research or you believe you have sustained a research-related injury or assault; you should contact;

Department of Physiotherapy,

School of Basic Medical Sciences

University of Benin, Benin-City,

Edo State, Nigeria.

Phone Number: 07050345189

Email: marvellousosifo@gmail.com

Ethnics and Research Committee,

University of Benin Teaching Hospital

Phone: 07063331337

IF THERE IS ANY PORTION OF THIS CONSENT AGREEMENT THAT YOU DO NOT UNDERSTAND, ASK THE FIELD WORKER OR INVESTIGATOR BEFORE SIGNING.

Please, sign below if you have agreed to participate in the study.

CERTIFICATION OF CONSENT

I, _____ (Name) having full capacity to consent for myself and having attained my _____ birthday, do hereby to my participation in the research study:

The methods and means by which the study will be conducted and the risks which may be reasonably expected have been explained to me by _____ I, have been given the opportunity to ask question concerning this investigational study, and any such questions have been answered to my full and complete satisfaction.

I understand that I may at any time during the course of this study revoke this consent and withdraw myself from the study without prejudice.

Subject's Signature: _____ Date: _____

Permanent Address: _____

Witness's Signature: _____ Date: _____

Study Number: _____

SOCIO-DEMOGRAPHIC DATA INFORMATION

Patient identification no: _____

Age: _____

Gender: Male [] Female []

Religion: (A) Christianity [] (B) Islam [] (C) None []

Highest educational qualification: (A) SSCE [] (B) HND/BSC [] (C) MSC [] (D) PHD [] (E) None []

Occupation: (A) Student [] (B) Self-employed [] (C) Civil servant [] (D) Retired [] (E) Not employed

Marital status _____ (A) Married [] (B) Single [] (C) Divorced []

Comorbidities: _____

Duration of diagnosis of DM _____

Membership of support group (A) Yes (B) No

Do you engage in physical activity for at least 150 minutes a week? (A) Yes (B) No

SECTION B: SPIRITUALITY QUESTIONNAIRE

INSTRUCTION: Please tick the best option regarding this questionnaire

S/N	Items	Strongly disagree	Disagree	Agree	Strongly agree
1	I am satisfied with who I am				
2	I have good qualities				
3	I have positive attitude towards myself				
4	I am a worthy person				
5	I am generally self-confident				
6	My life is meaningful to me				
7	I believe I am equal to other people				

8	I am a compassionate person				
9	I find meaning in different situations				
10	I think about positive things				
11	My spirituality helps me define my goals				
12	My spirituality helps me decide who I am				
13	My spirituality is part of my whole approach to life				
14	My spirituality is integrated into my life				
15	I become involve in environmental programs				
16	I read books about spirituality				
17	I meditate to achieve inner peace				
18	I try to live in harmony with nature				
19	I try to find any opportunity to enhance spirituality				
20	I use silence to get in touch with myself				
21	I search for a purpose in life				
22	I enjoy listening to music				
23	I need to find answers to life mysteries				
24	Maintaining relationships is important to me				
25	I need to attain inner peace				
26	I seek beauty in my life				
27	I need to have strong connections with people				
28	My life is evolving				

29	I need to develop a meaningful life				
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SECTION C: DIABETES SELF MANAGEMENT INSTRUMENT SHORT FORM (DSMI-20)

INSTRUCTION: Please tick the best option regarding this questionnaire

S/N	Items	Never	Occasionally	Usually	Always
1	I am comfortable telling HCPs(health care providers Eg Physiotherapists, Nurses, Etc) about my struggles in managing Diabetes				
2	I am comfortable discussing degree of flexibility in treatment plan with health care providers				
3	I collaborate to identify reasons for poor control				
4	I am comfortable asking health care provider questions				
5	I am comfortable discussing the modification treatment plan to fit my lifestyle with health care providers				
6	I am comfortable asking health care providers about Diabetes care resources				
7	I consider effect on blood sugar when making food choices				
8	I manage food portions and choices when eating				
9	I manage food choices to control blood sugar				
10	I am managing diabetes and participating in social activity				
11	I monitor my A1c. to reach goals				
12	I monitor my blood sugar level to reach goals				
13	I am regularly testing my blood sugar levels				
14	I set goals for my blood sugar control				
15	I compare differences between current and target blood sugar level				
16	I act in response to symptoms				
17	I test my blood sugar when feeling sick				
18	I increase the frequency of blood sugar test when sick or under great stress				
19	I make decisions based on experience				

20	I recognize which signs and symptoms of high or low blood sugar				
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APPENDIX B

Frequencies

[DataSet0]

Statistics

		age	SQ	DSMI
N	Valid	170	170	170
	Missing	0	0	0
Mean		60.0941	100.8235	69.6941
Std.Deviation		10.00251	4.12002	4.09509

