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Relationship Among Health Literacy Superstitious Beliefs and Self-Care Among Diabetic Patients in Warri, Nigeria

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Abstract

Relationship Among Health Literacy, Superstitious/Cultural Beliefs, and Self-Care

Among Diabetic Patients in Warri, Nigeria

by

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MPH, University of Lagos, 2010

MBBS, University of Port Harcourt, 1994

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Diabetes imposes significant burdens in medical expenditures, medication use, outpatient visits, and treatment of its chronic complications. Self-care behaviors such as medication adherence and foot care have been shown to reduce hospitalizations and complications, and high health literacy levels have been positively associated with self-care adoption. However, the effect of superstition on this relationship has not been studied among diabetic patients in Warri, Nigeria. This study was conducted to determine the moderating effects of superstitious or cultural beliefs on the relationship between health literacy and self-care adoption among diabetes patients in Warri, Nigeria. A quantitative, observational, cross-sectional design guided this study along with the health belief model and four research questions. Data were collected using a self-reported, self-administered, and structured questionnaire that combined a Brief Health Literacy Tool, Diabetes Self-Management Questionnaire, and the modified Traditional Beliefs Scale. Data from 384 participants were subjected to descriptive and inferential analyses. Results of the analyses showed low rates of health literacy and self-care adoption (12.3% & 17.7%, respectively) but a high rate of superstition (77.1%). The moderating effect of superstition on the association between health literacy and self-care was large (effect size of 11.05) and negative. Thus, intervention programs aimed at reducing the levels of superstition among the studied population are needed to improve the rate of self-care adoption and reduce hospitalizations and complications of diabetes. This can improve the lives of those with diabetes leading to positive social change.

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Dedication

I most gratefully dedicate this study to my darling wife, Barrister Mrs Ngozi Nwadiuto Ukpabi and to my lovely children, Nkemakolam Jnr, Nkemjidinma, and Nkemjika for going on this journey with me. I got your support, encouragement, and understanding all the way even when I could not give you my undivided attention when you needed it due to studying and researching. You are simply the best family anyone can ask of. An important take away from this journey is that you can achieve whatever you set out to achieve with commitment and family support as your foundation. Trusting in God and believing in yourself are equally fundamental to succeeding in this type of journey. I also dedicate the study to all diabetic patients who are battling to stay healthy and I pray that you all would understand the principle of self-management of diabetes which would help in keeping your blood glucose in check for better quality of life. May your homes and hearts be filled with peace, happiness and love.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Lack of Diagnosis or Knowledge of Diabetes in Africa

There are well-established methods for treating and controlling Type 2 diabetes including insulin injections, oral medications, diet, and exercise (American Diabetes Association [ADA], 2018). But many Africans are only diagnosed as diabetic only after suffering from one complication or the other (Pheiffer et al., 2018). The proportion of undiagnosed diabetes in Africans as 69.2%, and 77% of deaths from diabetes in Africans occur in individuals younger than 60 years of age. This trend has been observed among diabetic patients in Warri. A lack of initiatives to introduce diabetes education programs has kept diabetic patients in Warri unaware that risk of hereditary diabetes can be reduced through healthy diet, regular exercises, and moderate weight loss (Diabetes UK, 2017). Factors responsible for this lack of awareness include low educational level, low health literacy level, and low social economic status (Bansode & Nagarajan, 2017). Low educational level and low socioeconomic status can lead to lack of access to healthcare and poor diet that eventually results in poor health outcomes (ADA, 2017), which is also true for diabetic patients in Warri (Agofure, 2013). Further, these factors are associated with limited health literacy, which leads to poor medication adherence in diabetic patients (Zimmerman & Woolf, 2014, as cited in Lee et al., 2016).

Importance of Self-Care and its Link with Health Literacy

Health literacy is an important tool toward self-care adoption, which is necessary for managing diabetes. Self-care refers to intentional actions to remain healthy or to avoid worsening an existing health condition (ADA, 2009). Low health literacy is a predictor of

non-adherence in terms of medication and diet among diabetic patients (ADA, 2017). It also poses a challenge to access to health care services and to patients understanding, adopting, and maintaining other self-care behaviors such as foot care, exercises, and regular blood sugar checks (Friis et al., 2016). Diabetic patients without adequate specific knowledge of diabetes are less likely to understand treatment instructions and thus more likely to be noncompliant with the instructions (Friis et al., 2016). The association between health literacy and self-care might also be mediated by individual attitudes toward superstitious beliefs and religion (Protheroe et al., 2017). In many African cultures, illnesses including diabetes, are believed to be a punishment from supernatural beings or from humans with special powers, so individuals seek treatment from traditional healers (Workneh et al., 2018).

Need for the Current Study

Health literacy has been recognized as a potential asset for improving population health (Protheroe et al., 2017). But the moderating effect of superstitious beliefs on the relationship between health literacy and self-care behaviors among diabetic patients in Warri has not been widely studied (Emma-Echiegu et al., 2014). Studies that would help establish the moderating effect of superstitious beliefs on the relationship between health literacy and self-care adoption among diabetic patients in Warri are needed to improve knowledge about prevention and management of the disease for better health outcomes, good quality of life, and unnecessary hospital admissions.

Outline of the Chapter

In Chapter 1, background information about health literacy and a brief overview of the impact of health literacy and superstitious beliefs on self-care behaviors among diabetic patients is described. Also discussed are the purpose of the study, the significance of the research, definition of the variables, the research questions (RQs), assumptions, and the limitations of the study. The chapter ends with a summary.

Background to the Study

Prevalence of Diabetes

About 415 million people had diabetes worldwide as of 2015, and between 2012 and 2015, deaths resulting from diabetes was approximately 1.5 to 5.0 million deaths each year (International Diabetes Federation [IDF], 2016). If not properly managed, diabetic patients could also suffer from its negative and debilitating complications such as heart disease, stroke, blindness, kidney disease, nervous system disease, dental disease, and lower limb amputations (ADA, 2018). In Warri, the burden of diabetes is similar. The prevalence of diabetes in Warri is 11% with high morbidity and mortality rates due to ignorance, poverty, and unhealthy lifestyle and practices (Aghoja et al., 2016, p. 96).

Costs of Diabetes Treatment

Diabetes also imposes significant economic burdens with medical expenditures attributable to hospitalizations, medications, outpatient visits, and treatment of chronic complications (IDF, 2016). Patients suffering from diabetes, on average, have medical costs that are two-and-half times higher than people without the disease. The global economic cost of diabetes in 2014 was estimated to be US $612 billion (World Health

Organization [WHO], 2017) and in the United States, diabetes cost $245 billion in 2012 (ADA, 2018).

Importance of Health Literacy

Level of health literacy is a key determinant of a population's health (Ringsberg et al., 2018), which includes the management of diabetes. The two most important determinants of an individual's health are level of education and general health literacy level among other factors such as social environment, income, and working conditions (Lee et al., 2016). Other researchers have also linked low knowledge of preventable diseases, unnecessary use of hospital care, and poor quality of life to low health literacy (Protheroe et al., 2017; Zimmerman & Woolf, 2014). There has been a strong association between self-care, access and utilization of health care facilities, patient-provider relationship, and socioeconomic indicators and level of health literacy (Sentell et al., 2017). However, the ADA (2018) has associated the over $106 billion that the U.S. spends annually on health care costs with low health literacy levels.

Addressing Low Health Literacy

To address health literacy, which has been described as an asset for the improvement of individual and population health outcomes, some initiatives have been developed. These include the development of a conceptual framework for planning and implementation of interventions that will address low health literacy in the United States. This framework was developed by the Institute of Medicine's Committee on Health Literacy. The need to develop more advanced oral communication skills, critical thinking skills, and writing skills was also recommended by the framework (Sentell et al., 2017).

In the United States, a National Action Plan was created in 2010 to improve health literacy. The plan addressed the need to develop individual cognitive skills needed for critical analyses of health-related information and improved access to reliable health-related information (Centers for Disease Control and Prevention [CDC], 2016). The 2010 Action Plan also emphasized the role of health professional, health organizations, and the mass media in providing health-related information for people with limited health literacy (CDC, 2016). These interventions are also relevant in Nigeria's situation to address health literacy issues, which may improve self-care adoption among diabetic patients. For instance, the Diabetes Association of Nigeria has formed advocacy groups to pressure governments at national, state, and local levels to develop and implement health literacy intervention programs. The association has also organized foot care workshops for diabetic patients in Lagos and Port Harcourt (Akpunonu, 2017).

Relevance of Study to Address Health Literacy and Self-Care

In this study, my aim was to determine whether superstitious beliefs moderate the correlation between health literacy level and the adoption of self-care behaviors among diabetic patients in Warri, Nigeria while controlling for the effects of educational level, gender, income, and age. In most societies, both the literate and illiterate persons hold and practice cultural, traditional, and superstitious belief (see Abbo et al., 2009; Bhikha et al., 2015; Burns et al., 2011; Charles et al., 2007; Saravanan et al., 2007), which could affect levels of health literacy and self-care adoption. The implications of this research study for social change include determining the moderating effects of superstitious beliefs on the relationship between high literacy levels and self-care adoption. The results

could lead to the development of credible culture-sensitive and culture-competent intervention programs that would improve the health literacy levels of the diabetic patients in Warri and adoption of self-care behaviors, which would eventually lead to better management outcomes and better quality of life of these patients.

Problem Statement

Prevalence of diabetes rose from 108 million in 1980 to 422 million in 2014, constituting a rise from 4.7% to 8.6% of the population. Deaths resulting from diabetes were estimated to be 1.6 million in 2016, making diabetes the sixth leading cause of death globally (WHO, 2017). Additionally, diabetes imposes significant economic burdens due to medical costs (ADA, 2018). In Nigeria, diabetes is a leading cause of death and affects about 8–10% of the urban population such as in Warri, which is between 13 and 17 million (Okeoghene & Ekpebegh, 2014). This large number poses a substantial strain on the health budget in Nigeria, as many of these patients present to secondary and tertiary health care centers with advanced disease and attendant high morbidity and mortality. Diabetes has led to high numbers of lower extremity amputation in Nigeria and has been associated with the resurgence of tuberculosis and rising prevalence of end-stage kidney disease, erectile dysfunction, and stroke (Fasanmade & Dagogo-Jack, 2015). A quarter to a third of all admissions in Nigerian medical (nonsurgical) wards is made up of diabetic patients who record longest hospital stay and highest medical bills (Fasanmade & Dagogo-Jack, 2015).

Understanding and knowing how to use health information and when to appropriately use health services can decrease complications from a chronic disease such

as diabetes (CDC, 2016). But poor health literacy, which is common among patients with chronic conditions such as diabetes, contributes to the disproportionate burden of diabetes-related complications especially among disadvantaged populations (Sentell et al., 2017), leading to high healthcare costs. It is presumed that superstitious or cultural beliefs surrounding the cause and treatment modalities of diabetes may worsen low health literacy. However, few works have been done on health literacy or diabetes knowledge, superstitious beliefs, and self-care or other health behaviors of diabetic patients (Lee et al., 2016). The studies that have been done were outside Warri, which has created a gap in research that I filled with this study.

Purpose of the Study

The purpose of this quantitative study was to determine whether superstitious beliefs moderate the positive relationship between high levels of health literacy and the adoption of self-care behaviors among diabetic patients in Warri, Nigeria. From the study, the levels of health literacy, diabetic knowledge, superstitious or cultural beliefs, and the number of patients that adopt self-care behaviors will be ascertained. According to National Bureau of Statistics (2014), about 12% of population in Warri, Nigeria is diabetic or approximately 60,000 patients (National Population Commission, 2006). This population is large and deserves to be studied so that the results could be used to fashion out culturally-sensitive intervention programs to improve the quality of life of these patients. Clinicians in Warri, often see many of these diabetic patients come into clinics with various complications of diabetes, which could be attributed to lack of understanding of the disease in terms of its management including self-management or

self-care. The result of this study could lead to interventions that would help improve the health literacy levels of these patients and self-care behaviors that would help them achieve better management outcomes without complications.

Research Questions

RQ1: Is there statistically significant relationship between superstitious beliefs and the adoption of self-care behaviors among diabetic patients in Warri?

$H_0 1$: There is no statistically significant relationship between superstitious beliefs of diabetic patients in Warri and their adoption of self-care behaviors.

$H_A 1$: There is statistically significant relationship between superstitious and religious beliefs of diabetic patients in Warri and their adoption of self-care behaviors.

RQ2: Is there statistically significant association between superstitious beliefs and health literacy among diabetic patients in Warri?

$H_0 2$: There is no statistically significant correlation between superstitious beliefs and health literacy among diabetic patients in Warri.

$H_A 2$: There is statistically significant correlation between superstitious beliefs and health literacy among diabetic patients in Warri.

RQ3: Is there statistically significant correlation between level of health literacy and the adoption of self-care behaviors among diabetic patients in Warri?

$H_0 3$: There is no statistically significant correlation between levels of health literacy and the adoption of self-care behaviors among diabetic patients in Warri

$H_A 3$: There is statistically significant correlation between levels of health literacy and the adoption of self-care behaviors among diabetic patients in Warri.

RQ4: Do superstitious beliefs significantly moderate the relationship between health literacy and self-care behaviors among diabetic patients in Warri?

$H_0$4: Superstitious beliefs do not significantly moderate the relationship between health literacy and self-care behaviors among diabetic patients in Warri.

H_A4: Superstitious beliefs significantly moderate the relationship between health literacy and self-care behaviors among diabetic patients in Warri.

Theoretical Framework of the Study

One of the most popular health theories in the field of health behaviors, health promotion, and health education is the HBM. The HBM is used to explain and predict health behaviors by focusing on the perceptions or beliefs of individuals (Glanz & Rimer, 2005). This theory is focused on four perceptions of severity, susceptibility, benefits and barrier (Glanz et al., 2002) as well as three minor constructs: cues to action, motivating factors, and self-efficacy (Creswell, 2014). The HBM thus addresses an an individuals's perceptions and beliefs of a disease related to the threat it may pose, which can influence their decision to act (Glanz & Rimer, 2005). I chose this theory to help determine the moderating effect of superstitious beliefs on the association between health literacy and self-care among diabetic patients in Warri. In many African cultures, illness is seen as punishment (Akpomuvie, 2014; Kahissay et al., 2017) or due to an evil spirit (Carteret, 2011), meaning they come to the hospitals as a last resort. But health literacy could lead to perceptions of severity and susceptibility of the complications of diabetes, which could in turn make diabetic patients more likely to adopt self-care behaviors such as taking prescribed medications.

Nature of Study

For my dissertation, I used a correlational quantitative research design. This

design was apt for my topic because it guided me to explore the relationship between my

dependent variable (self-care behaviors of diabetics), the independent variable (health

literacy), and the moderating variable (superstitious beliefs; Creswell, 2014). I collected

numerical data using closed-ended questions that were analyzed with statistical

procedures (Igwenagu, 2016). I used cross-sectional survey, which is useful in assessing

practices, attitudes, knowledge, and beliefs of a population in relation to a particular

health related event such as self-care in diabetes (Sedgwick, 2014). The results from

these surveys not only give an indication of the magnitude of the problem in a particular

population at a particular point in time but also provide a basis for designing appropriate

public health measures such as health education campaigns (Sharif & Blank, 2010).

