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Exploring the Role of Religious Leaders in Preventing Sickle Cell Disease in Nigeria

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2018

Abstract

Exploring the Role of Religious Leaders in Preventing Sickle Cell Disease in Nigeria

by

Grace Fikemi Awe

MPH, Walden University, 2013

BSN, Walden University, 2011

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

January 2018

Abstract

Nigeria has high rates of sickle cell disease (SCD), which is attributed to the lack of awareness of the disease among the reproductive age in the country. The purpose of this cross-sectional study was to explore the role of religious leaders in contributing to awareness and prevention of SCD in Nigeria. Religious leaders' knowledge, attitude, and prevention and awareness practices of SCD, and how they translated to the prevention of SCD through improved counseling of premarital couples, were explored. A stratified random sampling was employed in selecting a sample of 150 religious leaders from different religious affiliations. Data were collected through a survey of sampled religious leaders in Nigeria by use of semi-structured questionnaires. Correlation analysis was used to determine the relationship among the variables under study. According to study findings, the level of knowledge towards SCD among the religious leaders was high. Additionally, there was no significant relationship between the religious leaders' knowledge of SCD and their efforts in increasing testing and genetic counseling among their congregation members. The level of awareness among the religious leaders did not contribute to the prevention of SCD in the country. The implications for positive social change from this research include religious leaders' commitment to emphasizing genotype testing during regular premarital counseling sessions and including religious leaders in health promotion activities, especially SCD prevention.

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Dedication

I dedicate this study to the memory of my parents, Grace and Daniel, who have long ago moved to a higher realm. As a child, your decency, kindness, hard work, and integrity taught me everything I ever needed to know about what a virtuous woman should be. Thank you for that solid foundation.

Acknowledgments

I would like to thank my dissertation chair, Dr. Sriya Krishnamoorthy, for her understanding, patience, and encouragement. I am grateful to her for helping me to achieve my academic goal. To my committee member, I say thank you for your contribution. I also thank the university reviewer, Dr. Steve Nkansah-Amankra, for his expertise and sincere advice in making my dream come true.

My gratitude goes to my wonderful husband for his emotional and financial support. His encouragement, love, and understanding are the main reasons for my success. He believed in me and told me several times that I could do it. He is one in a million! To my entire family, I say thank you all for being so supportive of me.

I appreciate the knowledge that Walden University impacted in me at different levels of my education. My life has been completely transformed by Walden University values, and I will forever be grateful for helping me to achieve my American dream!

My biggest thanks go to my Alpha and Omega "who has not rejected my prayers or withheld His love from me." Glory be to His holy name.

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Chapter 1: Introduction to the Study

Introduction

Nigeria has high rates of sickle cell disease (SCD) that leads to mortality and morbidity (Aneke & Okocha, 2016). SCD is an inherited disorder of hemoglobin that is responsible for abnormal sickle-shaped hemoglobin (Saraf et al., 2014). SCD results in strain on health facilities, loss of labor hours, and poor quality of life. In Nigeria, 20 to 30% of the population is affected (World Health Organization [WHO], 2015). The mortality from SCD in the country, especially for children under 5, is high. Up to 90% of affected children in Nigeria will die before they reach the age of 5 because of lack of adequate and timely intervention (Piel, Hay, Gupta, Weatherall, & Williams, 2013). SCD is a public health concern in the country. The treatment of SCD has improved in recent years, and bone marrow (stem cell) transplantation is known to achieve a cure (Shenoy, 2011). However, the cost implications for the patient to have the treatment, the risks involved, and the infrastructural inadequacies hinder the adoption of this treatment in Nigeria (Aneke & Okocha, 2016). The government of Nigeria has intensified efforts to reduce the prevalence of the disease through various epidemiological interventions, such as the introduction of genetic counseling clinics and prenatal screening (Aneke & Okocha, 2016).

However, awareness of SCD remains low in Nigeria, especially among the reproductive age group (Durotoye, Salaudeen, Babatunde, & Bosah, 2013). Only a small number of Nigerian couples attend these clinics for screening and counseling. As such, the involvement of religious leaders can play a role in the prevention of SCD through the

promotion of genotype screening for premarital couples and offering counseling to hemoglobinopathy partners. Toni-Uebari and Inusa (2013) found that the involvement of religious leaders and faith organizations is effective in improving the participation, level of acceptance, and positive health outcomes among their congregants.

In this chapter, I describe the background of the study, the problem statement, and the purpose of the study. I also discuss the theoretical framework that guided the study, the research questions, and the nature and significance of the study.

Background of the Study

Hemoglobinopathies are the most common group of inherited disorders in the world (Durotoye et al., 2013). These disorders of hemoglobin affect the shape or the number of red blood cells in the body. About 7% of the population in the world are carriers, and between 300,000 and 400,000 children with various forms of hemoglobinopathies are born every year (Durotoye et al., 2013). The two most common forms of hemoglobinopathies are thalassemia and the SCD (Toni-Uebari & Inusa, 2009). Thalassemia occurs as a result of abnormal formation of hemoglobin chains, resulting in reduced production of hemoglobin (Toni-Uebari & Inusa, 2009). SCD results from the substitution of a single amino acid in the beta chain of hemoglobin, which causes abnormal hemoglobin to be formed (Toni-Uebari & Inusa, 2009). Approximately 250, 000 of children born with cases of hemoglobinopathies suffer from SCD (Durotoye et al., 2013). According to WHO (2017), three-quarters of these children are born in Sub-Saharan Africa, and almost half of them die within the first 5 years of life. The prevalence of SCD in Nigeria is between 20% and 30% of the population (WHO, 2017).

There is no definitive health care for hemoglobinopathies. The only cure for SCD is bone marrow transplants; however, bone marrow transplants rarely occur in Africa because of the significant risks that are involved (Okyay, Çelenk, Nazlıcan, & Akbaba, 2016). The WHO (2017) recommended primary prevention measures to avoid the birth of an affected child including increasing public enlightenment, genetic counseling, screening for carriers, and antenatal detection. There has been an introduction of premarital screening programs in many of the affected countries, including Nigeria.

To reduce cases of hemoglobinopathies, programs have highlighted the importance of creating awareness and knowledge about the disorders (Okyay et al., 2016). Durotoye et al. (2013) stated that the main factors that have contributed to the high prevalence of SCD in Nigeria are limited knowledge about SCD and inadequate centers for genetic counseling. Durotoye et al. established that knowledge about SCD is low in Nigeria, especially among the reproductive age group, despite its prevalence in the country. Increased awareness about this life-threatening disorder among Nigerians must occur. One of the ways to increase awareness and increase testing is to involve religious leaders, such as priests, pastors, and Imams.

Scholars have examined the role that religious leaders play towards the promotion of health and interventions programs (Mendel et al., 2014). Religious leaders play a role in the delivery of intervention programs that promote positive health outcomes. Asekun-Olarinmoye, Asekun-Olarinmoye, Fatiregun, and Fawole (2013) revealed that faith leaders can play a role in individual and community health intervention programs. Catanzaro, Meador, Koenig, Kuchibhatla, and Clipp (2007) asserted that faith-based

organizations provide culturally appropriate avenues through which promotion of activities can be done. Furthermore, Williams et al. (2012) found that faith leaders are community gatekeepers who have access to members of the community and are better positioned to deliver information to both the health care providers and their congregation. Religious leaders also exert influence that may encourage members to take part in the intervention (Baruth, Wilcox, Laken, Bopp, & Saunders, 2008; Webb, Bopp, & Fallon, 2013). Religious leaders may offer guidance related to health-related issues and intervention measures regarding chronic diseases (Stansbury, Harley, King, Nelson, & Speight, 2012).

Although the positive impact of engaging religious leaders in the promotion of intervention programs among their congregation has been established, there is limited research with regard to how its application in Nigeria may enhance the prevention of SCD. Gaining an understanding of how religious leaders' knowledge on SCD enhances genetic counseling may help in guiding efforts to prevent the disease.

Problem Statement

SCD is the most common genetic condition in Nigeria with one out of 2000 children who are affected (Nnodu, 2014). Approximately one in 300 of these births occur in rural areas (Nnodu, 2014). SCD is responsible for high mortality rates, especially for children under 5 years of age. In addition, it presents economic challenges for SCD sufferers. The costs of raising a child are substantial (Nnodu, 2014). Furthermore, SCD presents physical, psychological, and social challenges (Nnodu, 2014). Prevention of SCD is possible if two carriers are encouraged not to marry or to have children (WHO,

2015). Premarital screening and genetic counseling entails examination of blood samples of couples intending to get married, and the results of the tests, as well as the implications, are shared with the couples (Memish & Saeed, 2011).

Two-thirds of couples in Nigeria are at risk of having children with SCD (Nnaji et al., 2013). If correctly applied, premarital genetic counseling and genotype testing have the potential of reducing the number of infants affected by the disease, reducing the prevalence of the disease in the long term (Aneke & Okocha, 2016). However, the current use of premarital genetic counseling and testing in the country is low (Aneke & Okocha, 2016).

There is a need for Nigerians to be educated on the importance of voluntary counseling and testing of sickle cell traits as a means of reducing future occurrence of the disease in children. Premarital counseling and genetic testing as epidemiological interventions for SCD can be enhanced through the efforts of religious leaders, who wield power among the people (PEW Research Center, 2010). Partnerships between health care professionals and religious leaders can raise the number of premarital couples who get tested and improve the number of carriers who are identified.

The involvement of religious leaders as change agents in the drive to prevent SCD in Nigeria was important because not only are they influential in decision-making processes of most Nigerians (Asekun-Olarinmoye et al., 2013), but they have also been successfully used in the past in promoting other health activities (Lumpkins, Cameron, & Frisby, 2012). The engagement of religious leaders in genetic testing and counseling may

influence society to embrace these epidemiological interventions, thereby creating informed population-based knowledge on the prevalence of SCD in the country.

Gbenol, Brisibe, and Ordinioha (2015) established that some religious bodies in Nigeria carry out premarital genetic counseling and testing for SCD as a part of marriage requirements. However, it was unclear whether the premarital counseling offered by religious bodies was effective and whether the quality of counseling offered to at-risk couples met the expected scientific standards. Thus, it was imperative to establish whether religious leaders had enough knowledge and understandings of SCD so that they can enhance their counseling and provide would-be spouses with the information to make informed decisions.

Purpose of the Study

The purpose of this cross-sectional study was to explore the role of religious leaders in the prevention of SCD in Nigeria. I aimed to establish the level of knowledge and understanding of SCD and other hemoglobinopathies among religious leaders who could translate this information to couples to improve marital counseling. In addition, I explored how religious leaders' knowledge of SCD could be applied to improve early testing among premarital couples and to improve marital counseling outcomes.

Theoretical Framework

The study was grounded within two theoretical frameworks: health belief model (HBM) and social cognitive theory (SCT). HBM is a psychological model that aims to predict preventive health-related behaviors. The model was developed in 1952 by Hochbaum, Rosenstock, and Kegelsin. The model has been adapted in exploring a variety

of health behaviors, such as prevention of tuberculosis, sexual behaviors, transmission of HIV/AIDs, and breast cancer detection behaviors (Abolfotouh et al., 2015). The HMB includes a focus on the beliefs and attitudes of individuals. According to the HBM, the perceptions of an individual with regards to a threat posed by a health problem and the value of the actions to reduce the threat will influence the health-related behavior of the individual (Canbulat & Uzun, 2008). An individual will make a health-related action if the individual feels that it is possible to avoid a negative health condition and expects that taking an advised action facilitates the avoidance of the negative health condition. HBM was constructed from six domains that include perceived susceptibility, perceived severity, perceived barriers, perceived benefits, cue to action, and perceived self-efficacy (Ayele, Tesfa, Abebe, Tilahun, & Girma, 2012).