FrequencyTable

Age

		Frequency	Percent	ValidPercent	Cumulati vePerce nt
Valid	36.00	1	.6	.6	.6
	39.00	2	1.2	1.2	1.8
	40.00	1	.6	.6	2.4
	44.00	2	1.2	1.2	3.5
	45.00	3	1.8	1.8	5.3
	46.00	4	2.4	2.4	7.6
	47.00	2	1.2	1.2	8.8
	48.00	9	5.3	5.3	14.1
	49.00	1	.6	.6	14.7
	50.00	13	7.6	7.6	22.4
	51.00	2	1.2	1.2	23.5
	52.00	8	4.7	4.7	28.2
	53.00	4	2.4	2.4	30.6
	54.00	4	2.4	2.4	32.9
	55.00	8	4.7	4.7	37.6
	56.00	5	2.9	2.9	40.6
	57.00	3	1.8	1.8	42.4
	58.00	5	2.9	2.9	45.3
	59.00	2	1.2	1.2	46.5
	60.00	14	8.2	8.2	54.7
61.00	1	.6	.6	55.3	
62.00	6	3.5	3.5	58.8	

Age

	Frequency	Percent	ValidPercent	Cumulati vePerc ent
63.00	2	1.2	1.2	60.0
64.00	4	2.4	2.4	62.4
65.00	6	3.5	3.5	65.9
66.00	7	4.1	4.1	70.0
67.00	3	1.8	1.8	71.8
68.00	4	2.4	2.4	74.1
69.00	4	2.4	2.4	76.5
70.00	9	5.3	5.3	81.8
71.00	6	3.5	3.5	85.3
72.00	6	3.5	3.5	88.8
73.00	4	2.4	2.4	91.2
74.00	5	2.9	2.9	94.1
75.00	2	1.2	1.2	95.3
76.00	2	1.2	1.2	96.5
77.00	2	1.2	1.2	97.6
78.00	1	.6	.6	98.2
79.00	1	.6	.6	98.8
80.00	1	.6	.6	99.4
86.00	1	.6	.6	100.0
Total	170	100.0	100.0	

SQ

	Frequency	Percent	ValidPercent	Cumulati vePerc ent
Valid 90.00	3	1.8	1.8	1.8
91.00	1	.6	.6	2.4
92.00	1	.6	.6	2.9
93.00	3	1.8	1.8	4.7
94.00	8	4.7	4.7	9.4
95.00	2	1.2	1.2	10.6
96.00	5	2.9	2.9	13.5
97.00	15	8.8	8.8	22.4
98.00	5	2.9	2.9	25.3
99.00	16	9.4	9.4	34.7
100.00	19	11.2	11.2	45.9
101.00	12	7.1	7.1	52.9
102.00	16	9.4	9.4	62.4
103.00	15	8.8	8.8	71.2
104.00	17	10.0	10.0	81.2
105.00	12	7.1	7.1	88.2
106.00	10	5.9	5.9	94.1
107.00	4	2.4	2.4	96.5
108.00	5	2.9	2.9	99.4
112.00	1	.6	.6	100.0
Total	170	100.0	100.0	

DSMI

	Frequency	Percent	ValidPercent	Cumulati vePerc ent
Valid 55.00	1	.6	.6	.6
59.00	1	.6	.6	1.2
60.00	4	2.4	2.4	3.5
61.00	1	.6	.6	4.1
62.00	5	2.9	2.9	7.1
63.00	4	2.4	2.4	9.4
64.00	4	2.4	2.4	11.8
65.00	3	1.8	1.8	13.5
66.00	6	3.5	3.5	17.1
67.00	12	7.1	7.1	24.1
68.00	12	7.1	7.1	31.2
69.00	21	12.4	12.4	43.5
70.00	15	8.8	8.8	52.4
71.00	26	15.3	15.3	67.6
72.00	16	9.4	9.4	77.1
73.00	15	8.8	8.8	85.9
74.00	8	4.7	4.7	90.6
75.00	8	4.7	4.7	95.3
76.00	3	1.8	1.8	97.1
78.00	3	1.8	1.8	98.8
79.00	2	1.2	1.2	100.0
Total	170	100.0	100.0	

Frequencies

Statistics

	gender	religio n	Highest ucn	occup atn	Marital status	comorbi dities	durationdia gnosis	Membership SG	PA
N Valid	170	170	170	170	170	170	170	170	170
Missing	0	0	0	0	0	0	0	0	0
Mode	2.00	1.00	1.00	2.00	1.00	1.00	1.00	2.00	1.00

FrequencyTable

Gender

	Frequency	Percent	ValidPercent	Cumulati vePerc ent
Valid 1.00	47	27.6	27.6	27.6
2.00	123	72.4	72.4	100.0
Total	170	100.0	100.0	

Religion

	Frequency	Percent	ValidPercent	Cumulati vePerc ent
Valid 1.00	166	97.6	97.6	97.6
2.00	4	2.4	2.4	100.0
Total	170	100.0	100.0	