Based on these benefits, a cross-sectional survey was appropriate to assess the self-care

behaviors of diabetics in relation to their levels of health literacy.

Operational Definitions

Cultural beliefs: Cultural beliefs are beliefs held dear by social groups, which are

transmitted non-genetically from generation to generation. Some of these beliefs are

pejorative or irrational in nature and constitute superstitious beliefs. Cultural beliefs and

superstitious beliefs could be used interchangeably in this study (Hamilton, 2017).

Diabetes knowledge: Having knowledge and a clear understanding regarding the

outcome expectancies and self-care (self-efficacy) practices as they relate to Type 2

diabetes, which permit patients to make informed choices about focusing their risk reduction efforts (Saver, 2014).

Diabetes mellitus: Diabetes mellitus is a metabolic disorder in which there is either lack of insulin (Type 1) or insulin resistance (Type 2) in the body that leading abnormally high blood glucose levels in the body (ADA, 2014a).

Diabetes self-care: Self-care refers to actions taken or behaviors exhibited by individuals to remain healthy or to avoid worsening already existing health condition. In diabetes, self-care means actions taken and behaviors adopted by patients to ensure that blood sugar level remains normal to avoid complications (ADA, 2009). These actions include medication adherence, dietary compliance, engagement in physical activities, self-monitoring of blood sugar, and foot-care among others (ADA, 2009)

Health literacy: Health literacy is the ability to use various communication skills such as speaking, reading, and writing as well as critical analysis, to locate, assess, comprehend, and apply information to personal behaviors to improve and maintain health (Coleman et al., 2009).

Medication adherence: This term describes the "cognitive and functional ability to self-administer a medication regimen as it has been prescribed" (Maddigan et al., 2003, p. 333).

Religious beliefs: Religious beliefs are beliefs that center on the existence, characteristics, and worship of a deity or deities who are supreme beings and to the idea of divine interventions in the universe and in human lives. Religious beliefs are usually codified (Minton & Khale, 2014).

Superstitious beliefs: Superstitious beliefs are beliefs or practices that are considered irrational or supernatural mostly arising from ignorance, misunderstanding of science or causality, and positive belief in fate or magic, or fear of that which is unknown. It is commonly applied to beliefs and practices surrounding luck, prophecy, and certain spiritual beings (Risen, 2016).

Assumptions

The following assumptions were made about this study. First, I assumed that participants provided unbiased and truthful responses. I also assumed that participants were proficient in English and could read and comprehend at the eighth-grade level, which was necessary to understand the questionnaires. Finally, I assumed that participants represented an unbiased population of diabetic patients in Warri, Nigeria.

Scope and Delimitations

The focus of this study was on the moderating effects of superstitious beliefs on the relationship between health literacy and self-care behaviors adoption of diabetic patients in Warri, Nigeria. Most published research studies on diabetes in Nigeria have been done outside Warri and did not address the relationship between superstitious beliefs, health literacy, and self-care. My aim was to identify the health literacy levels of diabetic patients, their level of diabetes knowledge, their personal beliefs about the causes and treatment of diabetes and its complications, and their self-care behaviors. These could help in planning intervention programs that would improve diabetes knowledge and the perceptions of these patients about diabetes so that they can adopt self-care behaviors. A convenience sample of diabetic patients in Warri was selected to complete

questionnaires on health literacy, superstitious beliefs, and self-care behaviors. The study population comprised all the ethnic groups in Warri regardless of socioeconomic status so because all the ethnic groups are susceptible to superstitious beliefs about disease causation and treatment with resultant engagement in negative health behaviors and practices that result in poor management outcomes (Swami et al., 2010).

The HBM is the theoretical framework on which this study was built. The HBM attempts to predict health-related behaviors based on the individual's perception of the severity and susceptibility to a particular disease condition. However, it does not account for other factors that influence such health behaviors. For instance, habitual health-related behaviors such as smoking may become relatively independent of conscious health-related decision-making processes (Glanz et al., 2015). Individuals engage in some health-related behaviors for reasons unrelated to health such as exercising for aesthetic reasons. But environmental factors outside an individual's control may prevent engagement in desired behaviors. For example, an individual living in a dangerous neighborhood may be unable to go for a jog outdoors due to safety concerns (Skinner et al., 2015).

Limitations

Investigating a phenomenon involves being thorough in both data collection and analyses procedures, but because no research study is exhaustive, all research studies have limitations (Aguinis & Edwards, 2014). For this study, the limitations could be (a) the sampling technique, which was convenience sampling; (b) the number of diabetic

patients in Warri willing to participate in the study; and (c) the number of years of experience in managing diabetes.

External validity could be another limitation for this study. External validity is the extent to which the results of studies could be generalized (Steckler & McLeroy, 2008). Although studies should be generalized, the focus of this study was on health literacy, superstitious beliefs, and self-care behaviors of diabetic patients in Warri, which may not be generalizable to other populations, ethnic groups, and cultures suffering from diabetes. External validity was addressed by using standardized instruments to measure the variables and a sample size justified in terms of adequate statistical power and effect size. Additionally, internal validity indicates how well the results of the study reflect the study intent (Brutus, 2013). Inclusion of the covariates such as knowledge of diabetes, physical activities, and socioeconomic status could increase internal validity and confidence when a change in the dependent variable could affect the outcome of the independent variable.

Additional limitations to cross sectional designs include difficulty to assume cause and effect. The study was also limited to a brief point in time and prevalence-incidence bias (Levin, 2006). But the data collection instrument was designed to be easily understood, and ability to read and understand English was one of the inclusion criteria for the participants.

Significance of the Study

The significance of this study is that it will help fill the gap in the literature because I found no studies on health literacy, superstitious beliefs, and the practice of self-care among diabetic patients in Warri, South-South Nigeria. Results from this study

could provide the evidence for the institution of culture-sensitive intervention programs that will improve health literacy levels of these patients and possibly reduce their beliefs in superstition. These could in turn lead to more adoption of self-care behaviors among these patients, which would improve management outcomes of diabetes and the quality of lives of the patients. Improved management of diabetes would also help reduce in-hospital care and cost (Betancourt et al., 2014). Studies such as this that aim at advancing health literacy information and skills should be encouraged to improve health knowledge about preventable diseases, and management outcomes especially in chronic diseases such as diabetes (Son & Yu, 2016).

Implications for Social Change

Implementation of culture-competent and culture-sensitive intervention programs that could lead to self-care behaviors adoption would result in good management outcomes. If people begin to see diabetes as a disease and not as a curse or punishment from gods, care can be sought early in health care facilities and not from spiritual or traditional healers. Good management outcomes that translate to good glycemic control could reduce the complications of uncontrolled diabetes mellitus such as nephropathy, retinopathy, neuropathy, and angiopathy that could lead to debilitating health conditions such as renal failure, blindness, and limb amputation (Cleveland Clinic, 2017). Reduction in incidence of diabetes complications would then amount to better quality and longer lives of these patients. This reduction can also reduce hospital admissions and the cost of treatment of these patients, saving money that can be channeled to improve social amenities such as shelter, water, health, and educational facilities. More able-bodied

manpower would also be available for farming and production industries for economic growth, which would more money for more social amenities. Social change can thus result from the information in this study encouraging public health policies that make the teaching of culture-sensitive diabetes knowledge and self-care compulsory for diabetic patients.

Summary and Transition

In Chapter 1, a brief background was presented on the effect of health literacy on the adoption of self-care behaviors and clinical outcomes in a sample of diabetic patients in Warri, Nigeria. The chapter started with an overview of the research study and later the background information about functional and communicative health literacy. The chapter also described the purpose of the study as well as its significance. Thereafter, it discussed the RQs and their hypotheses, defined the variables before finally discussing the assumptions and limitations of the study. In this study, demographic factors, the levels of health literacy of diabetic patients in Warri, diabetes knowledge, medication adherence, compliance with dietary instructions, engagement in physical activities, and self-efficacy were measured. From data collected, I determined whether there is an association between the health literacy levels and self-care behaviors among the diabetic patients in Warri, Nigeria.

In Chapter 2, literature will be reviewed on health literacy, superstitious or cultural beliefs, and self-care behaviors among diabetic patients as they relate to the present study. The literature review will encompass both positive and negative relationships among the variables. This comprehensive literature review will also

evaluate cultural and socioeconomic factors affecting the management outcomes of diabetics as well as explore the possible effects of self-care or self-management behaviors among diabetic patients in general terms. Chapter 3 is a description of the research methodology including the sampling, sample size, data collection method, instrumentation, and data analysis. Chapter 4 will include the analysis and interpretation of the data collected through charts, graphs, and narratives. Chapter 5 will be a summary of the conclusions, a discussion of social impact, and future research recommendations.

Chapter 2: Literature Review

The aim of this research study was to examine the moderating effects of superstitious beliefs on the relationship between health literacy and self-care or self-management behaviors among diabetic patients in Warri, Nigeria. To identify factors associated with health literacy, current literature was reviewed, which is presented in this chapter. Additionally, previous knowledge related to health literacy instruments, health literacy and advanced health literacy skills, superstitious beliefs and health practices, diabetes disease management, and self-care or self-management behaviors are covered in the literature review.

Literature Search Strategy

A literature review of the independent variable (health literacy), the covariate or moderating variable (superstitious beliefs), and the dependent variable (self-care) was conducted. The databases searched for peer-reviewed articles published not later than 2013 include MEDLINE, CINAHL, PubMed, Google Scholar, and Science Direct. The literature search included all the terms related to *health literacy*, *health literacy* and *diabetes management*, *superstitious* and *cultural beliefs*, *treatment adherence*, *health literacy* and *self-care* or *self-management*. The literature review is presented as a thematically-organized vertical list that was not arranged in chronological order.

Theoretical Framework

For this study, the HBM was applied as the theoretical framework. The HBM is a psychological model that researchers employ to explain and predict health behaviors by focusing on the perceptions or beliefs of individuals (Glanz & Rimer, 2005). This theory

is based on human perceptions or beliefs of diseases and the strategies available to reduce their occurrence. Four perceptions of severity, susceptibility, benefits and barrier, serve as the main constructs of the model (Glanz et al., 2002). Perception of severity is the belief that a disease such as diabetes complications could seriously affect the health of individuals and could even lead to death (Glanz & Rimer, 2005). Thus, individuals are likely to adopt behaviors such as self-care behaviors that could prevent them contracting the disease. Perceived susceptibility is the belief that an individual is likely to contract a disease if the individual engages in risky health behaviors (Glanz et al., 2015). Later, three other minor constructs were added: cues to action, motivating factors, and self-efficacy (Creswell, 2014). In summary, the HBM addresses the individual's perceptions of the threat posed by a health problem (susceptibility, severity), the benefits of avoiding the threat, and factors influencing the decision to act (barriers, cues to action, and self-efficacy; Glanz & Rimer, 2005). The HBM was thus chosen to help determine the moderating effect of superstitious beliefs on the association between health literacy and self-care among diabetic patients in Warri.

From this theory, superstitious beliefs have their roots in culture, traditions, and customs of the people. Like any other behavior, the heart of health behavior is health attribution, which is the causal explanation process used to understand health and diseases. Health attributions influence health beliefs about diseases and subsequent health behaviors (Greenhalgh et al., 1998). In turn, cultural health attributions affect beliefs about diseases, treatment, and other health practices, such as diabetic patients in Africa who believe that diabetes is due to evil spirit. Some cultural beliefs that are described as

superstitious beliefs attribute evil forces as cause of illnesses in retaliation for moral and spiritual failings. People who have violated social norms or breached religious taboos may invoke the wrath of a deity and their sickness is explained as a form of divine punishment (Kahissay et al., 2017). In many African cultures especially, Nigeria inclusive, illness is seen as punishment for failing to carry out the proper rituals of respect for a dead ancestor (Akpomuvie, 2014). Therefore, these individuals seek spiritual solutions either from pastors or witch doctors (Carteret, 2011). Recovery from an illness usually involves the use of rituals and symbolisms, mostly carried out by practitioners who are specially trained in these arts. The practitioners, known as witch doctors or priests counteract and cast out these evil forces through prayers, incantations, medicinal herbs, and plants (Carteret, 2011). These patients come to the hospitals as a last resort with different complications because of late presentation. To effectively address these issues, medical educators must have knowledge about cultural differences and how those differences affect beliefs and treatment choices of a disease. Culturally diverse patient populations require that medical educators also learn new methods of cultural assessment and treatment in order to holistically care for patients effectively (Vaughn et al., 2009).

Using the HBM, I determined whether superstitious beliefs have moderating effects on the positive relationship between high health literacy and self-care adoption. High health literacy levels could lead to perceptions of severity and susceptibility of the complications of diabetes, which could in turn make diabetic patients more likely to adopt self-care behaviors to avoid the complications. High health literacy levels could also help patients to know that taking prescribed medications, adhering to recommended

diets, and adopting other self-care behaviors could reduce the risks of complications (perceived benefits) without negative side effects or excessive difficulty (perceived barriers). Additionally, because of high literacy levels, print materials, reminder letters, or pill calendars might encourage patients to adopt self-care behaviors (cues to action) while verbal reinforcements and demonstration of desired behaviors could provide the confidence on one's ability to act (self-efficacy; Glanz & Rimer, 2005). This study helped determine whether cultural beliefs in supernatural beings as the cause of diabetes would moderate the health behavior adoption (self-care) despite the activation of the perceptions of susceptibility, severity, benefits, and barriers of these patients through health literacy.

Literature Review Related to Key Concepts

Diabetes Mellitus

Diabetes mellitus, simply known as diabetes, is a metabolic disorder characterized by high blood sugar levels and due to lack of insulin production or ineffectiveness of produced insulin in the body. Symptoms of diabetes include polyurea (excessive passage of urine), polydipsia (excessive water consumption), polyphagia (excessive food consumption), weight loss, lethargy, skin infection, and coma (Cleveland Clinic, 2018).

Epidemiology of Diabetes

Diabetes mellitus is one of the leading causes of death in Nigeria and affects 8-10% of the population (13 to 17 million people; Okeoghene & Ekpebegh, 2014). Thus, it constitutes a significant health and socioeconomic burden for the patient and the healthcare system (Okeoghene & Ekpebegh, 2014). Diabetes has become as much a

public health problem in Nigeria as it is globally (IDF, 2016). Prevalence of diabetes rose from 108 million in 1980 to 422 million worldwide in 2014 (WHO, 2017). This corresponds to rise in prevalence rate from 4.7% in 1980 to 8.6% in 2014 (WHO, 2017). Deaths resulting from diabetes were estimated to be 1.6 million in 2016, making diabetes the sixth leading cause of death globally (WHO, 2017).