The first four domains account for readiness of individuals to act. Perceived susceptibility involves the individuals' belief that they can get a condition while perceived severity relates to individuals' opinions about the seriousness of a condition (Ayele et al., 2012). The third concept, perceived benefits, involves the belief of individuals in the efficacy of the recommended actions in reducing the seriousness or risk of the condition, while perceived barriers revolve around an individual's opinion with regard to the costs of the recommended action (Ayele et al., 2012). The fifth domain, cues to action, activates the readiness, thereby stimulating the healthy behavior (Ayele et al., 2012). The last domain (self-efficacy) involves the confidence of an individual in the ability to perform an action successfully (Ayele et al., 2012). Figure 1 below presents the HBM model.
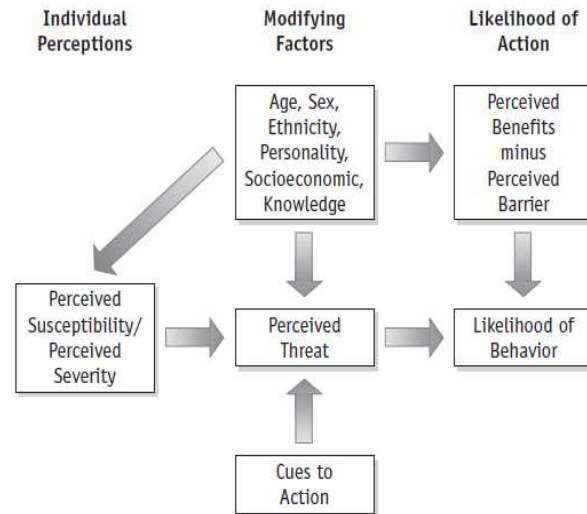
Figure 1. The HBM. Adapted from "*Health behavior: Theory, research, and practice*," by K. Glanz, B. K. Rimer, and K. Viswanath, 2015. Copyright 2015 by Jossey-Bass.

SCT was developed by Bandura in 1986 to explain and predict human behavior (Bandura, 2011). According to the SCT, a triadic interaction exists between an individual, behavior, and environment. This relationship can be explained by a construct: reciprocal determinism (Bandura, 2011). Personal factors involve whether a person has a high or low efficacy towards the target behavior (Bandura, 2011). Behavioral factor is the response a person receives after performing a behavior (Bandura, 2011). Environmental factors include those things in a setting that influence the individual's ability to successfully complete a task (Bandura, 2011). There are various ways of changing behavior using reciprocal determinism, and these are outcome expectation, self-efficacy, collective efficacy, self-regulation, facilitation/behavioral capability, observational learning, incentive motivation, and moral disengagement (Glanz et al., 2008). The most relevant of these constructs is collective efficacy because it reflects the confidence or

belief in a group's ability to bring about the desired change or the desire of community members to intervene to help others (Glanz et al., 2008). In this study, it was believed that religious leaders can bring about the desired change in the prevention of SCD by counseling prospective couples about premarital genotype screening. More people need to be aware of their genotype status before getting married and starting their families. Collective efficacy provided a framework for exploring the knowledge, beliefs, and attitudes of religious leaders regarding SCD and how they impacted on the way they counseled would-be spouses in their congregation. It is possible to prevent and manage SCD through interventions that change the behavior of individuals. Mirabolghasemi, Noorminshah, and Miskon (2014) used this model to evaluate the factors that affect the effectiveness of social networks on cancer patients. Because religious leaders exert influence over their congregation, religious leaders were likely to translate their understanding of SCD to improved marital counseling outcomes. Figure 2 shows the SCT.
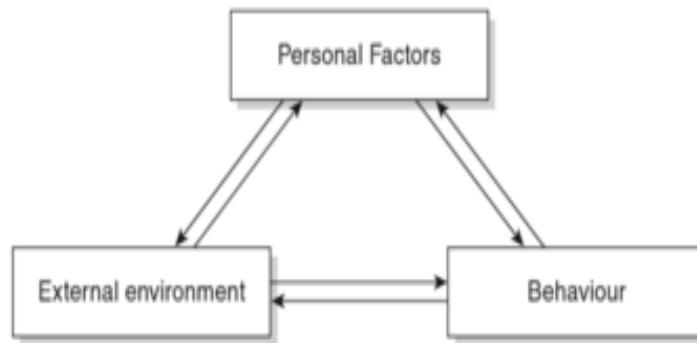
Figure 2. SCM. Adapted from "*Marketing theory: A student text*," by M. J. Baker and M. Saren, 2010. Copyright 2010 by Sage.

Research Questions

The research question that guided the study was the following: Are religious leaders in Nigeria qualified to and interested in counseling couples on SCD genotype screening?

Sub-questions were the following:

1. What is the perceived level of knowledge of SCD among religious leaders in Nigeria?

2. What is the perceived level of knowledge of genotype testing among religious leaders in Nigeria?

3. What is the relationship between health knowledge and willingness to recommend genotype testing by the religious leaders?

Hypotheses

The independent variables in this study were the perceived knowledge and the attitude of the religious leaders towards SCD. The dependent variable was the religious

leaders' interest or willingness to convince premarital couples to undergo genotype screening and genetic counseling in order to prevent SCD. Questionnaires with open-ended question were given, and the data gathered were evaluated.

H_0: There is no significant relationship in the religious leaders' knowledge and their willingness to recommend premarital genotype testing

H_1: There is a significant relationship in the religious leaders' knowledge and willingness to recommend premarital genotype testing.

Nature of Study

This was a correlational study design. Correlational designs involve the systematic investigation of the nature of relationships, or associations between and among variables, rather than direct cause and effect (Souza, Driessnack, & Mendes, 2007). This design builds on existing research, proposes relationships, and explores why and how of a variable (Sousa et al., 2007). Correlational coefficient ranges from-1.0 to +1.0, and this relates to identifying a pattern in terms of the direction and strength of a relationship between two factors.

Possible Types and Sources of Information or Data

Survey design provides a qualitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population (Creswell, 2009). A survey was administered to a sample of religious leaders in the Ibadan North Local Government, Nigeria in the form of questionnaire via telephone text. The Internet presented useful opportunities for data gathering from large populations, and in this study, it was a useful source of data.

Significance of the Study

In this study, I helped to establish the different levels of SCD knowledge among Nigerian religious leaders and the impact of their knowledge towards improved marital counseling for hemoglobinopathy There is a high prevalence of SCD in Nigeria despite various awareness programs by health workers. Public knowledge on its prevention could be conducted by having couples' genotype tested before marriage. Religious leaders were in a position to make sure that prospective couples undergo genetic testing before performing marriage rites for them. Involving religious leaders in this process required ascertaining their own knowledge level first and finding out those factors that dictated their understanding of SCD so that they could become change agents in the prevention of SCD in Nigeria. SCD knowledge among religious leaders may translate to improved counseling on couples planning marriage. Religious leaders could take a proactive role in promoting improved health by supporting would-be spouses on the relevance of premarital counseling and testing. The quality of counseling offered to individuals at risk might facilitate the making of informed decisions by couples and reduce the possibility of having offspring with SCD. As such, it might reduce the physical, psychological, social, and financial challenges encountered by individuals when they bear children affected by SCD.

This study provides a link between the religious leaders and other SCD stakeholders. Sensitization of religious leaders on how to prevent SCD could have a ripple effect on the congregation to accept genotype screening as an important medical procedure for every individual before having children. By involving religious leaders in

the campaign against SCD, a large number of Nigerians might be informed about how to avoid having children with SCD. This could decrease the under-5 mortality rate (Central Intelligence Agency [CIA], 2015).

Different groups of people have been involved in educating the public on the importance of genotype testing; however, the involvement of religious leaders in passing this message to their followers needed to be intensified. Religious leaders could reach large targeted audiences with culturally accepted messages that would be acceptable to religious groups (Lumpkins et al., 2012). Genotype result certificates could be included in wedding requirements or suggestions so that no one would be married without understanding the implications of the possibilities of having children with SCD if genotype tests are not carried out prior to procreation. The premarital screening may reduce the number of at-risk marriages and subsequently reduce SCD burden in Nigeria. This study provided evidence-based data for further training of health professionals on cultural competence for improved diagnoses and treatment among health professionals.

Definitions of Terms

For the purpose of this study, the following terms were defined as follows:

Genetic disorder: A disease that is caused by an abnormality in an individual's DNA (Genetic Learning Center, 2016).

Hemoglobin: The iron-containing protein found in all red cells that enables red blood cells to bind to oxygen in the lungs and carry it to tissues and organs (National Library of Medicine, 2017).

Hemoglobinopathy: It is a group of disorders in which there is abnormal production or structure of the hemoglobin molecule. (National Library of Medicine, 2017).

Sickle cell disease (SCD): A group of inherited red blood cell disorders in which red blood cells become hard and sticky and look like a C-shaped farm tool called a sickle (Center for Disease Control and Prevention [CDC], 2017).

Sickle cell trait: An inheritance of one sickle cell gene and one normal gene by an individual. People with sickle cell trait usually do not have any symptom, but they can pass the trait on to their children (CDC, 2017).

Summary

SCD is a genetic disorder because children inherit it from their parents. Although SCD is preventable, it is still a public health challenge worldwide, especially in some developing countries such as Nigeria. Over 150,000 babies are born every year in Nigeria, and it has the largest population of SCD worldwide (WHO, 2015). Its impact on under-5 morbidity and mortality are considerable.

Although different groups of people have been involved with creating public awareness on how to prevent SCD, babies with SCD are still being born in Nigeria (Nnodu, 2014). The involvement of religious leaders in curbing the incidence of SCD was worthy of exploration. The BBC (2014) reported the outcome of a U.S.-based PEW Research Center survey in which 87% of participants (Africans) confirmed their reverence and confidence in their religious leaders, and most African societies look to

them for guidance and direction. They have also been successfully involved in the past in

health promotion activities (Lumpkins et al., 2012).

      In Chapter 2, I provide the literature review for this dissertation.

Chapter 2: Literature Review

Introduction

In this chapter, I review previously published studies in the domain of SCD. In the literature review, I outline the published literature on the role of religious leaders in health promotion. To accomplish the main objective of the study, different databases, such as EBSCOhost, ProQuest, PubMed, MEDLINE, and EMBASE were used to retrieve journal articles.

Overview of Sickle Cell Disease

According to Doss et al. (2016), SCD is among the commonly inherited hemoglobinopathies globally. About 90,000-100,000 people in the United States have SCD (Doss et al., 2016). Doss et al. further argued that there is a higher prevalence of the disease in Africa. Grosse et al. (2011) posited that the mortality among African children has increased as a result of SCD among children who are 5 years and younger.

Chakravorty and Williams (2014) indicated that there are also high cases of mortality among adults who are affected by SCD in Africa. However, Chakravorty and Williams stated that mortality cases within high income nations have reduced as a result of the introduction of newborn screening, as well as the implementation of penicillin. According to Nelson (2011), individuals with SCD can have an increased quality of life if they receive targeted interventions. SCD has evolved over years, and it affects millions of people worldwide. The disease does not have a known cure; interventions only reduce the complications related to SCD. The key symptoms of SCD are as a result of abnormally

shaped sickle cells that block blood flow through the tissues, leading to damage of the affected organs due to inadequate blood flow (Nelson, 2011).

Genetic Cause of Sickle Cell Disease

Serjeant (2013) stressed that SCD entails a cluster of genetic conditions where pathology takes place from the inheritance of sickle cell gene (i.e., double heterozygote or homozygote). The SCD results from individual hemoglobin genes. The common genotype that is experienced during birth is homozygous SCD. This type of genotype tends to manifest in a greater mortality rate. The genotype is also influenced by geographical distribution and age of individual genes (Serjeant, 2013).