Highest Education

	Frequency	Percent	ValidPercent	Cumulati vePerc ent
Valid 1.00	142	83.5	83.5	83.5
2.00	24	14.1	14.1	97.6
3.00	3	1.8	1.8	99.4
4.00	1	.6	.6	100.0
Total	170	100.0	100.0	

Occupation

	Frequency	Percent	ValidPercent	Cumulati vePerc ent
Valid 1.00	1	.6	.6	.6
2.00	122	71.8	71.8	72.4
3.00	10	5.9	5.9	78.2
4.00	33	19.4	19.4	97.6
5.00	4	2.4	2.4	100.0
Total	170	100.0	100.0	

Marital Status

	Frequency	Percent	ValidPercent	Cumulati vePerc ent
Valid 1.00	166	97.6	97.6	97.6
2.00	4	2.4	2.4	100.0
Total	170	100.0	100.0	

Comorbidities

	Frequency	Percent	ValidPercent	CumulativePercent
Valid 1.00	147	86.5	86.5	86.5
2.00	13	7.6	7.6	94.1
3.00	10	5.9	5.9	100.0
Total	170	100.0	100.0	

Mann-WhitneyTest

Ranks

gender	N	MeanRank	Sum of Ranks
SQ 1.00	47	93.28	4384.00
2.00	123	82.53	10151.00
Total	170		
DSMI 1.00	47	86.99	4088.50
2.00	123	84.93	10446.50
Total	170		

TestStatistics^a

	S	DSMI
	Q	
Mann-WhitneyU	2525.000	2820.500
WilcoxonW	10151.00	10446.50
	0	0
Z	-1.278	-.245
Asymp.Sig. (2-tailed)	.201	.806

a. Grouping Variable: gender

NParTests

Mann-WhitneyTest

Ranks

religion	N	MeanRank	Sum of Ranks
SQ 1.00	166	85.18	14140.00
2.00	4	98.75	395.00
Total	170		
DSMI 1.00	166	85.26	14153.00
2.00	4	95.50	382.00
Total	170		

TestStatistics^a

	S Q	DSMI
Mann-WhitneyU	279.000	292.000
WilcoxonW	14140.00	14153.00
Z	0	0
Asymp.Sig. (2-tailed)	-.547	-.413
	.585	.680

a.Grouping Variable: religion

NParTests

Kruskal-WallisTest

Ranks

	Comorbidi es	N	MeanRank
SQ	1.00	147	86.86
	2.00	13	74.96
	3.00	10	79.20
	Total	170	
DSM I	1.00	147	84.66
	2.00	13	79.58
	3.00	10	105.60
	Total	170	

TestStatistics^{a,b}

	SQ	DSMI
Chi-Square	.878	1.916
df	2	2
Asymp.Sig	.645	.384

1 KruskalWallisTest

2 Grouping Variable: comorbidities



EDO
SPECIALIST
HOSPITAL

November 25, 2022

Osifo Marvellous
Department of Physiotherapy
Faculty of basic Medical Sciences
University of Benin

Dear Madam,

ETHICAL CLEARANCE TO CONDUCT RESEARCH

After a careful review of your application for Ethical Clearance to conduct a research at Edo Specialist Hospital; I am pleased to inform you that APPROVAL has been granted you to carry out a study on **"SPIRITUAL AND SELF-MANAGEMENT OF TYPE 2 DIABETES AMONG PATIENTS WITH TYPE 2 DIABETES IN BENIN CITY"**.

Thanks for your interest in Edo Specialist Hospital as we look forward to provide the necessary support towards the success of your research work.

Please contact the undersigned for any further assistance.

Yours Sincerely,

Solomon Ohiomokhare
Secretary,
ESH Research Ethics Committee

Prof. M. U. Nwagu
Chairman,
ESH Research Ethics Committee



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**HEALTH RESEARCH ETHICS COMMITTEE
APPROVAL**

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/14831686

PROPOSAL TITLE: "SPIRITUALITY AND SELF-MANAGEMENT OF TYPE 2 DIABETES AMONG PATIENTS WITH TYPE 2 DIABETES IN BENIN CITY"

PRINCIPAL INVESTIGATOR(S): OSIFO OSASUMWEN MARVELLOUS

DEPARTMENT/INSTITUTION: DEPARTMENT OF PHYSIOTHERAPY, UNIVERSITY OF BENIN, BENIN CITY, NIGERIA

DATE CONSIDERED OCTOBER 24TH, 2022

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 24/10/2022 TO 24/10/2023. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY.

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI

SIGNATURE & DATE: *A.N. Ofili* 24/10/2022

SUPERVISOR (S): DR JOSEPH UMUNNAH, PROF A.E. EDO

DECLARATION BY INVESTIGATOR(S):

PROTOCOL NUMBER (please quote in all enquiries)

Note that no participant accrual or activity related to this research may be conducted outside of these dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual re-port to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification.

Signature & Date: *A.E. Edo* 15/11/2022