Diagnosis of Diabetes

Diabetes mellitus, commonly referred to as diabetes, is a group of metabolic disorders in which there are high blood sugar levels over a prolonged period (ADA, 2013). The diagnosis is made when two measures of fasting plasma glucose level is equal or greater than 7.0 mmol/l (126 mg/dl). Diagnosis can also be made when plasma glucose level is equal or greater than 11.1 mmol/l (200 mg/dl) 2 hours after a 75 g oral glucose meal or when random plasma glucose level is equal or greater than 11.1 mmol/l (200 mg/dl), or the glycated hemoglobin (HbA1C) is equal or greater than 48 mmol/mol (Tucker, 2013). A prediabetic state is when blood glucose levels are higher than normal but not high enough for a diagnosis of Type 2 diabetes (Harrison, 2017). It can be fasting glucose levels from 6.1mmol/l to 6.9 mmol/l (110 to 125 mg/dl) or plasma glucose at or above 7.8 mmol/l (140 mg/dl), but not over 11.1 mmol/l (200 mg/dl) 2 hours after a 75 g oral glucose load. People with these readings are considered to have impaired glucose tolerance. The ADA (2018) have also used 5.6 to 6.9 mmol/l to categorize prediabetic state. If not checked, prediabetic state can progress to full diabetic state (WHO, 2017).

Pathophysiology of Diabetes

Diabetes results from insulin insufficiency in the body, which could be either absolute or relative. In absolute terms, insulin production from the pancreas is insufficient, and in relative terms, insulin produced, though sufficient, is not active otherwise known as insulin insensitivity or insulin resistance (Cleveland Clinic, 2018). Insulin is the principal hormone that allows the cells of the body to take up glucose from the blood for metabolism and generation of energy. Once there is this lack of insulin, either absolute or relative, uptake of glucose cannot take place and glucose accumulates in the bold stream leading to the symptoms and complications of diabetes such as ketoacidosis (Unger & Orci, 2013).

Types of Diabetes

There are four broad categories of diabete: Type 1, Type 2, gestational diabetes, and other specific types. Some people may have combinations of these types (Davenport,2018). Type 1 diabetes is due to loss of the insulin-producing beta cells of the pancreatic islets of Langerhans, leading to insulin deficiency. Two classes of Type 1 diabetes have been described as immune-mediated and idiopathic. The immune-mediated class is the commonest and affects more children than adults and thus was traditionally termed juvenile diabetes.

Type 2 diabetes, which is the commonest type of diabetes, is characterized by insulin insensitivity or resistance and is due to defective responsiveness of body tissues to insulin by insulin receptors. However, the specific defects are not known (ADA, 2018). A number of lifestyle factors have been associated with the development of Type2 diabetes

that include obesity (defined by a body mass index of greater than 30), lack of physical activity, poor diet, stress, and urbanization (WebMD, 2018).

Gestational diabetes mellitus involves a combination of insulin insensitivity and relative insulin inadequacy and occurs in about 2–10% of all pregnant women. The disease may disappear after delivery; however, approximately 5–10% of these women will progress most commonly to Type 2 diabetes (Cleveland, 2018). Gestational diabetes requires careful medical management throughout the pregnancy. Untreated gestational diabetes can damage the health of the fetus and mother (ADA Professional Practice Committee, 2013).

The other specific types of diabetes indicate genetic defects of insulin production in congenital diabetes and cystic fibrosis related diabetes. Other causes include mitochondrial DNA mutations, acromegaly, hyperthyroidism, and infections such as cytomegalovirus infection and coxsackievirus B infection (Davenport, 2018).

Management of Diabetes

Management of diabetes is aimed at maintaining the blood sugar level at normal ranges and can be achieved through lifestyle modifications, dietary measures, and drugs. Lifestyle modification entails maintaining normal body weight, practicing regular physical exercises, cessation of smoking and alcohol, and consumption of healthy diet (Cleveland Clinic, 2018). Dietary measures involve limiting sugar intake and red meat consumption, maintaining diet rich in whole grain and fiber, and choosing good fats such as in fish, nuts, and vegetables (Cleveland Clinic, 2018). Drugs used in diabetes management include oral hypoglycemics, such as metformin and glipizide, and insulin

that comes as long acting such as Levemor, short acting such as Novolin, rapid acting such as Humalog, and intermediate acting such as NPH (C) (Qaseem et al., 2017). Educating patients on self-management or self-care behaviors such as regular exercises, healthy diet, drug compliance, self-blood sugar checks, and foot care also form part of diabetes management (Khunti et al., 2014).

Complications of Diabetes

Diabetes is a chronic disease that does not have any cure and thus is associated with many acute and long-term complications. Acute complications include diabetic ketoacidosis, hyperosmolar hyperglycemic state, or sudden death, and the long-term complications include cardiovascular disease, stroke, chronic kidney disease, foot ulcers, and retinopathy (CDC, 2017). These complications come with poor quality of life for survivors. To make matters worse, both the prevalence and incidence of diabetes have been on the increase worldwide as it rose from 108 million people in 1980 to 422 million people in 2014 (WHO, 2017).

Self-Care and Diabetes

In health care, self-care, also known as self-management, is the necessary human regulatory function under an individual's control that is deliberate and self-initiated. Self-care is seen as one of the ways of reducing rising health care costs placed on governments (Panagioti et al., 2014). It is also considered a primary form of care for patients with chronic conditions such as diabetes who make many day-to-day decisionsor self-manage their illness (Mukeshimanal et al., 2015). Self-care is learned, purposeful, and continuous, and self-care education should complement traditional patient education in

primary care to support patients to live the best possible quality of life with their chronic conditions such as diabetes (Shrivastava et al., 2013).

Skills also influence an individual's ability to perform self-care behaviors as individuals need to plan, set goals, and make appropriate decisions regarding their health needs (Kelly et al., 2015). Self-care is influenced by an individual's self-efficacy to overcome barriers (Mutunga-Mwenda et al., 2017). Cultural beliefs and values may also influence self-care (Abdulrehman et al., 2016). Self-care may be viewed as highly important in some countries or within certain cultures, and in other cultures, it may contradict traditional beliefs and values (Chaurasia et al., 2015). Social supports, which include families, friends, and support groups, also influence how an individual performs self-care maintenance (Chaurasia et al., 2015).

There are seven essential self-care behaviors in people with diabetes which predict good outcomes. These are healthy eating, being physically active, monitoring of blood sugar, compliant with medications, foot care, good problem-solving skills, healthy coping skills, and risk-reduction behaviors (Mutunga-Mwenda et al., 2017). These self-care behaviors can be useful for both clinicians and educators treating individual patients and for researchers evaluating new approaches to care. All these seven behaviors have been found to be positively correlated with good glycemic control, reduction of complications, and improvement in quality of life (Shrivastava et al., 2013). Diabetes self-care requires the patient to make many dietary and lifestyle modifications supplemented with the supportive role of healthcare staff for maintaining a higher level of self-confidence leading to a successful behavior change (Baraz et al., 2017). Effective

management of diabetes often requires extensive lifestyle changes, behavioral changes, and the development of self-care skills among diabetic patients (Hollis et al., 2014; Kim & Kim, 2017).

Individuals with diabetes have been shown to make a dramatic impact on the progression and development of their disease by participating in their own care (Shrivastava et al., 2013). This participation can succeed only if those with diabetes and their health care providers are informed about taking effective care for the disease (Ishak et al., 2017). It is expected that those with the greatest knowledge will have a better understanding of the disease and have a better impact on the progression of the disease and complications (Rajasekharan et al., 2015). Based on a review of the standards of diabetes self-management education, there was a fourfold increase in diabetic complications for individuals with diabetes who had not received formal education concerning self-care practices (ADA, 2017). Self-management education for adults with Type 2 diabetes has also shown improvement in glycemic control at immediate follow-up, but continuing education may be necessary (Alhaik et al., 2019).

Research has also indicated that diabetes self-management education (DSME) must be intensified in order to promote self-care behaviors among diabetic patients (Musenge et al., 2016). DSME is the cornerstone of effective care in diabetes management (Haas et al., 2014), with the guidelines on DSME issued by the ADA being widely recognized and applied (Menino et al., 2013). In the United States, DSME has been shown to be a better method of intervention to ensure better adoption of self-management behavior for good outcomes (Sharder et al., 2013).

The report of a study in Greece in which self-care behaviors measurement was administered to 177 eligible participants showed that younger patients were less likely to adopt self-care behaviors when compared with older patients (Chourdakis et al., 2014). This implies that DSME should be directed more to the younger patients. And based on another study, goal-setting intervention program must be included in the DSME for better outcome in terms of glycemic control (Fredrix et al., 2018).

Health Literacy and Self-Care Adoption

Health Literacy

Health literacy is a concept that has evolved over time and there is still no universal agreement on its meaning (Johnson, 2014). Healthcare providers, researchers and policy makers most commonly understand health literacy to mean patients having the ability to understand and constructively act on health information (Johnson, 2014). Health literacy has defined as the social and cognitive skills that can enable and motivate an individual to access, comprehend, and utilize health information in such a way that will promote and maintain good health (WHO, 2015). Another definition sees health literacy as how much capacity an individual has to obtain, understand, and clearly share basic health information and services in order to make appropriate health decisions (Patient Protection and Affordable Care Act, 2010). Yet another scientific paper defined health literacy as a person's ability to use social and cognitive skills to have access to, comprehend, and utilize health information in ways that maintain and promote his or her health (Chen et al., 2012). In this study, the definition by WHO will serve as the

operational definition of health literacy because the aspect of using or acting on the information in order to promote and maintain good health is vital.

Health literacy is about acquiring knowledge, confidence, and personal skills that will improve personal and community health through changes in personal lifestyles and living conditions It is not just the ability to read pamphlets and schedule appointments; it is an important empowerment tool as it enhances an individual's ability to get health information and to act on it effectively (Nutbeam, 2015; Nutbeam, 2013).

These complex definitions of health literacy cover not only the ability to comprehend health information but also to understand that in the healthcare environment, external factors affect his or her ability to navigate and interact with others (Potter, 2017). Demonstration of health literacy is the ability to find and follow instructions in simple documents, identify information in short prose texts, and locate and use numbers in simple quantitative operations. This also means having the ability to read and understand health information in order to get tasks done, and not just to locate information (Porter, 2017).

Researchers in the U.S. discovered that 98% of the population was not proficient in health literacy skills (Kutner et al., 2006). Health literacy statistics of the U.S. is expectedly diverse due to the diverse nature of its population and race has shown to be directly correlated with health literacy (Lee et al., 2012). People with low socioeconomic status, the medically underserved, and the older adults were among the 98% that lacked health literacy proficiency (U.S. Department of Health and Human Services, 2015). In the same vein, this study would help in determining the exact percentage of diabetic patients

in Warri that are proficient in health literacy skills including their socioeconomic status, gender, and age bracket.

Health outcomes are affected by lack of health literacy abilities and misunderstanding between patients and healthcare providers due to poor health communication can adversely affect the outcome of care (CDC, 2015). Patients with poor health literacy levels are more predisposed to make mistakes with medications and seek care only when they very sick which results in higher rates of long hospital stays and deaths (Berkman et al., 2011). In the U.S., the cost of poor health literacy proficiency is more than $100 billion annually (National Academies of Sciences Engineering and Medicine., 2015). This amount is four times more than the care cost of those with high health literacy proficiency (Cheng et al., 2018) and the cost has been attributed to inability to coordinate health services and the complications of this chronic condition with resultant increased hospitalization (Leśniowska et al., 2014; Peters et al., 2017).

Those with inadequate or marginal health literacy had significantly higher outpatient and pharmacy costs when compared with those with adequate health literacy (Haun et al., 2015). A 3-year estimated cost of care for patients with low health literacy skills was $143 million higher than for patients with high health literacy skills (Porter, 2017) and one leading determinant of people's health literacy levels is education (Chen et al., 2012). The higher the level of education of an individual, the better the health literacy scores the person receives. Also, patient's ability to identify reliable resources of information on various health topics depends on level of education (Porter, 2017). Outcomes of ongoing care have been correlated by researchers with patients' health

literacy levels. Thus, healthcare organizations must deliver information appropriate to patients' health literacy levels so that they can understand the information given (Porter, 2017). Health literacy is now considered the sixth vital sign because of its prominent role in healthcare outcomes; it is also linked to health disparities (Heinrich, 2010). Healthcare professionals are expected to aid patients in identifying the best health information suited for a given situation via the different methods of communications (CDC, 2015).

Dimensions of Health Literacy

Three dimensions of health literacy have been described by researchers and these are functional, communicative, and critical dimensions of health literacy (Nutbeam, 2008; Nutbeam, 2000). Other authors have described twelve dimensions of health literacy (Doyle et al., 2012); but for the purpose of this study, the three dimensions will be adopted. The basic reading and writing skills that individuals need to function in everyday situations are regarded as functional dimension (Nutbeam, 2000). But the more advanced cognitive skills that promote an active participation in everyday situations and allow individuals to use new information and social skills to solve everyday situations are considered as the communicative or interactive dimension (Nutbeam, 2000). On the other hand, critical health literacy permits individuals to critically analyze information using advanced cognitive skills and to use the information and social skills to exert greater control over life events and situations (Nutbeam, 2000, p. 264).

Impact of Health Literacy on Self-Care and Health Outcome

Results of several studies have lend credence to the assumption that adequate health literacy is necessary for patients especially those with chronic health conditions to

maintain good quality of life (Al Sayah et al., 2013; Bailey et al., 2014; Zikmund-Fisher et al., 2014). There are also other numerous research findings that support the assumption that adequate health literacy results in good glycemic control and low HbA1c through the adoption of self-care (Moss, 2014; Newsome et al., 2016; Olesen et al., 2017). Similar findings linking poor health literacy with poor quality of life of patients with cardiovascular diseases have been reported in Taiwan (Tung et al., 2014), of diabetic patients in Denmark (Friis et al., 2016), and of patients with chronic diseases generally in the U.S. (Johnson et al., 2013). Thus, adequate health literacy actually helps patients to understand their health conditions better and to know ways of managing such conditions including self-management practices (Johnson, 2014).

In Nigeria, a group of researchers set out to determine causes and consequences of poor health literacy level and found causes to be lack or low level of education, poor socioeconomic status, culture, and belief systems. They found the consequences to be poor disease outcomes, poor understanding of preventive services, frequent hospital visitations, and poorer general health status (Adekoya-Cole et al., 2015). Identifying the factors that lead to poor health literacy such as poor socioeconomic status, low education, and belief systems could help health educators in fashioning out effective interventions programs for these patients.

However, from results of a study conducted in Jamaica, the researchers could not ascertain the existence of a linear relationship between health literacy and health outcomes among diabetic patients (Singh & Aiken, 2017). Similarly, in the U.S., from the findings of a systematic review of 778 articles on the relationship between health literacy

and health outcomes among diabetic patients, the authors could not establish association (Saya et al., 2013).

Superstitious Beliefs and Self-Care Among Diabetics

Superstition is a term used pejoratively to describe any belief or practice that is considered irrational or supernatural (Risen, 2016). It is believed to arise from ignorance, misunderstanding of science or causality, and a positive belief in fate or magic, or fear of the unknown (Risen, 2016). It is also commonly applied to beliefs and practices surrounding luck, prophecy, and certain spiritual beings, particularly the belief that future events can be foretold by specific unrelated prior events (Risen, 2016). Superstition has also been used as a word to refer to religious practices by the minority of a given society though the prevailing religion may contain certain elements of the alleged superstitions. Religious beliefs such as in the Supreme God, angels, and spirits, have been classified as superstition and the Pope was accused of superstition by Martin Luther (Risen, 2016). This warranted the Catholic Church to publish the catechism which summed up the beliefs of the church and described superstition as a perverse excess of religion. Thus, religious beliefs are presently viewed as different from superstition though a certain minority still thinks they are similar (Hamerman & Morewedge, 2015).