According to Serjeant (2013), SCD is more common in Africa, especially in central Africa, Benin, and Senegal. Ellithy, Yousri, and Shahin (2015) also stressed that SCD is predominately determined by genetic factors, as well as environmentally modified factors. Ellithy et al. also pointed out that physiologic alterations, such as multiple genetic mutation and polymorphisms, can modify the presentation of SCD. Inherited polymorphisms within Glutathione S-transferases (GST) hormones can result in a deficiency in the activity of the enzymes (Ellithy et al., 2015). GST is a family of multifunctional enzymes that catalyze reactions between glutathione (GSH), an antioxidant, and various potentially carcinogenic and toxic compounds (Ellithy et al., 2015). The polymorphism of GST gene might result in loss of the defensive role of GSH against possible oxidation stress that leads to manifestation of SCD (Ellithy et al., 2015).

Nelson (2011) stated that SCD is termed a genetic disorder because it is hereditary. Children are born with SCD if they inherit two abnormal genes (i.e., one from

each parent). The inherited genes results in alterations in red blood cells' shape (Nelson, 2011). The disease affects protein in red blood cells known as hemoglobin. Individuals affected by SCD have a type of hemoglobin referred to as hemoglobin S (HBS; Nelson, 2011). The HBS molecules clumps together and make the red blood cells sticky, as well as fragile (Nelson, 2011).

Statistics of Sickle Cell Disease

According to the CDC (2016), SCD affects millions of individuals across the world. The disease is common among people whose ancestral lineage originated from sub-Saharan Africa, Spanish regions, India, Saudi Arabia, and Mediterranean nations, such as Italy, Turkey, and Greece (CDC, 2016). In the United States, the disease affects about 100,000 individuals (CDC, 2016). The WHO (2011) pointed out that about 5% of the world population carries trait genes for hemoglobin disorders, mainly SCD. Approximately 300,000 children are born with severe hemoglobin disorders every year (WHO, 2015). Grosse et al. (2011) indicated that within sub-Saharan Africa, 3% of the children born are affected by SCD. The mortality rate within early life is between 50% and 90% of children born in Africa (Grosse et al., 2011). This high mortality rate is attributed to health departments not prioritizing this disease.

Management of Sickle Cell Disease

SCD continues to cause early death and morbidity in Nigeria and other parts of Africa despite advances its management, such as improved care and bone marrow transportation. However, the medical care needed for SCD is long term because of its chronic nature, and this economically and psychologically impacts the patients and the

affected families (Abioye-Kuteyi, Oyegbade, Bello, & Osakwe, 2009). Bone marrow

transplantation is the only known cure for SCD, but it is rarely done because of the

significant risks and high costs that are involved (Okyay et al., 2016). Thus, prevention of

the birth of affected children is recommended. Methods used in preventing the birth of

children with hemoglobinopathies include premarital screening and genetic counseling,

utero-therapy using stem cell transplantation, and prenatal and preconception diagnosis

(Adeyemo, Omidiji, & Shabi, 2007).

However, the best approach towards the prevention SCD is through the

identification of carriers in genetic counseling. Genetic counseling is cost-effective in

low-income countries where the disease is most prevalent (Abioye-Kuteyi et al., 2009).

Premarital screening and genetic counseling programs can reduce the number of children

born with SCD and other hemoglobinopathies (Adewoyin, 2015; Adeyemo et al., 2007).

However, the success of the program depends on the knowledge of SCD among the target

population, the altitude towards genetic screening and counseling, and the understanding

of the consequences of having an affected child (Adeyemo et al., 2007; Aneke & Okocha,

2016).

Genetic Testing for Sickle Cell Disease

Premarital screening for the diagnosis of SCD is crucial towards reducing the

condition among newborns (Omuemu, Obarisiagbon, & Ogboghodo, 2013). Premarital

screening allows for an individual's health-related reproductive risk to be determined.

Oyedele, Emmanuel, Gaji, and Ahure (2015) stated that premarital genetic screening

offers a chance for people to become aware of their genetic predisposition to disease. The

test helps couples to understand the possible genetic composition of their children. Therefore, premarital testing is one of the most reliable methods of preventing genetic diseases, such as SCD. Screening facilitates the identification of carriers and at-risk marriages. According to Fernandes, Januário, Cangussu, Macedo, and Viana (2010), neonatal screening programs can also be used to assess the possibility of deaths among children affected by SCD. The type of genotype is likely to facilitate the identification of SCD, as well as its complications. Patients' family members can be enlightened so as to minimize SDC-related mortality (Fernandes et al., 2010).

Premarital screening programs have been introduced in Nigeria (Umar & Oche, 2012). These programs have been shown to be successful in reducing cases of hemoglobinopathies in countries such as Turkey and Saud Arabia (Okyay et al., 2016). Okyay et al. (2016) highlighted the importance of creating awareness and knowledge about the disorders to encourage would-be spouses to attend genetic counseling clinics before considering marriage. However, the role of religious leaders in promoting screening in Nigeria has not been explored.

Status of Premarital Screening in Nigeria

There is mandatory HIV/AIDS premarital screening in Nigeria (Umar &Oche, 2012). However, Umar and Oche (2012) established that religious leaders in the country have a poor understanding of HIV/AIDS screening, which has negative effects on their congregants. Given the high prevalence of SCD in Nigeria, Arulogun and Adefioye (2010) asserted that there is a need to expand the premarital screening program to include SCD. Religious leaders are in charge of ensuring that would-be spouses undergo

premarital screening because most of the marriage licenses are granted by religious

bodies. It is important to involve religious leaders in premarital screening to enhance the

success of the program (Dibua, 2010). Moronkola and Fadairo (2007) found that the

knowledge and attitude towards sickle cells anemia among Nigerians is positive in spite

of the high mortality rate that results from inadequate health care. With counseling by

religious leaders, the number of Nigerians who attend premarital screening and genetic

counseling may increase. However, there were no studies on religious leaders'

understanding of SCD and how their understanding of the disease translates to improved

marital counseling.

Sickle Cell Disease among the Nigerian Population

SCD is prevalent in Nigeria. The number of affected individuals has been

increasing despite government efforts to address the issue. This high level of SCD is

attributed mainly to a low level of awareness about SCD, as well as inadequate centers

for counseling in the country (Durotoye et al., 2013). The disease is widespread even

among the urban residents and elite communities that have access to effective health care.

There is a low level of knowledge about SCD among many Nigerians. There is

misinformation, myths, inaccurate diagnosis, and stigmatization about SCD in Nigeria

(Adeyemo et al., 2007). According to Afolayan and Jolayemi (2011), Nigeria has a

population of approximately 150 million with a year growth rate of about 3.2%.

However, the number of individuals affected by SCD is not known because the majority

of them are born in rural areas and do not survive past childhood. It is, however,

estimated that 2.3% of the Nigerian population suffers from SCD, and 25% of the

nation's population are carriers of the abnormal hemoglobin gene (Afolayan & Jolayemi, 2011).

Anie, Egunjobi, and Akinyanju (2010) stressed that SCD is a worldwide challenge with psychosocial implications. Anie et al. pointed out that Nigeria has the highest population of individuals with SCD with an estimated 150,000 births per year. In Nigeria, beliefs are normally determined by religious, as well as cultural values that impact health behaviors (Anie et al., 2010).

According to Adewoyin (2015), SCD in Nigeria forms a small part of clinical practice of general medical practitioners. Adewoyin also stressed that there is a lack of devoted sickle cell centers. Modell and Darlison (2008) indicated that approximately 5% to 7% of the world population carriers have abnormal hemoglobin gene. A majority of the SCD cases are reported in sub-Saharan Africa, especially Nigeria (Modell & Darlison, 2008). Prevalence of sickle cell trait ranges from 10% to 45% in varying parts of sub-Saharan Africa (Adewoyin, 2015). In Nigeria, the carrier prevalence is approximately 20% to 30% of the population (Adewoyin, 2015). Moreover, the disease affects approximately 2% and 3% of the total population of Nigeria of about 160 million (Adewoyin, 2015).

Mortality Rate in Nigeria due to Sickle Cell Disease

According to Ogun, Ebili, and Kotila (2014), SCD has a high mortality rate in the Nigerian population. The high rate of mortality among individuals affected by the sickle cell is attributed to acute chest syndrome that might present thromboembolism or infections in the respiratory system (Ogun et al., 2014). Nonetheless, the use of bacterial

prophylaxis during childhood is projected to minimize early mortality and enhance the level of life expectancy of SCD patients (Ogun et al., 2014). Adewoyin (2015) stressed that cerebrovascular disease (stroke) is the main cause of mortality and morbidity among SCD patients. In Nigeria, the prevalence of stroke among SCD children is approximate 4.3% in Port Harcourt (Adewoyin. 2015). On the other hand, in Abuja, Nigeria, stroke prevalence of SCD children is at 5.2% (Adewoyin. 2015). Acute chest syndrome is also considered a principal cause of SCD-related mortality among Nigeria patients (Adewoyin, 2015).

According to Ogun et al. (2014), the leading causes of mortality among SCD patients entail infections, anemia, acute sequestration crisis, acute chest syndrome, and stroke. The average age of mortality was at 21.3 years (Ogun et al., 2014). Ogun et al. further stressed that most of the mortality cases tend to take place in the second and third decade of their lives. Nonetheless, some of the patients are currently attaining the fifth decade (Ogun et al., 2014).

Religion and Health Promotion

According to Rumun (2014), religion is communal and is defined by boundaries. Religion tends to influence health behaviors. Religion has the potential of promoting a healthy lifestyle. Nevertheless, Levin (2014) argued that faith-based organizations, as well as institutions, have been underused in the promotion of health and disease prevention. Religion has been found to influence health indirectly in various ways, and in Nigeria, some people believe that some diseases are caused by a lack of faith (Rumun, 2014). It is only the religious leaders who can encourage premarital genotype testing.

Religious institutions have also been involved in the delivery of human services, such as health care. A majority of the earliest health institutions were established by religious communities. Mainly, they focused on health promotion within the underserved societies. Levin further pointed out that faith-based institutions contribute towards health promotion as well as disease prevention. Religious participation has been associated with a decreased rate of morbidity and mortality. Levin recommended the establishment of health-based partnership in the health sector as means of promoting health.

Campbell et al. (2007) indicated that church-founded health promotion intervention can reach broad populations and can minimize health issues and disparities. Campbell et al. further stressed that church, as well as other religious institutions, may determine members' behavior. Anshel and Smith (2014) argued that religious communities are not immune to various societal conditions. Subsequently, altering the health behavior of the community requires input from individuals who possess credibility and knowledge, as well as a receptive audience. Nonetheless, one group of people (i.e., religious leaders) who are positioned to boost societal change tend to be ignored. Religious leaders can influence the promotion of health behaviors due to their power of persuasion, weekly captivated audience, exposure to healthy living, and the capability to lead health-related actions. Religious leaders can improve healthy living among their followers (Anshel & Smith, 2014).

Ruijs, Hautvast, Kerrar, Van der Velden, and Hulscher (2013) argued that the engagement of religious leaders in a health-related intervention is associated with enhanced participation of followers in health interventions. Consequently, the

involvement of religious leaders has been linked to progressive health outcomes. Health organizations are, therefore, encouraged to work in partnership with religious leaders as well as religious groups. The authority of religious leaders might convince the congregation to accept or reject health interventions. For example, religious leaders can be engaged by health organizations, such as UNICEF, to accept vaccination (Ruijs et al., 2013).

Rivera-Hernandez (2015) indicated that clergy within Mexico address health care-related needs of their followers. Rivera-Hernandez further stated that clergy can offer guidance as well as advice concerning health-related challenges. Religious leaders have a positive influence on the wellness and health of their followers (Rivera-Hernandez, 2015). Rakotoniana, Jean de Dieu, and Barennes (2014) examined the role played by churches in combating HIV/AIDS epidemic. Rakotoniana et al. emphasized that churches occupy a critical cultural and social position.

According to Lewis (2008), religious institutions contribute to the overall health of the community primarily because of religious leaders' positive impact on the manners of the society. Gill and Carlough (2008) pointed out that the partnerships between the public health sector and faith-based institutions are a strategy for addressing child mortality. For the past decades, faith-based institutions have played a role in the global attempt to improve the welfare and health among the disadvantaged populations. The scope of faith-based activities in the health service has expanded over the past years. There have also been calls for religious-based institutions to enhance health services through filling the gaps within the health sector (Gill & Carlough, 2008). Widmer et al.

(2011) revealed that encouraging partnerships between faith-based institutions and health services is an effective means of addressing issues of child mortality in Africa.

Summary

Cases of SCD are numerous in Nigeria. The children are heavily affected by the disease. Millions of people are affected by SCD worldwide. The disease lowers the quality of life and life expectancy of the affected individuals. The disease is believed to have originated from sub-Saharan Africa. Subsequently, African nations, especially the Western ones, recorded high number of SCD cases compared to other nations. The disease is inherited by children from their parents through genetic means. Children are born with SCD if they inherit two abnormal genes, one from each parent. Premarital testing is usually used to determine the genetic disposition of individuals. It can be used by couples to understand if they are potential carriers of abnormal genes.

There has been an increase in the number of SCD cases in Nigeria. There is also a high rate of mortality among peopled affected by SCD, which is attributed to acute chest syndrome that presents thromboembolism or infections in the respiratory system. Religious leaders in Nigeria can be used as change agents in the prevention of SCD. It Religious leaders and faith-based institutions have a role in addressing health issues because they have persuasion power over their followers. Nevertheless, their role in addressing health issues is, to some extent, being ignored by the health service sector.

In spite of the importance of religious leaders in offering health promotion programs, there is minimal research on the religious leaders' role in addressing SCD in

Nigeria. Therefore, the purpose of this study was to address the literature gap by exploring the role of religious leaders in preventing SCD in the country.

In Chapter 3, the methodology of the study was presented.

Chapter 3: Research Method

Introduction

The goal of this study was to explore the role of religious leaders in the prevention of SCD. The knowledge and attitudes of religious leaders in Nigeria about SCD and their impact on premarital counseling offered to would-be spouses to prevent SCD was evaluated. Possible relationships between the religious leaders' knowledge about SCD and their willingness to recommend premarital genotype testing to prospective couples were explored. In this chapter, a description of the research design was presented. The population and the sampling technique that was employed in the recruitment of the participants was explained. Data collection instrument, method of data collection, and data analysis were outlined. I also discuss threats to validity, feasibility and appropriateness, as well as ethical considerations.

Research Design

This study is an observational, cross-sectional study. Quantitative methodology is more objective than the qualitative methodology. Quantitative methodology involves the use of structured instruments and a large sample that represents the general population (Johnson & Christensen, 2008). The quantitative methodology was a good approach as the study could be repeated due to the high level of reliability. The methodology facilitated the exploration of the relationship between religious leaders' perceptions and knowledge about SCD and the prevention of the disease. This quantitative study entailed a survey that facilitated a standardized measure of the opinions, trends, attitudes, and views of convenience population. Surveys are versatile, and they can be carried out

through face-to-face interviews, mail, computer, paper platforms, and telephone or e-mails (Creswell, 2009).

A correlation design was employed to explore and measure the nature of a relationship between the dependent variable (a level of knowledge and positive recommendations by the religious leaders) and quality of genetic counseling and testing offered to followers.

. The results could help in coming up with a strategy for intervention that encompasses cultural influences (Ngimbudzi, Lukumay, Muriithi, Dhamani, & Petrucka, 2016). This might help in designing activities that suit the population in question. A questionnaire was used to collect the attitudes, trends, and opinions of the religious leaders in Ibadan, Nigeria.

Research Questions

Are religious leaders in Nigeria qualified and interested in counseling prospective couples on genotype testing and genetic counseling?

The following sub questions were used to refine the study:

1.   What is the perceived level of knowledge of SCD among religious leaders in Nigeria?

2.   What is the perceived level of knowledge of genotype testing among religious leaders in Nigeria?

3.   What is the relationship between religious leaders' health knowledge level and their interest or willingness to recommend premarital genotype testing?

The religious leaders are priests in various worship centers and must have been leading their congregations for at least three years. They also belong to a general association as well as their various sectional associations. For example, a Christian religious leader belongs to the Christian Council of Nigeria (CAN), a Muslim leader belongs to the League of Imams and operates in a specific Mosque while a traditional religious priest has his own worship center and belongs to the Orisa Congress.

Population and Sample

The population targeted by the study was Nigerian religious leaders, such as pastors, priests, and Imams drawn from Ibadan North Local government area. There were approximately 240 members, and all religions were equally represented on the Nigeria Inter Religious Council. Nigeria is one of the high populated countries in sub-Saharan Africa. The population was selected because Nigeria is affected with sickle cell anemia. In Nigeria, SCD is one of the most common genetic conditions where one in every 200 live births is affected (Node, 2014). The effects of SCD include loss of lives and economic impacts due to the high cost of managing the disease. Ibadan was a good site for this study as it is one of the largest cities in Nigeria with diverse religious affiliations.

Probability sampling was used to select 150 religious leaders from the general population of 240 religious leaders in Ibadan NLGA (based on Slovin's formula). Probability sampling ensured that all the religious sects were equally represented and this makes it the most appropriate sampling method for this study as it makes recruitment of a sample very easy to generalize to the general population unlike non-probabilistic sampling which recruits a specific sample of participants that does not generalize to the

general public. (Silverman, 2011.). Probability sampling was therefore more effective in this study as I was able to choose a given number of individuals as representative of the general population (Grafstrom & Lundstrom, 2013). Samples were drawn from the population until the given percentages were achieved as illustrated. There were 50 Muslim leaders, 50 Christian leaders, and 50 leaders from traditional religions.

An equal number of participants (religious leaders) was recruited from each of the three main religious communities. Christian leaders reflected all of the Christian denominations in Nigeria including Catholic, Anglican Communion, Methodist, Baptist, Salvation Army, Jehovah witness, and the Pentecostal movement. Christian religious leaders were recruited from the Catholic community, Pentecostal, White garment, and other orthodox churches. Muslim leaders also included all Muslim sects in Nigeria, such as Ahmadiyah, Ansarudeen, Nawarudeen, AnsarulIalam, ZumuratulIslamiya, and NASFAT sects. Traditional religious leaders were recruited from across the various practitioners of traditional religions available in the local government area. The inclusion criteria involved religious leaders who had more than 3 years of experience in the church or religious community. I excluded those religious leaders who had served fewer than 3 years because they may not be familiar with the religious community attitudes and beliefs and might also not have had enough experience to explore their knowledge of the SCD. The religious leaders with more than 3 years of experience were important in this study as they could have more influence on their congregation. Their level of knowledge about SCD and their attitudes towards the disease were explored. I explored their influence on

the community and how it may impact genetic screening before any couple can consider having children.

If the required sample size and the necessary percentage distribution were not attained, more samples would have been drawn from the population to achieve the required sample size and representation from each group. However, this did not happen in this study. Demographic information was used to assist in determining if the participant should be included in the study. Articles, publications, and reports from the Internet were also used to gather more information on the topic under study.

Data Collection Instruments

A questionnaire is an effective approach to carry out quantitative research. Questionnaires enable the researcher to collect valid data in a simple and economical way (Creswell, 2009). A survey questionnaire was, therefore, the best method to gather information from the religious leaders as it could be employed in a large group of participants and also be replicated in another population. It was easy to disperse questionnaires via telephone text messages because mobile telephones are an easy form of communication in Nigeria. I gathered data on the knowledge, attitudes, and beliefs of religious leaders towards the SCD and their role towards reducing its prevalence among their congregation.

I chose survey questionnaires due to the practical nature of this form of instrumentation. The other reason for selecting the use of questionnaires was the ability to receive a large amount of data even with a big group of people. More than 200 participants could be evaluated and could be used as a representative of the general

population. It would be economical to distribute the questionnaires to the sample

population and give them time to fill them out, which would enhance its reliability and

validity. It was also easy to quantify the results through the use of software packages, and

it was also possible to compare the results with other studies.

However, there was a limitation while using questionnaires to gather data. A

scholar may be unable to tell how truthful the respondent is while filling out the

questionnaire. The participants were encouraged to be honest beforehand by explaining

that there was no wrong or correct answer. I also had to be objective while developing the

questionnaire to avoid making personal decisions and judgments. The validity of the data

was determined from the existing history related to the use of questionnaires.

Questions addressed areas of SCD knowledge levels among religious leaders and

their interest in counseling prospective couples on premarital genotype screening. The

theoretical basis of the study was the application of collective or group efficacy, which is

a construct of SCT, and its relevance to the religious leaders' interest in bringing about

change in their communities by getting involved in SCD prevention activities. This could

only occur if they realized the impact of SCD on child survival in their communities. This

realization was based on HBM constructs of perceived susceptibility/severity and their

readiness to act. Both open-ended and close-ended questions were asked. The

questionnaires included statements that represented the beliefs of the religious leaders

with regard to SCD using a predetermined scale. The response categories were *strongly*

agrees (1), *agree* (2), *neither agree nor disagree* (3), *disagree* (4), and *strongly disagree*

(5). These statements were used to assess demography, importance, and significance of

genotype screening and the need to seek health care. Questions were also used to assess the practices of religious leaders with regards to SCD and their recommendations to the congregation. Questions covered the knowledge level of SCD among religious leaders and how this impacted their interest in offering premarital genotype testing among prospective couples.

The participants received information on the study through planned sensitization meetings with the Nigeria Inter Religious Council. The participants were selected and identified by individual phone numbers as provided by the leadership of the various religious organizations. No names were required, and the study was entirely voluntary. Direct consent was sent via individual phones, and participation served as consent; this was done after the participants agreed to provide information. Potential participants were provided with information regarding the purpose of the survey and what was required of them by text message. Formal invitation letters were then sent to participants via text before data collection.

This study involved 150 participants. Participants were required to sign an informed consent form before filling out the survey questionnaire (Appendix B). The informed consent was kept by the participants for future reference. Demographic information on the questionnaire included age, religion, denomination/sect, educational status, leadership position, and length of service. The participants were asked to answer all of the questions in the questionnaires; but, they were free to leave those that they were uncomfortable with. They were encouraged to be honest while filling out the questionnaire because there was no wrong answer as it was based on a participant's

knowledge, beliefs, and opinions. The time allocated for this survey data collection was 4

weeks. Participants took approximately 30 minutes to fill in the survey questions in the

questionnaires, and their answers were sent by text to me. Participants received N3000

(about $10) telephone cards for agreeing to participate in the study.

Internet Sources

Different academic sources, publications, and reports were used to collect

information on the role of religious leaders in the prevention of SCD in Nigeria. Various

educational sites such as ProQuest, EBSCO host, and NCBI were explored. These

sources were used because they contained peer-reviewed journals, and they offered

reliable and valid information. As such, reports and publications on the SCD knowledge

among religious leaders in Nigeria were obtained. In addition, secondary data from

previous studies on the role of religious leaders in preventing SCD in Nigeria were

gathered. I focused only on articles published within the last 5 years in order to gather up-

to-date data that were valid and reliable.