Superstition or cultural beliefs and religiosity permeate all societies and are seen as part of culture and tradition or were handed down from elders. These superstitions not only predict health seeking behaviors of a person but also play a major role in shaping the response of a community to any health intervention program (Risen, 2016). Superstitious or cultural beliefs lead individuals to behave in certain ways that seem abnormal and

dangerous in terms of their health. In illness, especially chronic illnesses, sufferers'

beliefs on the cause of the disease and its outcome could determine how the individual

complies with the disease management instructions (Risen, 2016). In diabetes, patients'

diabetes-related beliefs in terms of causation and control are related to either adoption or

non-adoption of self-management behaviors. Beliefs about diabetes play an important

role in instigating illness management, as well as informing interventions to either change

or challenge such beliefs. In Africa generally and in Nigeria specifically, superstitious

belief about illness causation is still strong. People believe that illness comes from evil

spirits, witches and wizards, and from evil-eyes, that is those who do not like you. For

this reason, they seek for help and cure from spiritual healers, traditional healers, native

doctors, and exorcists (Hamerman, & Morewedge, 2015). These unorthodox healers

administer concoctions, charms, and amulets for cure and protection of the patients. But

despite the so-called treatments, they still come down with complications. High health

literacy levels have helped diabetic patients to adopt self-care behaviors with better

management outcomes (Zikmund-Fisher, Exe, & Witteman, 2014). But with high level of

superstition, the effects of high literacy levels could be moderated leading to non-

adoption of self-care behaviors.

Successful self-management requires an understanding of diabetes. However,

cultural health beliefs and poor understanding of diabetes have been reported to impede

self-management practices resulting in poor diabetes outcomes (Hamerman, &

Morewedge, 2015). In a study on British South Asians with diabetes, researchers

discovered that majority of patients interviewed held strong fatalistic beliefs about

diabetes which was the belief that diabetes is controlled by external forces such as God and that deities are more powerful in controlling health and illness (Vyse, 2018). By this belief, self-management of diabetes will be badly affected as sufferers would not want to adopt any of the self-care behaviors but rather wait for God to control the disease and cure them (Flanagan, 2013).

Another cultural practice that tends to be superstitious in nature which adversely affects the adoption of self-care behaviors is the belief in traditional healers who use herbs, roots, and leaves. Many Africans and South Asians believe in the use of herbs and roots to cure numerous diseases and there are no scientific evidences on the curative properties of these herbs and roots (Vyse, 2018). Some of the common alternative therapies include bitter lemon or karella and aloe vera which the participants believe lower blood sugar because of their bitterness (Vyse, 2018). Some participants believe that a mixture of herbs such as ginger, rosemary, and wheat or cinnamon mixed with honey can cure diabetes outright (Vyse, 2018). By believing in these alternative therapies that do not have scientific support, these patients disregard the adoption of well researched self-care measures in diabetes which could lead to complications.

Researchers in Kenya studied the influence of cultural beliefs and practices on self-management behaviors of diabetic patients and they found that the patients had strong attachment to their traditional therapy of herbs and roots which stem from the belief that western medicine has many side effects. They also found that the Muslims among them refused insulin outright because it is derived from pork which is inconsistent with their religious beliefs (Abdurehman et al., 2016). The consequence of such cultural

practices is that majority of the patients studied (78%), had poor glycemic control that could lead to complications and poor quality of life (Abdurehman et al., 2016).

In Lagos, South-West Nigeria, a group of researchers reported that 60% of diabetic patients studied were women and 90% of these women were obese. The cultural practice behind the high obesity rate among the women, according to the researchers, is that being fat is regarded as healthy as they see obesity as evidence of good living (Ogundele, Dada, and Mosuro, 2016).

In the U.S., based on the results of a study on cultural issues in diabetes self-management behaviors of elderly Korean Americans, the researchers reported that diabetic patients engaged in the so-called good food that is at variance with recommended dietary guidelines proposed by the American Diabetes Association with resultant poor management outcomes. The practice was based on the Korean cultural belief that there is no disease to be cured by medications, if it is not cured by food (Cha et al., 2013).

The only cultural belief and practice that seems to encourage self-management behaviors among diabetic patients is the belief that illness management is often a shared task involving patients' social networks such as families and friends. Some authors have described strong family ties in the South Asian population associated with shaping patients' attitudes, and the provision of information about diabetes (Lucas et al., 2013). Typically, married men relied on their wife for managing their diet, food shopping and cooking for the family while other men have described how their wives or other females in their network, for instance their mother or sisters, provided support with their diabetes

medication(s) and strongly believed that other people in the family should take responsibility for ensuring people with diabetes take their medications and eat the right foods. For women with diabetes, managing their diabetes, particularly their diet, seemed to be secondary to the everyday work they had to do for their immediate and extended families. Though some women reported on how their children helped to provide information and support related to diet (Lucas et al., 2013). This particular belief in family support is a good self-care prompt as family support is important in the adoption of self-management behaviors among diabetic patients.

Health Literacy and Superstitious Beliefs

Superstition or cultural beliefs and religiosity permeate all societies and are seen as part of culture and tradition or were handed down from elders. These superstitions not only predict health seeking behaviors of a person but also play a major role in shaping the response of a community to any health intervention program. Superstitious or cultural beliefs lead individuals to behave in certain ways that seem abnormal and dangerous in terms of their health. In illness, especially chronic illnesses, sufferers' beliefs on the cause of the disease and its outcome could determine how the individual complies with the disease management instructions (Gearhart & Abdulrehman, 2014). In diabetes, patients' diabetes-related beliefs in terms of causation and control are related to either adoption or non-adoption of self-management behaviors. Beliefs about diabetes play an important role in instigating illness management, as well as informing interventions to either change or challenge such beliefs.

Successful self-management requires an understanding of diabetes. However, cultural health beliefs and poor understanding of diabetes have been reported to impede self-management practices resulting in poor diabetes outcomes (Patel et al., 2015). In a study on British South Asians with diabetes, researchers discovered that majority of patients interviewed hold strong fatalistic beliefs about diabetes which is the belief that diabetes is controlled to external forces such as God and that deities are more powerful in controlling health and illness (Abdurehman et al., 2016). By this belief, self-management of diabetes will be badly affected as sufferers would not want to adopt any of the self-care behaviors but rather wait for God to control the disease and cure them (van Esch et al., 2014).

Researchers in Ebonyi State, South-East Nigeria studied the factors related to the high incidence of vesico-vaginal fistula (VVF) and they discovered that the majority of the VVF patients lacked knowledge of the disease in terms of the causes, its prevention, and its treatment. They were rural dwellers, with low level of health education, and socioeconomic status. They expressed strong superstitious beliefs about the causes of VVF which include the pregnant woman's sins, anger of the gods, ancestral curse, and evil spirits. One of such sins that could cause VVF was disregard to one's husband's or elder's authority. The participants also believed that cure to VVF lied with native doctors, healing homes, churches, and herbal homes. The researchers thus concluded that low health literacy was associated with beliefs in superstition about VVF due to lack of proper knowledge of the disease (Emma-Echiegbu, Okoye, and Okey, 2014).

A study was conducted to determine patterns of beliefs and attitudes of health professionals toward mental illness and the mentally ill persons in five countries of US, China, Brazil, Nigeria, and Ghana. Four factors were measured among these professionals based on the different cultural settings in the five countries. The factors were socializing factor, normalizing relationships, non-belief in superstitious causes of mental illness, and belief in psycho-social factor. While the US scored high in all four factors, the two African countries of Nigeria and Ghana scored lowest in the non-belief in superstitious causes of mental illness factor (Sefanovics et al., 2015). The results meant that health professionals in Nigeria and Ghana were more likely to endorse the items which suggest that witchcraft, possession by evil spirits, or ancestral curses can cause mental illness. It also demonstrated the powerful influence of cultural milieu or cultural environments of Nigeria and Ghana on health professionals. Thus, high health literacy levels could equally be negatively influenced by beliefs in superstition due to the cultural milieu in which individuals operate.

Lay beliefs about causes, manifestations, and treatment of mental illness may be categorized into biological, psychological, sociological, supernatural, and fatalistic. In the Western cultures, the belief is mostly biomedical. But in nonwestern cultures, beliefs in supernatural causes and traditional healing predominate (Sheihk & Furnham, 2013). Loo and Furnham (2013) focused on understanding depression that is influenced culturally. Previous researchers highlighted that Asians somaticize depression often and present with various physical symptoms such as body aches and pains and crawling sensations. Indian Malaysians hold such superstitious and religious beliefs about mental illness as being

possessed, karma, black magic, and evil spirits, as well as the beliefs in traditional healers such as faith healers, temple healers, and exorcists. In Malaysia, researchers investigated knowledge and beliefs about depression among urban and rural Indian Malaysians so that the concept of depression held in these communities could be used in fashioning out culture-sensitive intervention programs for these communities. Results showed that urban participants exhibited high health literacy and adopted the biomedical and psychological causes of depression as well as the biomedical treatment option. The rural participants on the other hand demonstrated low health literacy levels and believed more in superstitious and sociological causes of depression. They also adopted the traditional and spiritual healing methods more than the biomedical methods (Loo & Furnham, 2013).

In the field of mental health, superstitious beliefs about mental illness have played a part in non-adoption of self-care behaviors in spite of the health literacy levels of sufferers. A study was done in South Africa, Ethiopia, Uganda, and Nigeria to determine why there is treatment gap in mental illness care. From the narratives of 28 psychiatrists interviewed, two factors were attributed to the treatment gap. The first is lack of access to mental care and the second is lack of uptake of available mental health services. Lack of uptake of mental health services was attributed to low mental health literacy and its associated superstitious belief about mental illness being a spiritual calling or an affliction by evil spirits. Sufferers prefer to seek help from traditional healers and spiritual homes (Cooper, 2016). Based on the foregoing, most of the psychiatrists suggested collaboration with these alternative therapists as one of the measures to bridge the treatment gap. Some psychiatrists actually expressed doubt on whether orthodox

medicine has all the answers to mental health while some admitted that alternative

therapies do have some goods effects (Cooper, 2016). The result of this study has

demonstrated people with high mental health literacy level like psychiatrists could also

admit to the merits of some cultural beliefs attributable to acculturation process. This

means that high literacy level could be associated with superstitious beliefs. Thus, it is

necessary to ascertain through this study if diabetic patients also could be influenced by

superstitious beliefs not to adopt self-care behaviors despite their high health literacy

levels.

Another healthcare area where superstitious beliefs have affected access to care is

in antenatal care. A review of existing literature in CINAHL Plus, Medline, POPLINE,

PubMed, Cochrane, and Scopus databases were carried out in the United Kingdom to

determine whether cultural beliefs and practices influence antenatal care for black

African women living there. The study was necessitated by high maternal mortality rates

among the Black African women immigrants in UK despite availability of antenatal

services (Esegbona-Adeigbe, 2018). As a background to this study, some researchers had

implicated cultural beliefs and practices as hinderance to uptake of antenatal services.

They suggested that reduced antenatal care was influenced by socio-cultural factors,

beliefs, and behaviors such as traditional medicine and pregnancy taboos. Engagement

with antenatal care was affected by cultural beliefs and practices for migrant Black

African women in developed countries (Haddrill et al., 2014; Mohale, Sweet, & Graham,

2017; Nair, Yoshida, & Lambrecht, 2014). The results of this literature review showed

that cultural qualities have some impact on women's satisfaction with antenatal care

which they consider as impediment to care uptake by Black African women whether they are in their indigenous countries or in diaspora (Esegbona-Adeigbe, 2018). They also highlighted the importance of cultural qualities in antenatal care for Black African women regardless of the length of time in their new countries. This knowledge can be exploited to fashion out culturally competent and sensitive antenatal care services which would improve access and uptake and in turn reduce maternal mortality rates among these women (Esegbona-Adeigbe, 2018). Given the foregoing, it is possible that superstitious beliefs could also affect the adoption of self-care behaviors among diabetic patients in Warri despite their health literacy levels which is what has informed this study.

Health Literacy, Superstitious Beliefs, and Self-Care Among Diabetics

Researchers have associated high literacy levels with adoption of self-care behaviors among diabetic patients (ADA, 2018; Protheroe et al., 2017). Others did not find such direct association between high literacy levels and the adoption of self-care behaviors (Lee et al., 2016). This section of the literature review deals with finding out what has been published regarding the moderating effects of superstitious or cultural beliefs on the relationships between health literacy and self-care behavior adoption by diabetic patients.

There is documented evidence that the role of diet in the control of diabetes is influenced by cultural beliefs and practices. Family, language barriers, health literacy, and acculturation are all factors affecting cultural approaches to diabetes management in these immigrant populations (Wallia et al., 2014). A study was carried out in the U.S. to

determine how cultural beliefs and practices affect dietary habits of Asian, Middle Easterners, and Latino patients with diabetes. A comprehensive literature search in PubMed for relevant studies that addressed specific populations of interest, diabetes, and diet was conducted. The results showed that strong tie with the family negatively influences healthy dietary habits in Hispanics because one is expected to eat together with other family members especially during ceremonies. Limited English language fluency and low health literacy also hindered healthy dietary habits among Hispanics. For Latinos, fatalistic viewpoints and doubts about preventative measures constituted barriers to healthy dietary habits (Mora and Golden, 2017). This review also showed that culturally tailored diabetes education programs could result in better dietary practices and better glycemic control.

Results of a literature review that focused on factors that affect self-care for better diabetes control among Chinese Americans showed that majority of the study participants lacked or had limited ability to communicate effectively in English language leading to limited access to health-related information and thus exhibited low level of health literacy. The factors studied include language barriers, cultural beliefs and values, and health literacy levels. This study was carried out against the background that this population believed in strong family ties, that disease is due to imbalance between yin and yang, and that traditional Chinese medicine is more effective than western medicine (Tseng, Halperin, Ritholz, and Hsu, 2013; Wang, Song, Ba, Zhu, & Wen, 2014). Belief in traditional medicine to balance yin and yang encouraged them not to take prescribed

drugs. These have led to poor health literacy, poor self-care behaviors, and increased prevalence of diabetes in the population studied (Wang et al., 2014).

In Australia, a group of researchers examined the needs of Australians with low or negligible English proficiency in terms of understanding health and medicine information and the role of pharmacy in achieving best medicine use outcomes. They conducted the study on the assumption that low health literacy can lead to poor drugs compliance especially in culturally and linguistically diverse setting where language barrier could compound the problem. They found that language barrier prevented access to health information and the understanding of health professionals' explanations as individuals with limited proficiency relied on family members and friends to explain health issues in general and drugs in particular. Also, cultural nuances that influenced drug compliance include taking drugs with warm water and the contempt for generic drugs (Mohammed, Saini, and Chaar, 2015)

In another study in Australia, investigators set out to determine the influence of culture and other factors on diabetes self-management behaviors among Chinese Australians with diabetes. They found that 80% preferred to speak Chinese language with family and friends and to follow Chinese traditions and culture in Australia. About 50% believed that Chinese traditional medicine was more efficacious with fewer side effects than western medicine while 25% still believe that it is shameful for the individual and the family to have diabetes (Eh, McGill, Wong, and Krass, 2016). The Chinese Australians have poor acculturation, poor health literacy levels, poor self-care behaviors,

and poor management outcomes for diabetes because of strong cultural beliefs (Eh, McGill, Wong, and Krass, 2016).