Data Analysis

The Statistical Package for the Social Sciences (IBM SPSS) software was used to

analyze the data collected from the questionnaire. The alpha level was set at 0.05 to

evaluate the statistical significance. There were nine questions that were employed in the

knowledge sections of the survey questionnaire, which was evaluated on the scale of 0 to

9 points. The average scores ranged from 0 to 9 where a score higher than 5.4 was

considered *high knowledge* and below 1 was considered *low knowledge*. The rate of

knowledge awareness was clarified as the percentage of those participants rated as high-

level knowledge. The 10 questions on the attitudes of religious leaders were evaluated on the scale of 0 to 9 points. The scores on the practices of the religious leaders in a prevention of SDC also varied from 0 to 9, but these scores were then categorized into three parts: the 7.5 to 9.0 points as *good practice*, 4.5 to 7.4 as *fair practice*, and 0 to 4.4 as *poor practice*. The questionnaires were used to gain an insight into how the understanding of SCD among religious leaders translated to improved counseling on premarital genotype testing in an effort to prevent SCD in the country. The scale construction was based on collective efficacy, perceived susceptibility, and readiness to act.

The use of Internet sources was also appropriate in this study. Academic sources such ProQuest, EBSCOhost, and NCBI offered up-to-date data that were useful for this study. The articles were peer-reviewed and provided valid and reliable information. The use of the latest publications and reports assisted in gathering more data on the role of religious leaders in the prevention of sickle cell anemia. The results from the survey were compared to other previous studies and recommendations were given.

Ethical Considerations

The study was conducted after an approval was sought and granted by the institutional review board (IRB). In addition, data were collected from participants after they signed an informed letter of consent. The participants were required to go through the form that outlined the purpose of the study and what was needed of them during the study. The documents were signed to show that they willingly agreed to participate in the study. No personal identifiers were used in the survey interviews, and each participant's

phone number was the only form of identification. All of the data gathered from the

participants were downloaded and transferred on to a flash drive and saved in a lockable

safe that is accessible only by me. These steps ensured that the participants were

protected, and the information given remained confidential.

Threats to Validity

Internal Validity

According to Onwuegbuzie and Johnson (2006), internal validity is the validity

arrived at from the relationship between independent and dependent variables. In this

study, the independent and dependent variables were knowledge of the religious leaders

on SCD, attitude towards SCD, and interest in recommending premarital genotype testing

and genetic counseling to prospective couples. I excluded other factors that might

influence the results of this study. Questions were set based on the research questions and

the theoretical concepts of collective efficacy and perceived susceptibility by finding out

the level of SCD knowledge among the religious leaders and how their knowledge level

affect their willingness to participate in SCD prevention.

Construct Validity

The procedural concept of arriving at relevant quality operation in a study is

construct validity (Onwuegbuzie & Johnson, 2006). It involves considering to what

extent shall an investigation take to achieve accurate data. In this study, questions were

based on religious leaders' knowledge level about SCD and the impact their knowledge

had on recommending genotype testing to prospective couples. Participants were

encouraged to give their honest opinions in order to obtain accurate data and be told that there was no wrong or right answer.

External Validity

Eeva-Mari Ihantola and Lili-Anne Kihn (2011) claimed that external validity determines how a researcher shall arrive at the conclusion after collecting data. Threats to external validity were overcome by use of a stratified sampling technique to ensure that the sample mirrored the population of the study and can be generalized to the wider population.

Statistical Conclusion Validity

Eeva-Mari Ihantola and Lili-Anne Kihn (2011) argued that statistical validity of a study is determined from the methodological activities during research that includes research design, data collection, data analysis, and interpretation. I used stratified sampling to ensure that the sample taken was a representative of the general population.

Statistical control of cofounders

Confounding variables or confounders are regularly characterized as the variables that connect (decidedly or contrarily) with both the dependent variable and the independent variable. There are different approaches to alter a study design to effectively bar or control confounding variables, (Pourhoseinghol, Baghestani and Vahedi, 2012), including Randomization, Restriction and Matching. Be that as it may, every one of these strategies is appropriate at the level of study design and before the procedure of data gathering. Notwithstanding, for review, illogical, or incomprehensible experiments specialists depend on measurable techniques to alter for conceivably confounding impacts. There are

three ways of managing confounders in an investigation namely: stratification, multivariate and linear regression strategies (Pourhoseinghol, Baghestani and Vahedi, 2012). Goal of stratification is to settle the level of the confounders and create bunches inside which the confounder does not differ. Stratified investigation works best in the path that there is not a great deal of strata and if just one or two confounders must be controlled. In the event that the quantity of potential confounders or the level of their gathering is expansive, multivariate investigation offers another method. Multivariate models can deal with vast quantities of covariates (and furthermore confounders) all the while (Pourhoseinghol, Baghestani and Vahedi, 2012). The linear regression examination is another factual model that can be utilized to look at the relationship between multiple covariates and a numeric result. This model can be utilized as a multiple linear regression to see through confounding and seclude the relationship of intrigue. The way toward representing covariates is additionally called alteration (like strategic regression model) and looking at the after effects of multiple linear regressions can illuminate how much the confounders in the model contort the connection amongst variables and outcome (Pourhoseinghol, Baghestani and Vahedi, 2012).

This way of controlling covariates is additionally called adjustment (like strategic regression model) and looking at the consequences of direct and multiple linear regressions can clear up how much the confounders in the model mutilate the connection amongst introduction and result. This technique was tried through directed hierarchical multiple regression models in which conceivable confounding variables were controlled. This approach was proposed by Aguinis, Peterson, and Pierce (1999) who had shown that

the utilization of hierarchical multiple regression examination as technique for decision for evaluating controlled impacts in non-trial thinks about.

In model 1, all possible confounding variables such as religious affiliation, sex and level of education were entered into the multiple regressions. In the model 2, to test the main effect of the independent variable such as the knowledge, attitude, and religious practices on SCD, variables were entered in Model 2 in addition to all variables in Model 1.

Table 4: *Hierarchical multiple regression analysis*

	Model I					Model 2				
	R= .18	**R²= .01**	**F= 1.36**	**Sig. =.25**		**R= .32**	**R=.10**	**F=2.84**	**Sig. = .01**	
	Unstandardized Coefficients		Standardized Coefficients			Unstandardized Coefficients		Standardized Coefficients		
	B	S.E	Beta	t	sig.	B	S.E	Beta	t	sig.
(Constant)	3.60	0.12		29.69	0.00	3.13	0.36		8.62	0.00
Religious Affiliation	-0.03	0.03	-0.10	-1.09	0.28	-0.03	0.03	-0.09	-1.08	0.28
Sex	0.09	0.07	0.12	1.32	0.19	0.07	0.07	0.09	1.06	0.29
Education	0.02	0.03	0.07	0.80	0.43	0.03	0.02	0.09	1.07	0.29
Attitude towards SCD						0.23	0.08	0.25	2.85	0.01
Knowledge and recommendation on SCD						0.10	0.07	0.12	1.44	0.15

Dependent Variable: testing and genetic counselling

*p < 0.05, **p < 0.01.

Result revealed in model 1 that the relationship between religious affiliation, sex, education and testing and genetic counselling. The P-values of religious affiliation ($p =$ .28), sex ($p = .19$), and education ($p = .43$), and testing and genetic counselling were insignificant ($p > 0.05$). This demonstrates that the confounders did not contribute to genetic counselling and testing.

In the model 2, the independent variables of Knowledge and recommendation on SCD and their perceived attitude towards SCD were introduced in to the model. The P-values of religious affiliation ($p = .28$), sex ($p = .29$), and education ($p = .29$), and testing and genetic counselling were also not significant ($p > 0.05$). This demonstrates that the confounding variables did not contribute to the impact of the independent variables to genetic counselling and testing.

Further, there was significant influence of perceived attitude towards SCD on testing and genetic counselling ($\beta=0.25$, t $= 2.85$, $p<.01$). Additionally, the results ($p=0.01$) indicates that there is a significant relation between the attitude of religious leaders on SCD and genotype testing and genetic counseling (religious leaders practices on SCD). The P-value ($p=0.01$) is significant ($p < 0.05$). The result indicates that an increase in attitude towards SCD relate with their decision on testing and genetic counselling. However, there is a no significant influence of knowledge and recommendation towards SCD on testing and genetic counselling ($\beta=0.12$, t $= 1.44$, $p=.15$). From the result obtained above, we do reject the assumption that the confounding or control variables contributed significant relationship between the religious relationship

between Attitude to SCD, leaders' knowledge and positive recommendation, and genotype testing and genetic counseling.

Summary

This section provided a description of the research design that was used in this study. A quantitative, correlational study was used to explore the role of religious leaders in the prevention of SCD. The target population of the study was religious leaders in Ibadan, Nigeria. A stratified sampling technique was used in the survey to obtain a sample of 180 participants. Participants must have served for a minimum of 3 years in religious leadership roles in order to be considered for inclusion into the study. The data collection instrument employed in this study was a survey questionnaire. Data were collected from secondary sources available in various databases. The data gathered were analyzed using the IBM SPSS software. The ethical issues considered in this study included approval by IRB to conduct the study. Participant also signed an implied consent form and participation was considered consent. Confidentiality was maintained by the use of telephone numbers only and transferring the data into a flash drive and kept in a lockable safe that is accessible only by me. Threats to validity were managed through the use of a stratified sample and cofounders were statistically controlled by through multiple regression analysis.

Chapter 4: Results

Introduction

In this chapter, I present the results from the analysis of primary data that were collected from 150 respondents. Further, I also present related results from other studies. The first section of the chapter includes the response rate and descriptive statistics that represented demographic variables of sampled religious leaders in the study. The second section of the data analysis includes results in relation to the objective of the study, as well as descriptive analysis of the main study variables: knowledge, attitude, and practices of religious leaders with regards to SCD. The various statistical tests that were conducted to test the validity of the research hypothesis and answer the research question are represented in the chapter.

Response Rate

A total of 150 questionnaires were handed over to a stratified sample of religious leaders. The religious leaders in the study represented Christianity, Muslim, and traditional religions. Among the 150 questionnaires, 50 were handed to Christian religious leaders, 50 to Muslim religious leaders, and 50 to traditional religious leaders. These were leaders of various religious sects from different religious organizations. The submitted questionnaires were reviewed for completeness, consistency, and whether they met the inclusion criteria. The response rate was based on the number of fully filled questionnaires. Out of the 150 questionnaires, 130 of the questionnaires were completed fully, which represented an 86.7% response rate. Table 1 below represents the response rate obtained from all sampled participants.

Table 1

Response Rate Among Study Participants(N=130)

Completion Rate	Questionnaires	Percentage %
Fully filled and returned	130	86.7%
Not fully filled/don't meet criteria	20	13.3%
Total	150	100%

Table 2 below illustrates the response rate for each of the stratified groups included in the study: Christianity, Muslim, and other religions. Christian leaders had a response rate of 90%, followed by Muslim leaders with a response rate of 86% while traditional religions had the least response rate of 84%. Overall, primary data used for the analysis were obtained from 45 Christian religious leaders, 43 Muslims religious leaders, and 42 religious leaders from other religions. Primary data used in the analysis were from a total of 130 religious leaders. In the questionnaire, I gathered a range of information from the religious leader, which is illustrated in the following section.

Table 2

Response Rate Among Study Participants per Religion (n=130)

Religion	Frequency	Percent %	Percentage per strata %
Christians	45	34.6	90.0
Muslim	43	33.1	86.0
Other	42	32.3	84.0
Total	130	100.0	

Demographic Results of the Respondents

Demographic information of participants was obtained and analyzed. The demographic information analyzed included gender, age, education, marital status, religion, and years of service. The tables below summarize the demographic characteristics of the participants included in the study indicating the frequencies and percentages. Based on the descriptive analysis, the total number of participants whose data I analysed was 130. The majority of the participants were male religious leaders, representing 90% of the participants, while the female religious leaders represented only 10% of the study participants. The majority of the religious leaders involved in the study were aged between 36 and 49 years, representing 43.1% of the participants. The next most popular age group included participants between the ages of 50 and 64 at 23.1%. The ages of 18 to 35 years of the religious leaders represented 22.3% of the study participants, while the least number of the religious leaders fell between the ages above 65 years at 11.5%

Most of the religious leaders in the study were college graduates who represented 33.1 % of all of the study participants. Religious leaders who were graduates represented 29.2% of the study participants, followed by religious leaders who had only finished high school at 18.5%. Religious leaders whose education level was lower than high school represented 10% of the participants, while few participants were religious leaders who had finished postgraduate education at 9.2%. Most of the participants in the study were married and represented 67.7% of the religious leaders. The single religious leaders were represented by 14.6%, while those who were neither married nor single were represented by 17.7% of the study participants.

The Christian religion was represented by 34.6 % of the participants, while the Muslim religion was represented by 33.1% of the religious leaders. Traditional religions were represented by 32.3% of religious leaders in the study. Most of the religious leaders in the study had worked for 11 to 20 years, representing 37.7% of the participants. The religious leaders who had worked between 21 to 30 years represented 30.8% of the participants, while those who had worked as religious leaders for over 30 years represented 10% of the participants. The religious leaders who had worked for the least number of years fell in the range between 3 and10 years and represented 21.5% of the study participants.

Table 3

Gender of Study Participants Demographic Characteristics (n=130)

Variables	Frequency	Percentage %
Gender		
Male	117	90.0
Female	13	10.0
Total	130	100.0

Table 4

Age of Study Participants Demographic Characteristics (n=130)

Age		
18-35	29	22.3
36-49	56	43.1
50-64	30	23.1
>65	15	11.5
Total	130	100.0

Table 5

Education of Study Participants Demographic Characteristics (n=130)

Education		
Lower than High School	13	10.0
High School	24	18.5
Collage	43	33.1
Graduate	38	29.2
Post Graduate	12	9.2
Total	130	100.0

Table 6

Marital Status of Study Participants Demographic Characteristics (n=130)

Marital Status		
Single	19	14.6
Married	88	67.7
Other	23	17.7
Total	130	100.0

Table 7

Religion of Study Participants Demographic Characteristics (n=130)

Religion		
Christian	45	34.6
Muslim	43	33.1
Other religion	42	32.3
Total	130	100.0

Table 8

Years of Service of Study Participants Demographic Characteristics (n=130)

Years of Service		
3-10 Years	28	21.5
11-20 Years	49	37.7
21-30 Years	40	30.8
> 30 Years	13	10.0

Study Variables Measurements

The variable genotype testing and genetic counseling (religious practices on SCD), which was the dependent variable of the study, was measured by 7-point, Likert scale items. The dependent variable was computed as the mean score of the 7-point, Likert scale items. The mean score varied from 1 to 9 where 1 represented low testing *and genetic counseling* while 9 represented a *high testing and genetic counseling*.

Knowledge and positive recommendation on SCD (knowledge and positive recommendation on SCD) was an independent variable of the study. The variable was measured by 10-point, Likert scale items. The variable was computed as the mean score of the 10-Likert scale items. On Likert scale, 1=extremely low; 2=very low; 3=moderately low; 4= slightly low; 5= neither low high; 6=slightly high; 7=moderately high; 8=very high; 9=extremely high

The attitude of religious leaders towards SCD (attitude on SCD) was the second independent variable of the research study. The variable was measured by 5-point, Likert scale items. The variable was computed as the mean score of the 5-point, Likert scale items. The mean score varied from 1 to 9 where 1 represented *low attitude of religious leaders towards SCD* while 9 represented *high knowledge and positive recommendation on SCD*.

Reliability analysis was used to test the internal consistency of the study Likert scale items in measuring the study variables based on the sampled study participants. Results of the reliability analysis are indicated in the following section.

Reliability Analysis

Reliability analysis was conducted to assess the internal consistency of the survey

instrument in measuring the study variables through the use of Likert scale items with a

score range 1 to 9. The Likert scale items were used to measure and compute the mean

scores of each of the three study variables: knowledge and recommendation of SCD,

attitude on SCD, and practice by religious leaders to counter SCD. Cronbach Alpha (α)

was used as a measure of the internal consistency of the survey instrument. According to

Manerikar and Manerikar (2015), the minimum acceptable level of Cronbach Alpha is α

= 0.60. However, a Cronbach Alpha where $\alpha \geq 0.70$ indicates a good internal consistency

of the scale items in measuring the study variables within the sample used in the study.

Table 9 below illustrates the internal consistency of the Likert scale item of the survey

instrument used for the study.

Table 9

Reliability Report of Independent and Dependent Study Variables (n=130)

Variables	*M*	*SD*	Range	α
Knowledge and recommendation on SCD	5.61	.90	1-9	.767
Attitude towards SCD	4.65	1.25	1-9	.810
Religious practices on SCD	5.13	1.21	1-9	.744

Table 9 indicates good reliability results. The internal consistency of the Likert scale items can be termed as good based on the values of the Cronbach alpha statistic (α > .70). There was a high level of internal consistency within the study items for each variable under study within the sample used. The Likert scale items measuring each variable were reliable. This further indicated the reliability of the survey instrument and the results of the study.

Descriptive Analysis of Study Variables

Genotype Testing and Genetic Counseling

Based on the overall arithmetic mean and standard deviation on the dependent variable, which indicted 5.13 and 1.21 respectively, the religious leaders reported some appreciable genotype testing and genetic counseling to their congregations. The religious leaders reported a high level of knowledge and positive recommendation on SCD considering their overall arithmetic mean of 5.61 and standard deviation of 0.90 respectively. Also, almost half of the respondents reported positive attitudes toward SCD based on their overall arithmetic mean of 4.65 with a standard deviation of 1.25. Based on Table 10, the arithmetic mean of each of the seven items used to measure the variable, genotype testing and genetic counselling on SCD, ranged from 4.35 to 6.01.

Table 10

Descriptive Statistics of Testing and Genetic Counseling on SCD (n=130)

Item	Mean	SD	Importance	Item level
I initiate several programs in the Church/Mosque/ organization to support family members with SCD	4.55	2.12	6	Fair Practice
I recommend other practices than genotype screening for preventing sickle cell disease	4.35	1.66	7	Poor Practice
I frequently organize genotype screening campaign in my community	4.88	1.66	5	Fair Practice
My community/congregation positively responds to the organized genotype screening campaigns.	4.89	1.89	4	Fair Practice
I organize various other activities geared towards prevention of SCD	5.13	2.10	3	Fair Practice
I recommend that youth in my church/mosque/organization to attend counseling and seek genotype screening as a prevention measure for sickle	5.93	2.02	2	Fair Practice

cell disease in their offspring

My efforts lead to improved marital counselling on SCD	6.01	1.94	1	Fair Practice
General arithmetic means and standard deviation	5.13	1.21		Fair Practice

The highest mean was for the item *"My efforts leads to improved marital counselling on SCD"* with a mean of 6.01and standard deviation of 1.94. The lowest mean was for the item *"*I recommend other practices than genotype screening for preventing sickle cell disease" with a mean of 4.35 and a standard deviation of 1.66. The overall arithmetic mean and standard deviation of the dependent variable testing and genetic counselling on SCD was 5.13 and 1.21 respectively.

Genotype testing and genetic counseling (religious practices on SCD) among the religious leaders was fair. The religious leaders made good efforts in their fight against SCD among their members and the communities they reached out to. The religious leaders had a fair ability to convince premarital couples to attend genotype screening and genetic counselling as an intervention to prevent SCD. The scores of the variable genotype testing and genetic counselling on SCD ranged from 1(low)-9 (high). Figure 3 presents the distribution of the scores of genotype testing and genetic counselling on SCD among the religious leaders who participated in the study. The scores were calculated as the mean score of the seven items under the construct of genotype testing and genetic counselling on SCD.

Religious Practice on SCD
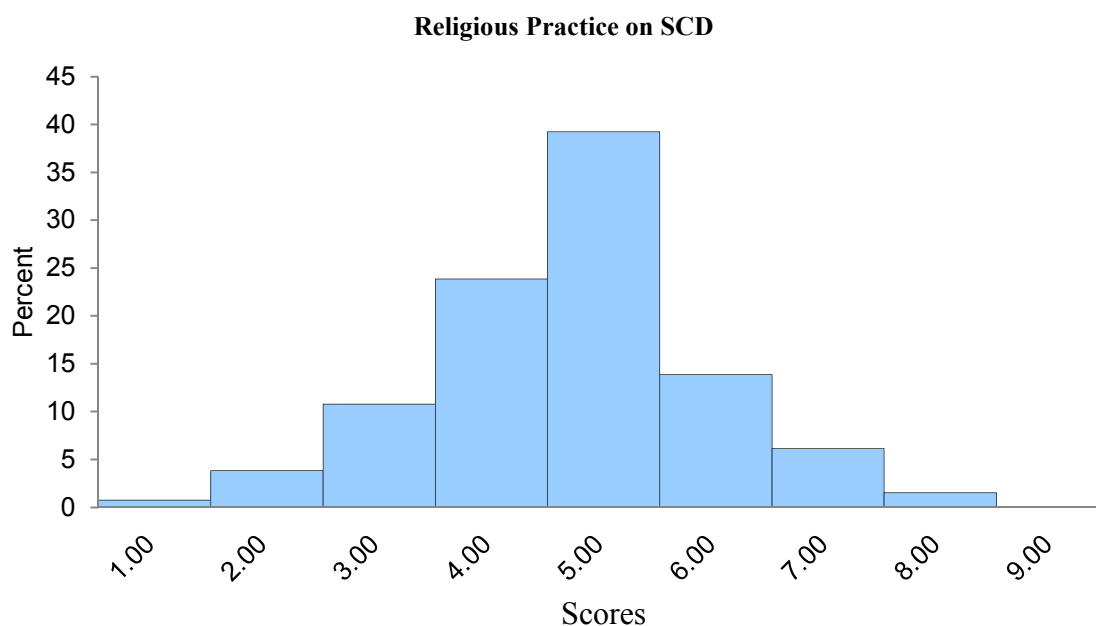
Figure 3. Distribution of the dependent variable mean score among the religious leaders.

Based on the scores of the dependent variable as shown in Figure 3, most of the religious leaders in the study had a mean score of 5 representing 36.15% of the study participants. Most of the religious leaders demonstrated fair practice to prevent SCD among their congregations and the communities they reached to. Some of the religious leaders, as indicated in Figure 3, had poor practices while others had initiated good practices to prevent the prevalence of SCD.

Knowledge and Positive Recommendation on Sickle Cell Disease

I established the descriptive statistics of the first independent variable, knowledge and positive recommendation on SCD, as indicated in Table 11. The arithmetic mean of the items, their standard deviation, item importance, and item level were used to describe the construct of knowledge and positive recommendation of the religious leaders. The

mean of the individual items was used to determine the item level and importance of the item within the independent variable construct. The item level was categorized into two parts: high knowledge for item mean scores above 5.4 and low knowledge for item mean score below 5.4.

I established the descriptive statistics of the first independent variable, knowledge and positive recommendation on SCD, as indicated in Table 11. The arithmetic mean of the items, their standard deviation, item importance, and item level were used to describe the construct of knowledge and positive recommendation of the religious leaders. The mean of the individual items was used to determine the item level and importance of the item within the independent variable construct. The item level was categorized into two parts: high knowledge for item mean scores above 5.4 and low knowledge for item mean score below 5.4.