A study on how social, economic, and cultural resources affect health capabilities and self-management behaviors of diabetic patients was conducted in Ontario, Canada. It examined whether resources available to an individual determines his or her health-related behaviors. The investigators recruited and interviewed 45 patients and discovered that those in the low group of the three factors admitted to poor dietary compliance while those in the medium group had good compliance in the economic and cultural factors but were poor in compliance in the social factor. For the participants in the high resources group, they admitted to good compliance in all three factors (Weaver et al., 2014). Thus, one can say that social and economic factors could be co-founders that could lead to poor health literacy and poor self-care behaviors among diabetic patients that eventually would translate to poor glycemic control and poor quality of life.

Understanding the perceptions of an illness shared by a group of people is useful in developing culturally appropriate intervention measures targeted to the needs of the community. This is so because illness perceptions, influenced by cultural beliefs, are associated with disease self-management adherence (Brandes & Mullan, 2014). Results of a study on how African Americans perceived Type 2 diabetes that used common sense model as the conceptual framework and phenomenological qualitative research method, showed that 79% of the participants attributed causes of diabetes to slavery, healthcare providers, and God. About 63% believed that faith in God, positive thinking, and medication adherence helped in controlling diabetes (Shoyanbola, Ward, and Brown,

2018). From this study, it is obvious that African Americans have been well acculturated, though vestiges still remain, thus they do not so much hold strong cultural beliefs that would prevent them from adhering to their medications. The study also demonstrates that poor acculturation could be another confounder in the association between health literacy, superstitious beliefs, and self-care behaviors.

Summary

In this chapter, the results of a literature review of previous studies related with the association between health literacy and self-care adoption of diabetic patients as well as the moderating effects of superstitious or cultural beliefs on the association have been presented. Most of the researchers reviewed concluded that high literacy level is associated with self-care adoption with resultant good glycemic control while low literacy level leads to non-adoption of self-care behaviors with resultant poor glycemic control. But there were a few studies that did not find direct association between health literacy levels and self-care adoption. Superstitious or cultural beliefs and practices were found to have moderating effects on the relationship between health literacy and self-care adoption especially among diabetic immigrants from Asia, Middle East, South Asia, and Africa. Some factors that could constitute confounders of the association between health literacy, superstitious or cultural beliefs, and self-care were also identified. These include low socioeconomic status, level of education, and poor acculturation. The retrieved studies employed both the quantitative and qualitative research methods and a variety of data analytical methods to obtain the published results. In Chapter 3, the methodological aspects of this dissertation including the research design, measurement instruments, the

study population, sample size, sampling method, and data analytical method will be

described.

Chapter 3: Research Method

The purpose of this quantitative study was to determine whether there is a moderating effect of superstitious or cultural beliefs on levels of health literacy and self-care practices among diabetic patients in Warri, Nigeria. Employing correlational quantitative research design, I examined the relationship existing among health literacy (independent variable), superstitious or cultural beliefs (covariable), and the adoption of self-care behaviors (dependent variable) among diabetic patients in Warri, Nigeria. The participants answered a structured and culturally adapted questionnaire that has integrated the health literacy tool, the superstitious beliefs tool, and the self-care instrument. This chapter is an outline of the research design and method that were used. The method of recruitment of the participants, the culturally adapted instrument, and the protection of participants' rights are also detailed in the chapter. The sample size determination and type of statistical analytic method used are also described.

Research Design and Rationale

An observational cross-sectional study was chosen to examine the relationship between health literacy, superstitious beliefs, and the adoption of self-care behaviors among diabetic patients in Warri, Nigeria. It was an observational type of study, as no interventions or experiments was conducted for data collection (Wang & Cheng, 2020). Rather, I collected the self-reported health literacy levels, levels of superstitious or cultural beliefs, and levels of self-care behaviors among these patients. I chose a cross-sectional survey because structured questionnaires with closed-ended questions are used to collect data from participants at a specific point in time (Tabachnick & Fidell, 2013).

The participants were asked to complete a questionnaire I designed. The first section contained questions on demographic characteristics of the participants such as sex, age, education, marital status, employment status, and income. The second section contained questions based on the Brief Health Literacy Screening Tool (Chew et al., 2004). In the third section were questions on diabetes self-care based on the Diabetes Self-Management Questionnaire (DSMQ; Schmitt et al., 2009). The fourth section contained questions on superstitious and religious beliefs using the Revised Paranormal Beliefs Scale (Drinkwater et al., 2017). Answers to these questions allowed for the determination of the relationship between health literacy (the independent variable) and self-care (the dependent variable; Creswell, 2014). They also allowed for the determination of the moderating effects of superstitious and religious beliefs on the relationship between health literacy and self-care among the diabetic patients in Warri, Nigeria (Creswell, 2014).

Research Questions and Hypotheses

RQ 1: Is there statistically significant relationship between superstitious beliefs and the adoption of self-care behaviors among diabetic patients in Warri?

$H_0$1: There is no statistically significant relationship between superstitious beliefs of diabetic patients in Warri and their adoption of self-care behaviors.

H_A1: There is statistically significant relationship between superstitious and religious beliefs of diabetic patients in Warri and their adoption of self-care behaviors.

RQ 2: Is there statistically significant association between superstitious beliefs and health literacy among diabetic patients in Warri?

$H_0$2: There is no statistically significant correlation between superstitious beliefs and health literacy among diabetic patients in Warri

H_A2: There is statistically significant correlation between superstitious beliefs and health literacy among diabetic patients in Warri.

RQ 3: Is there statistically significant correlation between level of health literacy and the adoption of self-care behaviors among diabetic patients in Warri?

$H_0$3: There is no statistically significant correlation between levels of health literacy and the adoption of self-care behaviors among diabetic patients in Warri.

H_A3: There is statistically significant correlation between levels of health literacy and the adoption of self-care behaviors among diabetic patients in Warri.

RQ 4: Do superstitious beliefs significantly moderate the relationship between health literacy and self-care behaviors among diabetic patients in Warri?

$H_0$4: Superstitious beliefs do not significantly moderate the relationship between health literacy and self-care behaviors among diabetic patients in Warri.

H_A4: Superstitious beliefs significantly moderate the relationship between health literacy and self-care behaviors among diabetic patients in Warri.

Justification of Design and Approach

A cross sectional study was selected due to its advantages including one-time data collection and its efficacy to determine an association between health literacy, superstitious beliefs, and self-care behaviors among diabetic patients in Warri, Nigeria (Wang & Cheng, 2020). The selection of a cross sectional study increased the external validity of the study by using a probability purposive sampling of adult diabetic patients

accessing care at the endocrinology clinics in Warri, Warri Local Government Area of Delta State, South-South geopolitical region of Nigeria. In this type of research design, general inferences about the general population are not possible; however, the use of statistical analysis allowed for the assessment of the relationship between the independent, covariable, and dependent variables (Frankfort-Nachmias & Nachmias, 2008). This research design cannot be used to establish cause and effect; however, cross-tabulation and bivariate analysis were employed to reduce its methodological limitations (Frankfort-Nachmias & Nachmias, 2008). I conducted this study to determine the relationships among health literacy, superstitious beliefs, and adoption of self-care behaviors among diabetic patients in Warri, Nigeria after controlling for demographic factors such as sex, level of education, and socioeconomic status.

Methodology

Study Population

A study population refers to the entire group of pertinent units of analysis that is being investigated, while a representative subset of that group that can be used to generalize back to the entire population is referred to as a sample (Frankfort-Nachmias & Nachmias, 2008). I studied a sample of the diabetic patients in Warri, South-South Nigeria. Warri is an oil city and the commercial capital of Delta State in the Niger Delta region of Nigeria with an estimated population of 536,023 inhabitants (World Population Review, 2019). The prevalence of diabetes mellitus in the South-South Nigeria is 9.8% (Uloko et al., 2018); this implies that the estimated population of diabetic patients in Warri was 52,530. From this population, a sample representative of the population was

selected through consecutive sampling ensure that the research findings are generalizable to the whole population. Using sample size calculation formula, the right sample size representative of the population was calculated and selected using consecutive sampling technique to complete the questionnaire. This was in line with the inclusion criteria.

Sampling Procedures

To select a representative sample from a population, consecutive sampling procedures were used. There are many sampling techniques: purposive or convenience sampling, simple random sampling, systematic sampling, staged sampling, stratified sampling, and cluster sampling (Creswell, 2010). But the consecutive sampling method, which is based on knowledge of issues and willingness to participate, allows researchers to decide on who should be included in the study (Jupp, 2008). Consecutive sampling was employed to select only diabetic patients who were 18 years and above and had been diagnosed diabetic for at least 5 years with some experience in self-care behaviors and general management of the disease, and ability to read, speak, and understand English language. Data collection procedure was conducted in the endocrinology clinics of hospitals in Warri that are care centers where diabetic patients come to receive treatment after they are referred from primary care centers scattered around the city.

Sample Size Determination

The sample size is an important feature of any empirical study in which the goal is to make inferences about a population from a sample (Fugard & Potts, 2015). Sample size is determined based on the expense of data collection and the need to have sufficient statistical power (Francis et al., 2010). One of the four interrelated factors that can

influence detection of significant differences in relationships is sample size (Zamboni, 2018).

The sample size for this study focusing on the diabetic population in Warri was determined using three steps. First, alpha (the likelihood that type I error may occur) was selected. Type I errors occur when a true null hypothesis is rejected. This means admitting the existence of something that does not exist (Tomczak et al., 2014). The value of alpha is by convention usually set at 0.05 in social and behavioral sciences. Thus, 0.05 was selected as the alpha for this study. Effect size, which is a way of quantifying the size of the difference between two groups, was determined next. The value of the effect size for this study was selected as 0.02 (Cohen's small effect size) which is often the value set for social and behavioral sciences (Baugh, 2000). Lastly, the commonly recommended power value of 0.80 was also adopted.

After determining the values of alpha, effect size, and power, the sample size could be calculated either manually or with computer software such as G * Power. Considering the purpose of the study, the RQs and hypotheses to be tested, the sample size was calculated using the G*Power calculator v. 3.1.9.4. By selecting linear multiple regression as the statistical test and using t test as the family of tests, point biserial model and the power analysis a priori when type of tail(s) is two tails. Thus, setting alpha at 0.05, effect size at 0.02, and power at 0.80 (Frits, et al., 2011), and using G*Power calculator, the estimated sample size was calculated as 395. This sample size was selected using consecutive sampling from at least 1,000 patients willing to participate.

Recruitment Procedure

For data collection, it is imperative to recruit eligible participants to make up the sample size from the study population. For this study, participants recruited were diabetic patients attending the diabetes clinics in three major hospitals in Warri. They were 18 years of age and above and had been diagnosed diabetic not less than 5 years prior to this study. It was also important that they speak, read, and understand English language. The ability to read and understand English was necessary because the data collection tool (the questionnaire) was written in English. Being 18 years and above was to prevent minors from participating which would have required parents of such non-adults to also consent, thus making the process cumbersome. Participants who had been diagnosed diabetic 5 years prior would have gathered some experience in terms of diabetes and self-care education and stood better chance to volunteer more meaningful responses to the questionnaire. Finally, the participants willingly volunteered and gave informed consent before participating in the study.

Data Collection Instrument

The data collection instrument was a structured close-ended questionnaire that I constituted by combining three already existing and established research tools with some modifications. The questionnaire contained the demographic characteristics of the participants as its first part. The second part contained the BRIEF tool originally produced by Chew et al. (2004), but later modified by Haun et al. (2009). The BRIEF contained four questions for each of which the participant was expected to choose one of 5 options as answer. The third part was the modified DSMQ that contained seven

statements with the participant expected to select one of four options as the statement applied to him or her. The original DSMQ was produced by the Research Institute of the Diabetes Academy, Mergenthein and contains 16 statements (Schimtt et al., 2013). This was modified by leaving out statements that were repeated and adding a statement about foot-care. The fourth part was the modified version of the Revised Paranormal Beliefs Scale that assessed superstitious beliefs among the participants. The aspects of superstition, witchcraft, and spiritualism were extracted and some cultural beliefs about causes and treatment of diabetes were added. The 7-item Likert scale was thus reduced to 5-item Likert scale.

The Brief Health Literacy Screening Tool was chosen for the assessment of health literacy levels of diabetic patients in Warri because according to Chew et al. (2008), it is faster and easier to complete. It also has high validity and sensitivity as compared with other health literacy screening tools such as the Short Test of Functional Health Literacy in Adults and the Rapid Estimate of Adult Literacy. Schmitt et al (2013) studied the reliability and validity of the DSMQ and concluded that it is a reliable and valid instrument that enables an efficient assessment of self-care behaviors associated with glycemic control. They thus recommended the questionnaire as a valuable tool for scientific analyses as well as for clinical use in both type 1 and type 2 diabetes patients. Results of a study that examined the factorial structure and psychometric integrity of the Revised Paranormal Beliefs Scale using an aggregated heterogeneous sample ($N = 3,764$) showed that it possessed superior data-model fit as compared with other models. Thus, it was concluded that belief in the paranormal, as measured by the scale, is best

characterized as a single overarching construct, comprising several related, but conceptually independent sub-factors (Drinkwater et al., 2017).

To collect the data, in each of the three clinics, patients were approached individually for a brief explanation about the study and to let them know that participation was voluntary with the option of opting out at any point in time. The data collection instrument with the consent forms were then dropped in a secured box for participants to pick and take home for completion and to sign the consent form. The completed questionnaires and the signed consent forms were returned to the clinics from where they were picked within one week. This method of data collected was adopted to maintain complete anonymity and to avoid any form of coercion as no information that may reveal participants' identity was required to be entered into the data collection tool. The time frame of one week was agreed with prospective participants due to time constraint. The sum of 200 naira (equivalent to half a US dollar) was enclosed with each copy of the questionnaire to defray the cost of transport to return the completed copy of the questionnaire with the signed consent form. The disadvantage of this method as against face-to-face data collection method was that it did not afford the researcher the opportunity to explain any aspect of the questionnaire that participants might have found difficult to understand and it increased the rate of unreturned questionnaire. The questionnaire was a mix of indexes and scales and it was weighted. The completed copies of the questionnaire were picked up from each clinic by my next visit. I visited each of the three clinics twice in a week for 6 weeks spanning from 22 February 2021 to 2 April 2021 when the calculated sample size was collected.

A pilot study was conducted prior to actual data collection from 10 to 12 February 2021 using 20 patients to test acceptability, the language and ease of completing the questionnaire. Based on the outcome of the pilot study, the questionnaire was revised by reducing the level of English language in some areas and substituting the word superstition to traditional beliefs so as not offend the respondents.

Data Analyses Technique

The data analysis plan included collating the collected data and screening the data for errors. It also involved carrying out regression diagnostic and testing the data for parametric test assumptions. The data collected was converted into numerals and coded for input into the computer software Statistical Packages for Social Sciences (SPSS). For this study, SPSS version 27 was employed to analyze the data. Descriptive statistics was used to analyze the demographic characteristics while inferential statistics was used to determine the correlations between the variables while controlling for age, sex, level of education, and social status or income bracket. These were categorical variables and were turned into dummy variables. Linear Bivariate regression statistical analyses was employed in determining relationship between two variables (one independent and one dependent variables) such as the relationship between health literacy and self-care (RQ3), association between superstitious beliefs and self-care (RQ1) (Warner, 2013). In determining the relationships between more than two variables, linear multivariate regression statistical analysis was employed, for example, in determining the moderating effects of superstitious beliefs on the relationship between health literacy, and self-care

(RQ4) in which there were two independent variables and one dependent variable (Warner, 2013).