Table 11

Descriptive Statistics of Knowledge and Positive Recommendation on SCD (n=130)

Item	Mean	SD	Importance	Item level
I have knowledge on genotype testing	5.55	1.47	7	High knowledge
Genotype screening is important	5.67	1.69	2	High knowledge
I have adequate knowledge on sickle cell disease	5.64	1.51	5	High knowledge
I have knowledge on the symptoms of Sickle cell disease	5.34	1.63	9	Low knowledge
I believe sickle cell disease can be prevented	5.49	1.66	8	High knowledge
premarital genotype screening is important	5.65	1.68	3	High knowledge
I would recommend genotype screening for a couple during pre-marital counseling	5.56	1.49	6	High knowledge
genotype screening help in preventing sickle cell disease	5.65	1.42	3	High knowledge
I often talk about health to my congregation	5.79	1.53	1	High knowledge
What is the level of your religious beliefs towards SCD and its prevention?	4.63	1.73	10	Low knowledge

General arithmetic mean and standard deviation	5.61	0.90	High knowledge

Based on Table 11, the arithmetic mean of each of the 10 items used to measure the variable knowledge and positive recommendation on SCD ranged between 4.63 and 5.79. The highest mean was for the item "*I often talk about health to my congregation*" with a mean of 5.79 and standard deviation of 1.53. The lowest mean was for the item *"What is the level of your religious beliefs towards SCD and its prevention?"* with a mean of 4.63 and a standard deviation of 1.73. The overall arithmetic mean of knowledge and positive recommendation on SCD was 5.61 with a standard deviation of 0.90.

In general, knowledge and positive recommendation on SCD among the religious leaders was high. The religious leaders had a high level of knowledge on SCD and positively recommendations on SCD. The scores of the variable knowledge and positive recommendation ranged from 1(low)-9 (high). Figure 4 presents the distribution of the scores of knowledge and positive recommendation on SCD among the religious leaders who participated in the study. The scores were calculated as mean score of the 10 items under the construct of knowledge and positive recommendation on SCD.

Knowledge and Positive Recommendation on SCD
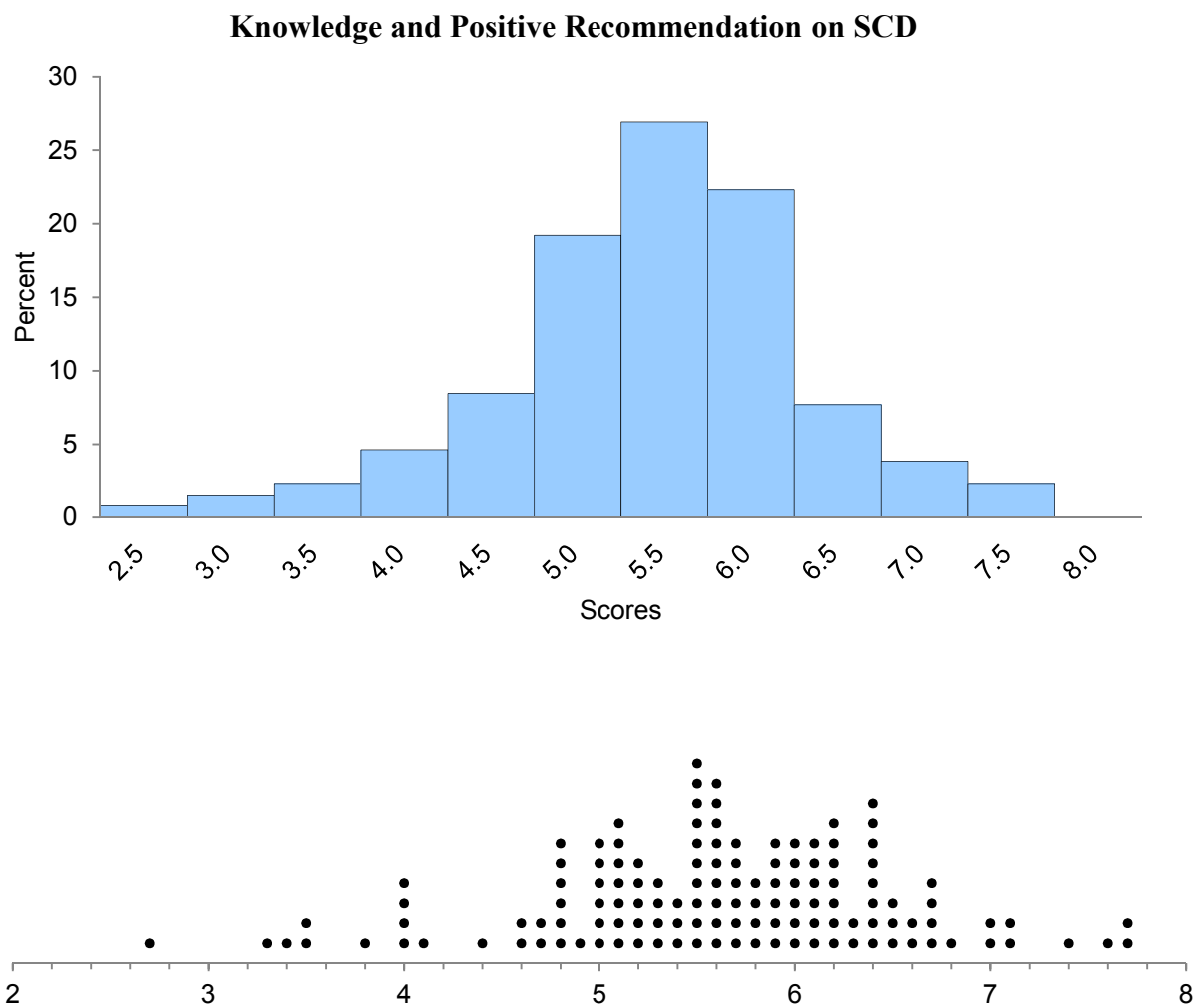
Figure 4. Distribution of the mean score of knowledge and positive recommendation on SCD.

Based on the score of knowledge and positive recommendations on SCD as shown in Figure 4, most of the religious leaders in the study had a score of 5.5. Most of the religious leaders in the study had a higher knowledge on SCD and presented positive recommendations to their congregations and the communities they reached out to. A number of the religious leader had low level of knowledge on SCD as well as positive recommendations towards preventing SCD among premarital couples in their congregations; such religious leaders had individual mean scores of 3 and 4 representing 2.31% and 4.92% of the participants of the study.

Attitude towards SCD

I established the descriptive statistics of the first independent variable, attitude towards SCD, as indicated in Table 12. The arithmetic mean of the items, their standard deviation, item importance, and item level were used to describe the construct of attitude of the religious leaders towards SCD. The mean of the individual items was used to determine the item level and importance of the item within the independent variable construct. The item level for the religious leaders' attitude towards SCD was based on the mean class interval. The mean class interval was calculated as follows.

$$\text{Mean class interval} = \frac{Maximum score - minimum score}{number of levels} = \frac{9-1}{3} = 2.67$$

The low item level; low attitude towards SCD ranged from 1-3.67 while the median item level; fair attitude towards SCD ranged from 3.68-7.34, and high item level; high attitude towards SCD ranged from 7.35 and above.

Table 12

Descriptive Statistics of Attitude towards SCD (n=130)

Item	Mean	SD	Importance	Item level
How important is interpretation of statistics concerning SCD among the newborns in Nigeria?	4.64	1.72	1	Fair attitude
How important is it for couples to be counseled about SCD during pre-marital counseling	4.78	1.68	2	Fair attitude
Attitude of your congregation towards sickle cell disease	3.52	1.66	3	Low attitude
I receive positive feedback from potential couples after counseling them about the importance of genotype testing	4.57	1.58	8	Fair attitude
Parents who have children with sickle cell disease among my congregation feel they can prevent the disease.	4.72	1.67	4	Fair attitude
General arithmetic mean and standard deviation	4.65	1.25		Fair attitude

Based on Table 12, the arithmetic mean of each of the five items used to measure attitude towards SCD among the participants ranged between 3.52 and 4.78. The highest mean was for the item "*How important is it for couples to be counseled about SCD during pre-marital counseling*" with a mean of 4.78 and a standard deviation of 1.68. The lowest mean was for the item *"Attitude of your congregation towards sickle cell disease"* with a mean of 3.52 and a standard deviation of 1.66. The overall arithmetic mean of all the five items measuring attitude on SCD among the participants was 4.65 with a standard deviation of 1.25.

In general, almost half of the religious leaders sampled reported fair attitude towards SCD. The scores of the variable knowledge and positive recommendation ranged from 1(low)-9 (high). Figure 5 presents the distribution of the scores of attitude towards SCD among the religious leaders who participated in the study. The scores were calculated as mean score of the five items under the construct of attitude towards SCD.
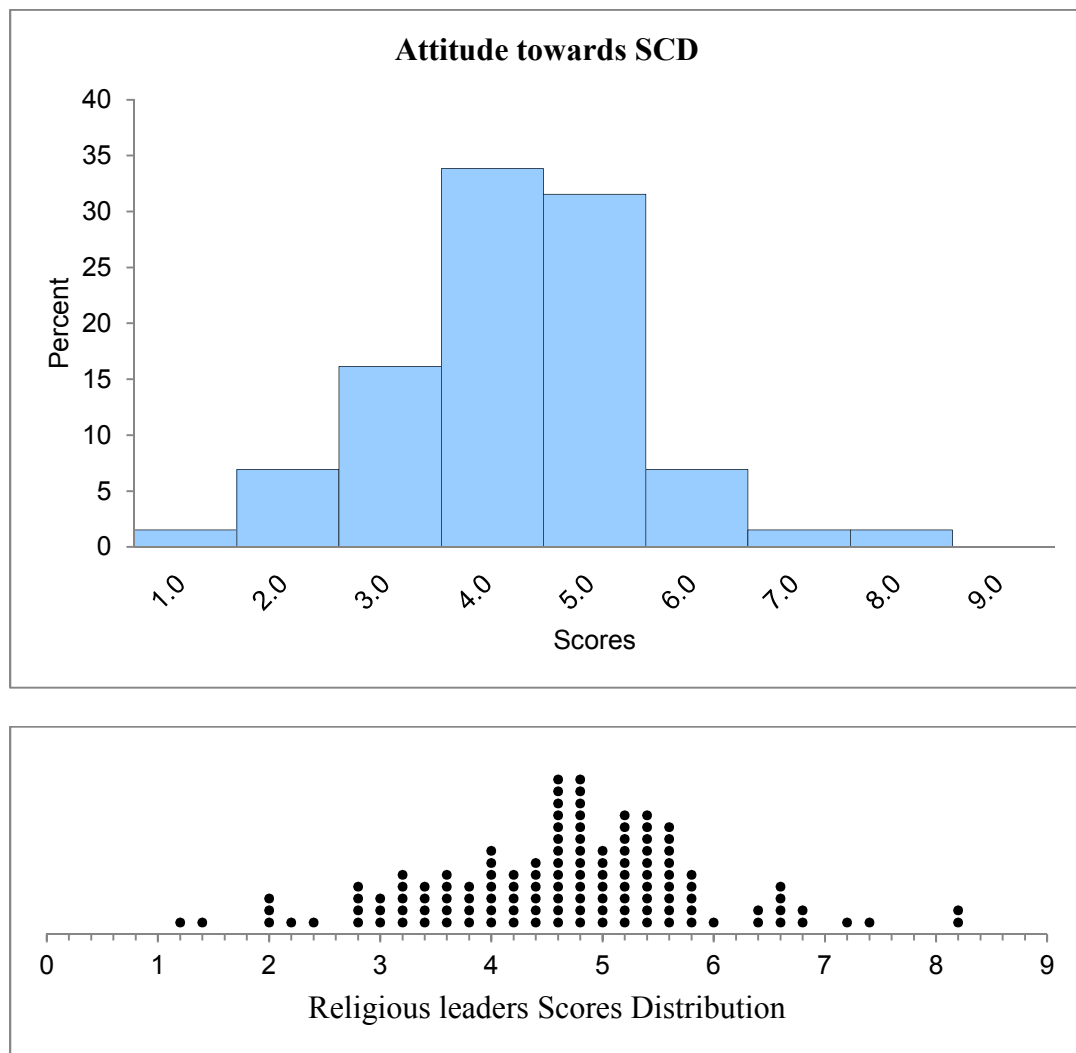
Figure 5. The distribution of the mean score of the religious leaders' attitude towards SCD.