Threat to Validity

The validity and reliability of any research study can be threatened by certain factors. For internal validity, such factors include history, selection, testing, and regression, among others (Creswell, 2010). For instance, history plays a role when some unanticipated events that affect the outcome of the research occur (Creswell, 2010) and so also would selection when participants with certain characteristics that will affect the research outcome are chosen (Creswell, 2010). For this study, threats to validity envisaged included response bias, measurement bias, and inaccurate recollection of past events. To guide against response bias, simple and short questions were framed in clear language easily understandable to the participants. The participants were also made to understand that answering the questions honestly was important as the findings of the study could be used to formulate policies that could make the management of diabetes easier and better.

To minimize measurement bias, data collection tool was one with tested and approved validity and reliability and to reduce the incidence of inaccurate recollection, only patients 18 years and above who had been diagnosed diabetic for at least five years and could speak and understand English were recruited from clinics in Warri. Since the study was specifically aimed at diabetic patients in Warri, the study's findings may not be generalizable to other parts of Nigeria due to selection bias (Pannucci & Wilkins, 2010). Selection bias is the bias introduced by the selection of individuals, groups or data for

analysis in such a way that proper randomization is not achieved, thereby ensuring that the sample obtained is not representative of the population intended to be analyzed (Pannucci & Wilkins, 2010). Data could be compared to look for similarities and areas of differences with studies done in other parts of the country.

Ethical Procedures

I sought for approval to conduct this study from the Institutional Review Board of Walden University in order to ensure that the ethical guidelines of the institution were complied with. Participation in this study was voluntary and participants were free to opt out of the study at any time they felt like doing so without any retributions (Crosby, DiClemente, & Salazar, 2006). Individuals within the protected group (those below 18 years) were excluded from this study while instructions both written and oral were simplified so that participants could easily complete the questionnaire appropriately (Crosby, DiClemente, & Salazar, 2006). A written informed consent was obtained from and a token sum of 200 naira (about half of one USD) given to each participant to defray transport fare.

No participant was made to disclose his or her identity and information obtained from patients was handled in the most confidential manner. I did not share with anyone or any organization data solely collected for this study and to ensure this, I stored all information relating to this study in a computer with password protection. The completed questionnaire has been stored in a safe with security lock and would be shredded five years after the completion of this dissertation. Data analyses were conducted by me alone so as not to allow someone else access to the confidential materials. I pledge that there is

no conflict of interest to declare as the participants were not my patients and the study is purely for academic purposes. Data was collected from three healthcare facilities in Warri and I work as a surgeon in one of them. Consequently, I had to write to the Heads of the healthcare facilities, including mine, for permission to collect data from their patients. I funded this project solely and provided all the resources needed for its successful completion in order to fulfill the degree requirements.

Summary

I have studied the relationships between health literacy, superstitious or cultural beliefs, and self-care behaviors among diabetic patients in Warri, Nigeria. Existing instruments that were slightly modified were used for data collection and approval was received from the institution review board to conduct the study. The survey participants were selected by consecutive sampling technique. Selection criteria included being 18 years of age and above, being diabetic for at least five years, and having the ability to speak and understand English Language. Patients that did not meet these criteria were excluded from the study. The drop-box method with participants' self-administered questionnaire was the method of data collection employed in this study.

The research design based on the RQs, the research purpose, and the methods that guided the study were also described in Chapter 3. Quantitative research design was chosen because it helped to answer questions on relationships between two or more variables. It also allowed for limited generalization of research findings on the population studied. Information was also provided in Chapter 3 on how the questionnaire was administered and on how data collected was analyzed.

Chapter 4: Results

The purpose of this quantitative, observational, cross-sectional research study was to determine whether there are moderating effects of superstitious beliefs on the relationship between health literacy status and self-care adoption among diabetic patients in Warri, Nigeria. In determining the association between the three variables, health literacy was considered the independent variable, superstitious or cultural beliefs the covariate, and the adoption of self-care behaviors was considered the dependent variable. A structured and culturally adapted questionnaire was used by incorporating the health literacy tool (Brief Health Literacy Screening Tool), the superstitious beliefs tool (Modified Revised Paranormal Beliefs Scale), and the self-care instrument (DSMQ) to assess health literacy levels, superstitious beliefs levels, and the degree of self-care adoption among the participants. A review of the literature did not reveal any previous research study that had examined the association between superstitious beliefs, health literacy, and self-care adoption among diabetes patients in Warri, Nigeria. Consequently, the results of this study could be used to fill this identified research gap.

In this chapter, the data collection method will be reviewed, and the descriptive statistics of the dependent and independent variables as well as the study covariates will be presented. I will also discuss the issues I identified, the inferential statistics analysis and hypothesis testing for the RQ, and the results of the statistical analyses. Further, I will provide a summary of the answers to the RQs.

Data Collection

Upon approval by the Institutional Review Board of Walden University (approval number 06-25-20-0368580), I commenced the data collection process on 26 February 2021, which entailed dropping off the questionnaire in endocrinology clinics. Before the questionnaires were dropped off, I had individualized discussions with all prospective participants, which were aimed at explaining to the prospective participants what the study was about and how it could help to ensure better management outcomes of diabetic patients generally. I also explained that participation was voluntary and that those who volunteered could pull out anytime they want to do so without any consequences. They were also instructed not to put down their names or any other thing that could give away their identities, assuring their confidentiality and anonymity of the study. The final instruction was for volunteers to take both the questionnaire and the consent form to complete at home, then return them into a well secured drop box in the clinic where they would collect 100 naira to help cover the cost of their transportation. This was the drop-off and pick-up method of questionnaire administration. The target participants were diabetic patients of more than 5 years since diagnosis, 18 years of age and above, and can read and understand English Language.

Using G*Power, the estimated sample size was 395. To achieve the estimated sample size of 395, a total of 500 questionnaires were sent out. A total of 422 of the survey questionnaires were returned out of 500 distributed, which gave the overall return rate of 84.5%. Out of the 422 returned overall, 38 questionnaires were disqualified because either one section was not completed, fewer than half of the items throughout the

entire survey were completed, or all items were given same answer. Thus, the total number of accepted survey questionnaire that was analyzed was 384, which gave overall response rate of 91.0% and 97.2% of the estimated sample size of 395.

<center>**Results of Descriptive Statistical Analyses of Data**</center>

Demographic Characteristics of the Participants

This study included 384 participants. I used SPSS, Version 27.0 to generate demographic percentages, frequencies, means, standard deviation, and kurtosis. As shown in Table 1, respondents were between the ages of 22 and 60 years with a mean age of 41. Most of the participants (54.7%) were single, and 11.2% were divorced. In terms of education, 43.8% of the respondents had secondary education (high school), whereas only 5.2% had university education. The household income for the participants ranged from low to high; those in the low-income range made up 60.9% of the respondents.

Table 1

Participants' Demographics

Variables	Frequency	Percentage
Age (in years)		
18–30	61	15.9%
31–40	103	26.8%
41–50	160	41.7%
51–60	60	15.6%
Gender		
Female	166	43.2%
Male	218	56.8%
Marital status		
Married	83	21.6%
Single	210	54.7%
Divorced	43	11.2%
Widow/Widower	48	12.5%
Education		
Primary	101	26.3%
Secondary	168	43.7%
Postsecondary	95	24.7%

University	20	5.2%
Income		
Low	234	60.9%
Medium	118	30.7%
High	32	8.3%

Age $p = 0.001$, education $p < 0.001$ and income $p < 0.001$ were significantly

associated with diabetes self-management (see Table 2). Additionally, 209 (54.4%) of the

respondents had inadequate health literacy level, 226 (58.9%) had poor diabetes self-

management behaviors, and 151(39.3%) had marginal superstitious beliefs. There were

154 (37.8%) respondents with strong superstitious beliefs.

Table 2

Relationship Between Social Demographic Characteristics and Self-Management

Variable	Self-management		x^2(p value)	Odds ratio (95%CI)
	Poor/Marginal	Good		
Age				
18-40	147(89.6)	17(10.4)	10.59 (0.001)	2.61(0.14, 4.72)
≥41	169(76.8)	51(23.2)		
Education				
Primary/Secondary	269(100.0)	0(0.0)	193.29 (<0.001)	2.45 (1.96, 3.05)
Postsecondary/university	47(40.9)	68(59.1)		
Marital status				
Single	168(80.0)	42(20.0)	1.67 (0.196)	0.70 (0.41,1.20)
Others	148(85.1)	26(14.9)		
Income				
Low/medium	308(87.5)	44(12.5)	78.63 (<0.001)	21.00 (8.88, 49,64)
High	8(25.0)	24(75.0)		

Table 3

Frequency Distributions for Level of Health Literacy, Diabetes Self-Management, and Superstitious Beliefs

Variable	Frequency ($N = 384$)	Percent (%)
Health literacy level		
Inadequate	209	54.4

Marginal	128	33.3
Adequate	47	12.3
Diabetes self-management		
Poor self-care adoption	226	58.9
Marginal adoption	90	23.4
Good self-care adoption	68	17.7
Superstitious belief		
Poor superstitious beliefs	88	22.9
Marginal superstitious beliefs	151	39.3
Strong superstitious beliefs	145	37.8

Results of Inferential Statistical Analyses of Data

With 95% confidence, the odds (likelihood) of diabetic patients with strong superstitious beliefs (exposure) adopting good self-care measures (outcome) is one-hundreth compared with the odds of patients with poor or marginal superstitious beliefs adopting good self-care measures ($p < 0.05$; see Table 4).

Table 4

Relationship Between Superstitious Believe and Diabetes Self-Management

Variable	Self-management		x^2(p value)	Odds ratio (95%CI)
	Good	Poor/Marginal		
Superstitious				
Strong	5(3.4)	140(96.6)	50.13(<0.001)	0.01(0.00,0.02)
Poor/Marginal	164(68.6)	75(31.4)		

Figure 1 shows statistically significant negative relationship between superstitious belief and self-management adoption This implies that as belief in superstition gets stronger, the less likely the respondents would adopt self-management measures and vice versa.

Figure 1

Relationship Between Superstitious Belief and Self-Management Adoption
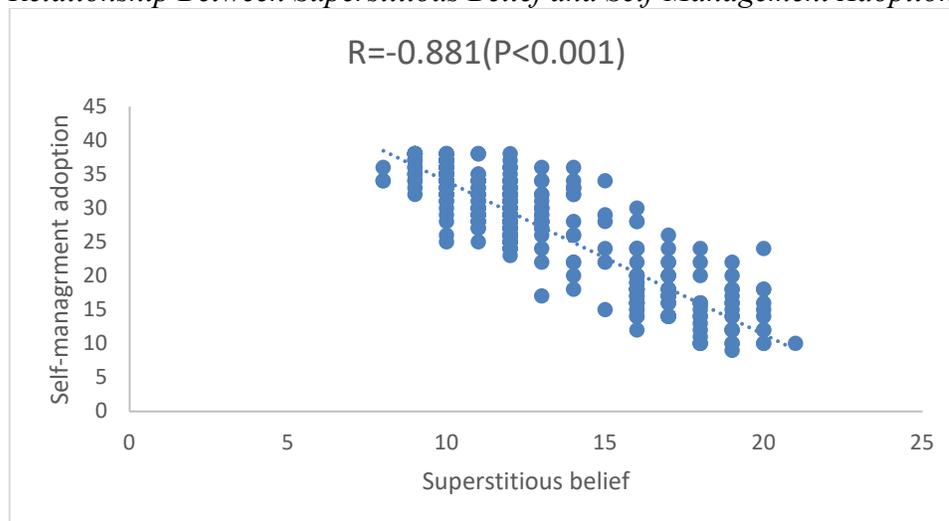
The results displayed in Table 5 show that with 95% confidence, patients with strong superstitious beliefs (exposure) were about one-twelfth time at odds (or likely) to report adequate health literacy levels (outcome) as compared with those with poor or marginal superstitious beliefs. More of the respondents who reported strong superstitious beliefs exhibited inadequate/marginal health literacy level.

Table 5

Relationship Between Superstitious Belief and Health Literacy Level

Variable	Health Literacy		x^2(p value)	Odds ratio (95% CI)
	Adequate	Low/Marginal		
Superstition				
Strong	8(5.5)	137(94.5)	32.491(<0.001)	0.04(0.00, 0.08)
Poor/Marginal	136(56.9)	103(43.1)		

The results displayed in Figure 2 showed a strong inverse correlation between superstitious beliefs and health literacy. This implied that an increase in superstitious beliefs led to a decrease in health literacy levels.

Figure 2

Relationship Between Superstitious Belief and Health Literacy
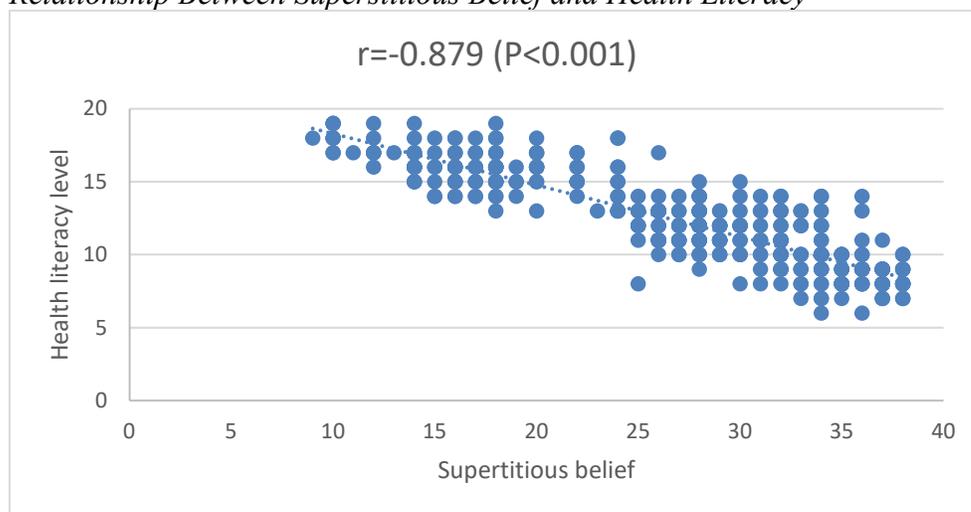
Table 6 shows that the odds (likelihood) of diabetic patients with adequate health literacy (exposure) to adopt self-care measures (outcome) is more than 100 times compared with the odds of patients with low or marginal health literacy to adopt self-care measures, $p < 0.001$. A significantly higher proportion of the respondents who had adequate health literacy level practiced a better diabetes self-management.

Table 6

Relationship Between Health Literacy and Diabetes Self-Care Adoption

Variables	Self-Care			
Health Literacy	Good	Poor/Marginal	x^2(p value)	Odds ratio (95% CI)
Adequate	42(89.4)	5(10.6)	200.058(<0.001)	104.83 (42.61, 167.05)
Low/Marginal	25(7.4)	312(92.6)		

Figure 3 showed statistically significant and direct positive relationship between health literacy level and self-management. Adequate or high literacy levels lead to good self-care practices.

Figure 3

Relationship Between Health Literacy and Diabetes Self-Management
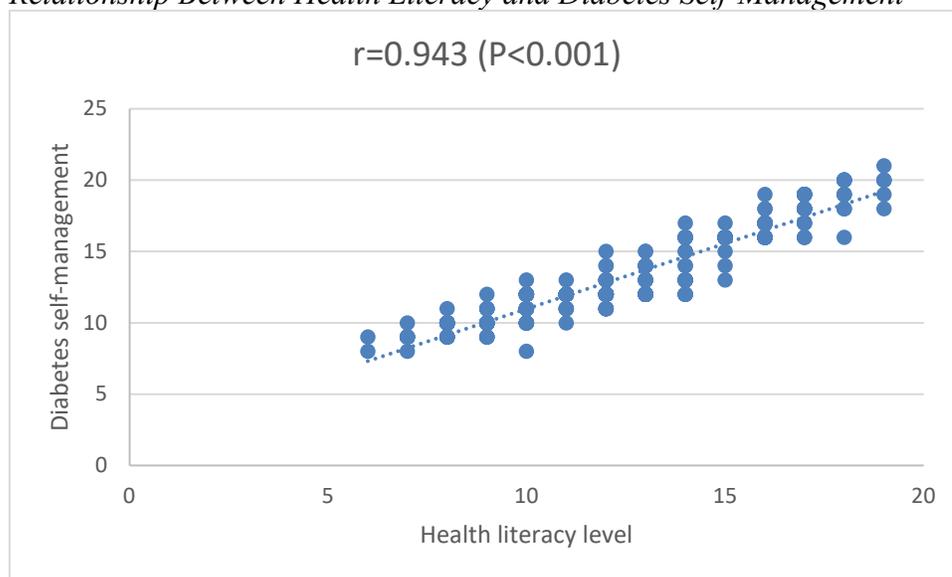
Table 7

Moderation Analysis Without Z Scores

Variable	Unstandardized coefficients		Standardized coefficients			95% CI for Beta	
	Beta	SE	Beta	t	sig	Low bound	Upper bound
HlthLiteracy	1.231	0.68	1.266	18.190	.000	1.098	1.364
Superstition	.161	.032	.412	5.009	.000	.098	.224
IntercTerm1	-.018	.002	-.333	-8.403	.000	-.022	.140
Constant	-.943	1.127	–	-.837	.403	-3.159	1.272

Note. Health literacy was the independent variable, self-care the dependent variable, and superstitious belief was the moderator or the interacting term

The moderation analysis conducted using unstandardized values of health literacy and superstitious beliefs showed that superstitious beliefs had statistically significant

moderating effect on the relationship between health literacy and self-care adoption among diabetes patients. In order to dampen the effect of the already established statistically significant negative relationships that superstitious beliefs had on both health literacy and self-care, the Z scores of the health literacy and superstitious beliefs were calculated thus standardizing the values and another interacting term was also calculated using the Z scores. The moderating effect of superstitious belief on the relationship between health literacy and self-care was then recalculated as shown in Table 8. Superstitious beliefs had a statistically significant moderating effect on the relationship between health literacy and self-care adoption among diabetic patients in Warri, Nigeria because the calculated p-value is < 0.05.

Table 8

Moderation Analysis With Z Scores

Variable	Unstandardized coefficients		Standardized coefficients			95% CI for Beta	
	Beta	SE	Beta	t	sig	Low bound	Upper bound
HlthLiteracy	2.396	.096	.782	24.938	.000	2.207	2.585
Superstition	-.439	.100	-.143	-4.396	.000	-.636	-.243
IntercTerm1	-.434	.052	-.135	-8.403	.000	-.535	-.332
Constant	12.779	.062	–	199.683	.000	12.653	12.905

Table 9

Model Summary for Variables

Model	Variables Entered	R	R^2	Adjusted R^2	Standard Error of the Estimate
1	Interact2, Z-Score (Health Literacy), Z-Score (Superstition).	0.957	0.917	0.916	0.88740

a. Dependent Variable: Self-Care

b.   Predictors: (Constant), Interact2, Z-Score(Health Literacy), Z-Score(Superstition).

Results In Relation to The Null Hypotheses

There are four null hypotheses based on the four RQs:

$H_0$1: There is no statistically significant relationship between superstitious and religious beliefs of diabetic patients in Warri and their adoption of self-care behaviors.

$H_0$2: There is no statistically significant correlation between superstitious and religious beliefs and health literacy among diabetic patients in Warri.

$H_0$3: There is no statistically significant correlation between levels of health literacy and the adoption of self-care behaviors among diabetic patients in Warri.

$H_0$4: There no statistically significant moderating effect of superstitious and religious beliefs on the relationship between health literacy and self-care behaviors among diabetic patients in Warri.

Based on all the results obtained from data analyses, a statistically significant negative relationship existed between superstitious beliefs and self-care adoption among diabetic patients in Warri; thus, the null hypothesis was rejected. There also existed a statistically significant negative correlation between superstitious beliefs and health literacy and a statistically significant positive correlation between health literacy and self-care adoption among diabetic patients in Warri. Thus, the null hypotheses 2 and 3 were also rejected. Same is the case with null hypothesis 4, which was also rejected because I found that superstitious beliefs had a statistically significant moderating effect on the relationship between health literacy and self-care adoption among diabetic patients in Warri, Nigeria.

Measurement of Effect Sizes

Effect size describes how large or how small the effect of one variable is or needs to be on another variable. It is the degree to which null hypothesis (H_0) if false and rejected. Effect size has been represented with such terms as Cohen d, Cohen Eta, and Cohen f^2 depending on whether the statistic is for correlation, t-Test, or multiple regression analysis (Cumming, 2013).

For the bivariate correlational analyses to determine if statistically significant relationships exist between two variables – health literacy and self-care, superstition and health literacy, and superstition and self-care, Cohen d was employed which says that effect size equals mean difference divided by average of their standard deviations (Cohen d = M1-M2/SD_{pooled}).

Based on Cohen d formula, calculated effect size of 0.02 is considered small, 0.05 is medium, while 0.08 is considered large. For the statistically significant positive relationship between health literacy and self-care, the calculated effect size was 0.25 which makes it very large effect size. This implied that the effect health literacy has on self-care adoption is big and could be interpreted to mean that as health literacy changes by an increment of 25%, self-care increases by only 100%, that is by four times. That the association between health literacy and self-care is statistically significant means that I can confidently say that it did not happen by chance at 95% confidence level.

For the association between superstition and health literacy, the calculated effect size was 2.49 which makes it a very large effect size. This means that one unit increment in superstition could lead to 25-fold reduction in health literacy level as the association is

a negative one and that the association is statistically significant means that it did not happen by chance at 95% confidence level.

The calculated effect size for the negatively statistically significant relationship between superstition and self-care was 2.29 which is also a very large effect size. This implies that one unit increment in superstition could lead to approximately 23-fold reduction in self-care adoption among the diabetic patients in Warri.

For the moderating effect of superstition on the relationship between health literacy and self-care, I used Cohen f^2 formula: $f^2 = R^2 / 1\text{-}R^2$, which gives standardized measure of effect size in a multivariate regression analysis with R being the multivariate regression factor. To calculate R, the standardized mean and standard deviation of each variable must be computed as shown in Table 10 below.

Table 10

Means and Standard Deviations for Health Literacy, Self-Care, and Superstition

Variable	Mean	SD	N
Health Literacy	12.3698	3.15049	384
Self-Care	13.1589	3.06301	384
Superstition	26.8021	7.84660	384

Based on the table above, the calculate effect size was 11.05. What this means is that one unit increment in level of superstition could produce 100-fold negative effect on the relationship between health literacy and self-care adoption among diabetic patients in Warri.

Results of the Operationalized HBM

The theoretical framework for this study which was the HBM was operationalized to determine how the respondents perceived their susceptibility and severity to the

complications of diabetes and such perceptions could lead to self-care adoption. The table

below shows the results of how the participants answered the questions. Perceptions of

susceptibility and severity were low while beliefs in traditional practices were high

among the respondents.

Table 11

Results of Operationalized Health Belief Model

Question	Number of Yes (%)	Number of Nos (%)
Do you believe that you are susceptible to diabetes complications?	115 (29.95%)	269 (70.05%)
Do you believe that complications of diabetes could be severe?	154 (40.10%)	230 (59.90%)
Do you believe that self-care behaviors could prevent complications?	138 (35.94%)	246 (64.06%)
Do you believe that there are barriers that could hinder you from adopting self-care?	196 (51.04%)	188 (48.96%)
Would you still go to traditional healers for charms and amulets to cure diabetes?	261 (67.97%)	123 (32.03%)

Summary

The purpose of this study was to examine the relationship between health literacy,

superstitious beliefs and self-care adoption among diabetic patients in Warri, Nigeria.

The population studied was diabetic patients in Warri aged 18 years and above, who had

been diabetic for at least 5 years, and that could speak, read and understand the English

Language. In this study, I set out to determine if there was a statistically significant

relationship between the dependent and the independent variables and to what extent the

moderating variable (superstitious beliefs) affected the relationship between the

independent variable (health literacy) and the dependent variable (self-care adoption)

among diabetic patients in Warri, Nigeria based on the health belief model. In chapter 4, I

reported the data collection procedure, return rate, data screening and treatment, and data

analysis methods. Findings from the study showed that there were statistically significant relationships between superstitious beliefs and self-care; between superstitious beliefs and health literacy; and between health literacy and self-care adoption among diabetic patients in Warri, Nigeria.

Findings from further analysis that included regression for moderation analyses of the moderator variable (superstitious beliefs) upon the independent variable (health literacy) showed that there was a statistically significant moderating effect of superstitious beliefs on the relationship between the independent and the dependent variables. These findings should however be interpreted with caution because the study participants might have responded in a manner beyond my control. The sample size did not meet the parametric tests which limits the extent to which it can be generalized to the larger population but the findings from the study can be used to develop intervention programs and services and enlightenment materials that could better improve self-care adoption behaviors of diabetic patients. In chapter 5, I shall be discussing the research findings, limitations of the study, recommendations, implications, and conclusion.

Chapter 5: Discussion, Conclusions, and Recommendations

The aim of this cross-sectional quantitative study was to determine whether superstitious beliefs moderated the relationship between health literacy and self-care adoption behaviors of diabetic patients in Warri, Nigeria. I also assessed the relationships among the variables—health literacy (independent variable), superstitious beliefs (moderator variable), and self-care (dependent variable). To achieve this aim, primary data were obtained from diabetic patients in three hospitals in Warri using a structured self-administered questionnaire. Key findings include a high rate of low health literacy, a low rate of self-care adoption, and high rate of superstitious beliefs in the study population. I also found a positive statistically significant relationship between health literacy and self-care adoption, a negative statistically significant relationship between superstitious beliefs and health literacy, and a negative statistically significant relationship between superstitious beliefs and self-care adoption. Superstitious belief was found to have large negative moderating effect on the relationship between health literacy and self-care adoption.

Interpretation of Findings

The descriptive analyses results support global trends in diabetes epidemiology. The results showed that more men (56.8%), mostly middle-age (68.5% aged 31-50 years), and mostly those low socioeconomic status in the urban area such as Warri were in majority of the respondents (60.9%; IDF, 2019; Kautzky-Willer et al., 2016). The results also showed a low rate of adequate health literacy levels at 12.3% and a low rate of self-care practices (17.7%), but very high rate of beliefs in superstition (77.1%) among

diabetic patients in Warri. These findings were similar to results of studies conducted in different regions of Nigeria. Prior authors attributed low health literacy to low level of education and low socioeconomic status of the majority of Nigerians (Adedimeji et al., 2017; Adekoya-Cole et al., 2015; Aluu et al., 2019; Kuyinu et al., 2020). Results were also similar to those found in the United States indicating that the rate of adequate health literacy in the United States is 12% (Newkirk, 2016).

In terms of relationships between the variables, analysis showed that health literacy has positive statistically significant relationship with self-care. This means that patients with high health literacy levels are more likely to adopt diabetic self-care behaviors such as dietary measures, physical exercises, self-blood sugar checks and proper foot care measures. The reverse is also true, meaning that patients with low health literacy are more unlikely to adopt diabetic self-care behaviors. This result was in accord with the previous studies conducted in Iran (Zeidi et al., 2021) and the United States (Platter et al., 2019). Only 12.2% of the participants in the current study had high health literacy levels, which may explain the high numbers of diabetic patients with diabetic complications in Nigeria such as diabetic foot ulcer that in most cases leads to lower limb amputation at a rate of 52% (Enweluzo et al., 2016; Ugwu et al., 2019).

Findings from this study also showed that there is statistically significant negative relationship between superstitious beliefs and self-care adoption among diabetic patients in Warri ($p < 0.001$). This means that the stronger the patients believe in superstition, the less likely they are to adopt self-care behaviors and the weaker their beliefs, the more likely they are to adopt self-care behaviors. This result supports the findings of studies

conducted in Kenya (Abdurehman et al., 2016), Lagos, Nigeria (Ogundele et al., 2016), and in United States (Cha et al., 2013). Some religious beliefs prevent diabetic patients from accepting insulin, and cultural/traditional beliefs in witchcraft or evil spirits as causes of diabetes or that amulets, charms, and exorcism are cures are have prevented patients from adopting self-care (Flanagan, 2013; Vyse, 2018). This contributes to high rates of diabetic complications and mortalities in this part of the world (Aguocha et al., 2013). In the current study, the majority (77.1%) of the respondents were patients with moderate to high levels of superstitious beliefs.

On the relationship between health literacy and superstitious beliefs, I found an inverse statistically significant relationship between the two ($p < 0.001$). This means that strong superstitious beliefs are associated with poor levels of health literacy. Health literacy is not just about sourcing, reading, and understanding health-related information but also acting on the information in order to remain healthy (Nutbeam, 2013; Porter, 2017). Highly educated patients may source for health-related information, read, and understand the information but may not be able to act on it because of the environment in which they live where religious, traditional, and cultural beliefs dominate. Past researchers have identified relationships where strong superstitious beliefs are associated with low health literacy levels (Emma-Echiegbu et al., 2014; Gearhart & Abdulrehman, 2014; van Esch et al., 2014).

On the question of whether superstitious beliefs have a moderating effect on the relationship between health literacy and self-care adoption among diabetic patients in Warri, the moderation analyses produced negative statistically significant moderating

effect of superstitious beliefs on the relationship existing between health literacy and self-care adoption among the studied diabetic patients. This implies that the stronger their beliefs in superstition, the fewer the patients with adequate health literacy and the less likely they were to adopt self-care behaviors and vice versa. This moderation result did not come as a surprise as I had earlier seen that superstitious beliefs have negative correlations with both health literacy and self-care adoption. However, in order to control for the correlational relationships between superstitious beliefs and the independent and dependent variables, the values of the variables were standardized by calculating their Z-scores. The Z-scores values were then used for the moderation analysis.

Some authors in past studies have reported similar findings in terms of the moderating effects of superstitious beliefs on the relationship between health literacy and self-care adoption. These past researchers include Tseng, Halperin, Ritholz, and Hsu (2013), Wang, Song, Ba, Zhu, & Wen (2014), and Wang et al. (2014) who studied Chinese-Americans. Superstition in most cases comes from traditional, cultural, and religious beliefs practiced in certain communities, societies, and regions. In Lemu region of Kenya, Abdurehman, Woith, Jenkins, Kossman, & Hunter (2016) found that people of the region had strong attachment to their traditional therapy of herbs and roots which stem from the belief that western medicine has many side effects. They also found that the Muslims among them including those with very high health literacy levels refused insulin outright because it is derived from pork which is inconsistent with their religious beliefs. The environments where superstitious beliefs are rife influence the people no matter their literacy levels not to act on whatever knowledge about diseases that they may

have acquired just to conform with tradition, culture, or religion (Flanagan, 2016).

Therefore, there may be a need to look at other socio-cultural factors which may act as

barriers to adoption of self-care behaviors among diabetic patients which ultimately lead

to poor glycemic control and subsequently to complications.

Findings in the Context of the Theoretical Framework

The theoretical framework for this study was the HBM which postulates that

perception of susceptibility and severity of a disease condition could push individuals to

begin to adopt health behaviors that would make them not to get the disease especially if

the benefits of adopting the health behaviors are obvious to them and there are cues that

could spur them into action (Shojaei, Farhadloo, Aein, & Vahedian, 2016). Conversely, if

individuals do not perceive susceptibility and severity of a disease condition due to

certain factors such as poor health literacy and traditional and religious beliefs, such

individuals would not be able take necessary preventive measures against such a disease

condition.

The results obtained from the questions that operationalize HBM showed that the

majority (70%) of the diabetic patients in Warri did not perceive their susceptibility to the

complications of diabetes and 60% did not perceive how severe such complications such

as stroke and lower limb amputation could be. These findings could be attributed to their

strong belief in superstition and low health literacy levels (Peeters, et al., 2015; Gyasi,

Asante, Abass, Yeboah, et al., 2016). Thus, the results from this study showed agreement

with the HBM. The correlation in education, income, health literacy level, superstitious

beliefs, and self-care adoption are all products of the environment. Socio-cultural factors

that are associated with low self-care adoption could also be viewed as modifying factors

and perceived barriers to health seeking behavior for the diabetic patients that

participated in this study. Furthermore, results from this study indicated the need for

prevention-focused programs that specifically target and encourage diabetic patients to

seek proper medical care as soon as they discover that they are diabetic. This may help to

promote self-care behaviors adoption and other healthy practices in these patients. Self-

efficacy can be used to assist these patients to begin to adopt self-care behaviors.

Limitations of the Study

The results of this study must be interpreted with caution as there exist some

limitations. The first of such limitations was the use of self-reported data in generating

the discussed results. Self-reported data has the potential to introduce response or recall

bias into the study (Aguinis, & Jeffrey, 2014). The second limitation was that the

questionnaire was participant-administered without the researcher which was employed

to avoid interference and coercing respondents to participate in this study. Participant-

administered questionnaire has the potential of having some questions that participants

may not fully understand or which participants may misunderstand leading to information

bias or wrong responses as well which may adversely affect the results of the study. Face-

to-face self-administered questionnaire takes care of this problem as the researcher would

be handy to explain the meaning of those kind of questions so that participants could give

appropriate responses (Brutus, et al., 2013).

The third limitation was the sampling technique that I used to conduct this study. I

use consecutive sampling technique which is a non-probability sampling method similar

to convenience sampling which has the ability to introduce sampling bias. Thus, the sample may not actually be representative of the population being studied and as such the results may not be generalizable (ter Riet, et al., 2013). The fourth limitation was that data collection, and the analyses were cross-sectional in nature. This limited my ability to draw conclusions about the causality of the associations in the regression models. The fifth limitation was non-inclusion of younger diabetic patients aged 14-17 years with better cognitive ability in this study. The study rather included patients aged 45 years and above that constituted about 53% of the respondents who could be having cognitive dysfunction which could have been caused by aging, type 2 diabetes, and depression associated with diabetes (Munshi, 2017). With cognitive dysfunction, the power of recall is much reduced, and this could affect the results obtained from the data.

Time constraint was considered as the sixth limitation as the rush to complete data collection before the expiry date of the approval granted could introduce errors which could affect the overall results. However, despite these limitations, the study would add to the body of knowledge on how traditional and religious beliefs in the midst of poor health literacy levels hinder diabetic patients in adopting self-care or management behaviors that could help improve their quality of life.

Recommendations

This study provided the opportunity to determine the associations between health literacy and self-care adoption, superstitious beliefs, and health literacy, and between superstitious beliefs and self-care adoption among diabetic patients. It also provided the forum to determine the moderating effect of superstitious beliefs on the relationship

between health literacy and self-care adoption among diabetic patients in Warri. The limitations of the study have been highlighted which opens the way for future research studies on this subject matter. A large-scale prospective study could be conducted to determine the mechanism behind the impact of health literacy on self-care, superstitious beliefs on Health literacy and self-care thereby establishing causality. Further studies could also be undertaken to find out the impact of health literacy on health promoting behaviors of patients suffering from other chronic diseases.

Another study could be conducted using a more recent and advanced health literacy scale known as All Aspects of Health Literacy Scale to measure functional, communicative, and critical aspects of health literacy (Chinn & McCarthey, 2013). Further research could be carried out to determine other potential moderating factors in the association between health literacy and health promoting behaviors especially with regard to chronic diseases. Furthermore, conducting research studies on the types of interventions that could be beneficial to diabetic patients with low health literacy and strong superstitious beliefs is also recommended.

Implications

Reducing to the barest minimum the complications of diabetes is an important goal for public health professionals globally. The results from this study showed an interplay of different variables and underscore the challenges health professionals face in a developing country, like Nigeria, in ensuring that diabetic patients stay free of debilitating complications such as stroke, renal failure, and lower limb amputation. Data from the study showed a high rate of low health literacy and a high rate of strong cultural,

traditional, and religious beliefs among Nigerians. Thus, culturally adapted community health promotion intervention programs should be designed to address these issues. The intervention programs should focus on improving general health literacy levels of these patients, reducing the rate of traditional, and religious beliefs that prevent the adoption of health promoting behaviors, and promoting the benefits of engaging in self-care or self-management practices.

Culturally adapted program would take into consideration people's ways of life including language, dialect, the occupation, what they worship, norms, and values. Based on these, enlightenment materials could be produced that the people would probably accept, digest, and act upon for the intended outcome. The intended outcome would contribute to improve the quality of lives of these patients who would now live longer and be available to contribute to the economy. The people could begin to see diabetes as a disease and not as a curse or punishment from gods. Thus, care would hopefully be sought early in healthcare facilities and not from spiritual or traditional healers. Public health policies could also be promulgated making the teaching of culture-sensitive diabetes knowledge and self-care compulsory for diabetic patients.

Conclusions

In this study, I found a positive correlation between health literacy and self-care practices that prevent complications among diabetic patients. However, cultural, traditional, and some religious beliefs correlate negatively with both health literacy and self-care practices singly with large effect sizes. These superstitious beliefs negatively moderate the positive relationship between health literacy and self-care practices. Thus,

one can conclude that high literacy level and low beliefs in cultural, traditional, and religious myths are very necessary for patients to practice self-care activities such as regular exercises, foot care, medication adherence, self-blood glucose checks, and compliance with clinic appointments. The development or adaptation of culturally sensitive interventions to address this public health problem is needed to improve the quality of life and health outcomes for these diabetic patients in Nigeria. The positive social change that might result of the intervention programs could be a reduction in unnecessary hospitalizations and emergency room visits, higher use of preventive screening services, and improving diabetes medication adherence. The long term positive social change implication of this study is that educational efforts and healthcare outreach programs could be focused on those diabetic patients that normally would not adopt self-care practices.

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Appendix 1: Data Collection Instrument

Dissertation Topic: Health Literacy, Superstitious Beliefs, and Self-Care Behaviors Among Diabetic Patients in Warri, Nigeria.

Hello. Please I am a PhD student of Walden University, Baltimore, Maryland, USA and I wish to collect data with this questionnaire to enable me to complete my dissertation and graduate. You are kindly requested to answer the questions honestly and to the best of your ability. The findings of this dissertation will help us healthcare practitioners to institute more appropriate measures to manage our diabetic patients for better outcomes and quality of life. By accepting to complete this questionnaire, it means you have given an informal consent to participate in the study. All the information supplied in this questionnaire will be treated with utmost confidentiality as you are not expected to write your name on the questionnaire. Participation is totally voluntary and can pull out anytime you feel like doing so. Thank you for participating.

Demographics

Age – 18-30, 31-40, 41-50, 51-60, above 60 (Interval)

Sex: M – F.   (Nominal)

Education Level: Primary, Secondary, Post-Secondary, University. (Ordinal)

Marital Status: Married, Single, Divorced, Widow, Widower (Nominal)

Income: Low, Medium, High. (Ordinal)

Brief Health Literacy Tool

Please circle the answer that best represents your response.

1. How often do you have someone help you read hospital materials? (Ordinal)

1. Always

2. Often

3. Sometimes

4. Occasionally

5. Never

2. How often do you have problems learning about your medical condition because of difficulty understanding written information? (Ordinal)

    1. Always

    2. Often

    3. Sometimes

    4. Occasionally

    5. Never

3. How often do you have a problem understanding what is told to you about your medical condition? (Ordinal)

    1. Always

    2. Often

    3. Sometimes

    4. Occasionally

    5. Never

4. How confident are you filling out medical forms by yourself? (Ordinal)

    1. Not at all

    2. A little bit

    3. Somewhat

    4. Quite a bit

    5. Extremely

Modified Diabetes Self-Management Questionnaire
Select how the following statements apply to you. Select 3 if the statement applies to you very much, select 2 if it applies to a considerable degree, 1 if it applies to some degree, and 0 if it does not apply to you. (Ordinal)
1. I check my blood sugar regularly with care and attention
2. I strictly follow the dietary recommendations given by my doctor or by the nutririonist

3. I take my diabetes medications (insulin, tablets) as prescribed.
4. I keep all doctor's appointments recommended for my diabetes treatment.
5. I take good care of my feet by washing and drying them regularly, not wearing tight shoes, and avoiding trimming my toe nails with razor blade.
6. My diabetes self-care is poor.

Modified Superstitious Beliefs Scale

Please put a number next to each item to indicate how much you agree or disagree with that item. Use the numbers as indicated below. There are no right or wrong answers. This is a sample of your own beliefs and attitudes. Thank you.

1=Strongly Disagree, 2=Slightly Disagree, 3=Uncertain 4=Slightly Agree, 5=Strongly Agree (Ordinal)

1. Black magic really exists.
2. Witches do exist.
3. Through the use of formulas and incantations, it is possible to cast spells on persons.
4. There are actual cases of witchcraft.
5. Evil spirit can cause disease including diabetes
6. "Evil eye" can cause disease including diabetes
7. Native doctors can cure diabetes with charms and amulets
8. Diabetes is 'sweet sickness' therefore bitter drugs and foods can cure it.

Operationalization of the HBM

Please answer Yes or No to the following questions: (Nominal)

1. Do you believe that you can suffer from the complications of diabetes such as stroke and non-healing leg ulcers if you do you not adopt self-care behaviors?

2. Do you believe that the complications of diabetes can be severe such as leg amputation, paralysis of one side of the body, or even death?

3. Do you believe that adopting self-care can help you to stay strong without complications?

Do you believe that there are barriers that make you not to adopt self-care behaviors?

4. If you answered yes in Q1 and Q2, would you still go to traditional/spiritual healers for charms and amulets for cure?

Appendix 2: Consent Form

You are invited to take part in a research study on how the level at which you can read and understand medical instructions and the way our people believe and see diabetes can affect you take care of yourself including taking your drugs, eating only recommended foods, caring for your feet, checking your sugar level regularly, and exercising yourself. The title of the study is "Health Literacy Superstitious Beliefs and Self-Care Adoption Among Diabetic Patients in Warri, Nigeria". The researcher is inviting only people who are 18 years and above who have been diabetic for more than 5 years and can read and understand simple English Language to take part in the study. This means that patients less than 18 years of age, been diabetic for 5 years and less, and cannot read and understand simple English Language should not take part. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part or not.

The person conducting this study is Nkemakolam Ukpabi, a student of Walden University.

Background Information:

The purpose of this study is to find out if the level at which you can read and understand medical instructions and how our traditional people view diabetes affect the way you look after yourself in terms of taking your drugs, eating only the recommended foods,

caring for your feet, conducting regular blood sugar checks, and exercising the body all of which help to keep blood sugar within normal level.

Procedures:

If you agree to be in this study, you will be asked to answer 22 simple questions that may take about 15 minutes to complete.

Here are some sample questions:

- Please draw a circle around the answer that you think is the correct one.

How often do you have someone help you read hospital materials?

    1. Always

    2. Often

    3. Sometimes

    4. Occasionally

  5. Never

- Select how the following statements apply to you. Select 3 if the statement applies to you very much, select 2 if it applies to a considerable degree, 1 if it applies to some degree, and 0 if it does not apply to you.

3	2	1	0

1. I check my blood sugar regularly with care and attention

2. I strictly follow the dietary recommendations given by my doctor or by the nutritionist.

| 3 | 2 | 1 | 0 |

3. I take my diabetes medications (insulin, tablets) as prescribed.

| 3 | 2 | 1 | 0 |

Voluntary Nature of the Study:

To take part in this study is voluntary. You are free to accept or turn down the invitation. No one in the hospitals that you attend will treat you differently if you decide not to take part in the study. If you decide to be in the study now, you can still change your mind later. You may stop at any time.

Risks and Benefits of Being in the Study:

Being in this type of study involves some risk of the minor discomforts that one experiences in daily life, such as being fatigued or upset. Being in this study would not pose risk to your safety or wellbeing. Potential benefits of this study include helping caregivers to communicate better with diabetes patients so that they would understand the importance of adopting self-care practices, implementing programs that would help patients to read and better understand medical instructions.

Payment:

All participants will be given 100 Naira to help in paying for their transportation.

Privacy:

Reports coming out of this study will not share the identities of those who took part. Details that might identify people who took part, such as the place that the study was conducted, also will not be shared. Even the researcher will not know who you are as it is a survey with implied consent through completion of the questionnaire and no consent signature. The researcher will not use your personal information for any purpose outside of this research project. Data will be kept secure by storing hard copies in a locked file cabinet at the researcher's home. Electronic files will be stored on the researcher's password-protected computer and backed up on a password-protected hard drive. Data will be kept for a period of at least 5 years, as required by the university after which the files would be deleted, shredded, burnt, and buried.

Contacts and Questions:

You may ask any questions you have now. If you want to talk privately about your rights as a participant, you can call the Research Participant Advocate at my university at +1-612-312-1210. Walden University's approval number for this study is 06-25-20-0368580 which would expire on 06-25-21.

You may keep a copy of the consent form.

Obtaining Your Consent

If you feel you understand the study well enough to make a decision about it, please

indicate your consent by returning a completed questionnaire. To protect your privacy,

please do not write your name or any other way through which you can be known.

Appendix 3 : Diagram showing how theory health literacy superstitious beliefs and self-care relate