Figure 5 further indicates that most of the religious leaders had scores ranging from 4.0-6.0 representing fair attitude towards SCD. A relative number of the religious leader had low attitude towards SCD with scores ranging from 1.0-3.0.

Hypotheses Testing

The hypotheses formulated for the study were tested to ascertain the relationship between variables and achieve the objective of the study. Correlational analysis as a statistical test was conducted for this purpose. A test for normality was also conducted. Hypotheses for the research tested by correlation analysis were

H_0: There is no significant relationship between religious leaders' knowledge, positive recommendations, and premarital genotype testing and genetic counseling.

H_1: There is a significant relationship in the religious leaders' knowledge, positive recommendations, and premarital genotype testing and genetic counseling.

Knowledge and positive recommendation on SCD had a statistically insignificant p-value ($p = 0.068$). Attitude on SCD had a statistically insignificant P–value ($p=0.080$) while test and genetic counselling (religious practices on SCD) had a statistically insignificant p-value ($p=0.243$). The Shapiro-Wilk p-values of all of the study variables are statistically insignificant ($p> 0.5$). Hence, the null hypothesis of the test on the nature of the relationship between the dependent variable and independent variable was not rejected, and it was concluded that all of the study variables were normally distributed. Based on these results, nonparametric statistical test such as Pearson correlation was applied instead of the nonparametric correlation test, such as Spearman rank correlation, to test the validity of the hypothesis. Pearson correlation analysis was used to test the validity of the research hypothesis.

Religious Leaders' Knowledge on Genotype Testing and Genetic Counseling

Pearson correlation was used to test the research hypothesis. The null hypothesis was tested, and there was no statistically significant relationship in the religious leaders' knowledge and positive recommendations, genotype testing, and genetic counseling (religious practices on SCD). The results are illustrated in Table 14 below.

Table 13.

Correlations and Descriptive Statistics for Key Study Variables (n=130)

Variables		M (SD)	1	2	3
1. Knowledge and	Correlation	3.68 (.03)		.010	-.035
recommendation on SCD	Sig.			.914	.693
2. Attitude towards SCD	Correlation	3.34(.35)			.174
	Sig.				.047
3. Religious practices on SCD	Correlation	3.37 (.28)			
	Sig.				

* $p < .05$

The *P*-value between knowledge and positive recommendation on SCD, and testing and genetic counselling, was *p*=0.693. The *P*-value (*p*=0.693) was insignificant (*p* > 0.05). From the results obtained above, I did not reject the null hypothesis of the test, and I concluded that there was no statistically significant relationship between the religious leaders' knowledge and positive recommendation and genotype testing and genetic counseling. This confirms that the hypothesis of the research study was valid.

Based on the correlation analysis in Table 14, There was a no correlation (*r*= -0.035) between knowledge and positive recommendation on SCD and testing and genetic counseling. There was no statistically significant relationship between the two variables. I found that an increase in knowledge and positive recommendation on SCD among the religious leaders did relate with an increase in genotype testing and genetic counseling. This illustrates the lack of a statistically significant relationship between the two variables.

I found (*p*=0.914) that there was no statistically significant relationship between religious leaders' knowledge and positive recommendation on SCD and their perceived attitude towards SCD. The *P*-value (*p*=0.914) was statistically not significant (*p* > 0.05). Moreover, there was a no correlation (*r*=0.010) between the two variables. An increase in knowledge and positive recommendation on SCD among the religious leaders did not relate with their attitude towards SCD. However, with an increase in knowledge and positive recommendation, there tended to be a positive attitude towards SCD or vice versa. There was a lack of a statistically significant relationship between the two independent variables.

Additionally, it was found that (*p*=0.047) there was a significant relation between the attitude of religious leaders on SCD and genotype testing and genetic counseling (religious leaders practices on SCD). The *P*-value (*p*=0.047) was significant (*p* < 0.05).

However, there was a weak positive correlation (*r*=0.174) among the two variables. When the religious leaders' positive attitude towards SCD increased, genotype testing and genetic counseling practices also increased or vice versa. The two variables tended to move in the same direction. There was a statistically significant positive relationship between the two variables

Chapter Summary

The study results obtained through descriptive and correlational analysis were from data collected from 130 religious leaders in Nigeria. The criterion for the religious leaders' participation in the study was 3 years of experience. The response rate of the study participants was 86.7%. Christian leader represented 34.6% of the study participants. Muslims represented 33.1%, while traditional religions were represented by 32.3% of the participants. The religious leaders had a fair practice of initiating testing and genetic counseling. The knowledge and positive recommendation on SCD among the religious leaders was high, while their attitude towards SCD was moderately positive. It was confirmed that there was no statistically significant relationship between religious leaders' knowledge and positive recommendation and genotype testing and genetic counseling practices. The results obtained represented the views of the religious leaders sampled in the study.

In Chapter 5, the findings obtained were summarized and interpreted in the discussion based on the peer-reviewed literature described in Chapter 2. Limitations and recommendations of the study were discussed and the implications of the study were presented.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

In this chapter, I present the discussion of the findings that were established in this quantitative study. I include recommendations and conclusions of the study based on the discussion of the findings provided. I also present the limitations and implications in the study on SCD.

The purpose of the study was to explore the role of religious leaders in the prevention and fight against SCD in Nigeria. I aimed to establish the level of knowledge of the religious leaders on SCD and how their understanding, attitude, and beliefs of the disease translated in their efforts to prevent the disease by improving genotype counseling on SCD during marital counseling. I explored how the knowledge on SCD among the religious leaders has been applied in improving early testing of SCD among premarital couples and improving marital counseling outcomes. Additionally, I examined the attitude that the religious leaders had on SCD and whether it impacted their efforts in preventing SCD through genotype testing and genetic counseling.

The study was structured under the framework of the HBM and construct of the SCT collective efficacy. The study was a quantitative correlation design that involved a systematic investigation of the nature of relationships between the study variables. The design assisted in building on the existing literature through establishing the relationship among variables related to SCD. The correlation coefficients ranged from -1.0 to +1.0 from which the patterns in relation to the strength and direction of the relationship among the study variables was established based on the religious leaders' beliefs and religion.

The quantitative approach supported the establishment of descriptive results of the items under the construct of the study variables. All statistical analyses done to establish the results of the study were performed using IBM SPSS.

Several key findings based on the data retrieved from 130 religious leader participants who were recruited from three religious groups: Christians, Muslims, and traditional religions were established. Primary data were collected through a survey, and an informed consent was provided with the assurance of confidentiality of the information obtained from the survey. Data were obtained through the use of quantitative, semi-structured questionnaires that were handed out to the religious leaders. The majority of the participants were male religious leaders, Christians, between the ages of 36-49, married, college graduates, and with 11-20 years of service as religious leaders. Previous scholars have focused on testing and genetic counseling on SCD offered by religious bodies as a part of marriage requirements (Gbenol et al., 2015). It is, however, unclear whether the efforts of the religious bodies in offering premarital counseling is effective in leading to the prevention of SCD, and whether the quality of counseling meets scientific standards. Hence, focus was on establishing whether religious leaders had enough knowledge of SCD to enhance their counseling to enable premarital couples to make informed decisions.

Most of the religious leaders' efforts of prevention of SCD through testing and genetic counseling were found to have led to improved marital counseling on SCD among their congregation members. However, the religious leaders were poor in recommending other practices of preventing SCD rather than genotype screening among

their congregation. The religious leaders' efforts on testing and genetic counseling in relation to their beliefs and religion were found to be fair.

The results from the descriptive and correlational analysis of the data provided were presented in Chapter 4. The variables studied included religious leaders' knowledge and positive recommendation on SCD, religious leaders' attitude towards SCD, and testing and genetic counseling as the dependent variable of the study. Based on the knowledge and positive recommendation on SCD, I established that most of the religious leaders shared their knowledge about health matters related to SCD with their congregation. The level of religious beliefs among some religious leaders towards SCD was a significant contributor to the lack of knowledge on the disease. The religious leaders' knowledge on SCD was, however, found to be relatively high. Based on the religious leaders' attitude towards SCD, the religious leaders had higher attitudes regarding counseling on SCD during premarital counseling. The religious leaders believed that their congregation had a low positive attitude towards SCD. The attitude of the religious leaders towards SCD, in general, was fair.

No significant relationship between the religious leaders' knowledge and their willingness in leading their followers to genotype testing and genetic counseling was established. There was also no relationship between religious leaders' knowledge and positive recommendation on SCD and their attitude towards SCD. Finally, a significant relationship between the religious leaders' attitudes on SCD and their efforts in the prevention of the disease through testing and genetic counseling was established. The religious leaders could contribute significantly to SCD prevention activities in Nigeria.

Interpretation of the Findings

In this section, findings of the study based on existing literature on SCD and the theoretical framework employed were discussed. Also presented was an interpretation of the descriptive findings, as well as the correlational findings established in the study

Level of Knowledge of Sickle Cell Disease among Religious Leaders in Nigeria

The knowledge of SCD among the religious leaders in Nigeria was high; as such, the religious leaders could be at the forefront of sharing this knowledge through health talks with their congregation. Moronkola and Fadairo (2007) also found that the knowledge of SCD among Nigerians was high. However, this finding is contrary to the findings established by Durotoye et al. (2013), who indicated that the level of awareness of SCD was low in Nigeria. The findings are consistent with those established by Lumpkins et al. (2012), who indicated that religious leaders have successfully been used in the promotion of health exercises among their congregations and communities.

Attitude towards Sickle Cell Disease

It was found that religious leaders perceived that it was important to interpret statistics concerning SCD among the newborns in Nigeria. The WHO (2017) pointed out that approximately 300,000 children are born with SCD and related hemoglobin disorders every year. In sub-Saharan Africa, in a country like Nigeria, 3% of the children born there are affected with SCD (Grosse et al., 2011). In addition, 150,000 births per year are affected with SCD in Nigeria (Anie et al., 2010). Further, the mortality rate of the newborns in African countries is about 50-90% (Grosse et al., 2011). Interpretation of statistics on SCD is significant in creating awareness in the people in Africa of the

prevalence of the disease (Grosse et al., 2011). The religious leaders believe that the interpretation of statistics concerning SCD among newborns will aid them in gaining more knowledge of the disease, as well as influence their efforts towards the prevention of the disease through encouraging their congregations to attend premarital testing and genetic counseling on SCD.

Testing and Genetic Counseling

It was established that the religious practice on SCD was fair; the religious leaders' efforts in encouraging and implementing practices on testing and genetic counseling were found to be fair. The religious leaders recommended premarital couples to seek premarital genotype screening and genetic counseling as a prevention measure of SCD. My results are consistent with the findings by Dibua (2010), who argued that religious leaders' involvement is important in encouraging premarital screening. Moreover, religions tend to influence positive health behaviors and healthy lifestyle among their followers (Lewis, 2008; Rivera-Hernandez, 2015; Ruijs et al., 2013; Rumun, 2014). Religious leaders in faith-based institutions contribute towards health promotion, as well as disease prevention (Rumun, 2014). According to Levin (2014), faith-based organizations have been underused in the promotion of health and disease prevention, which explains why the religious leaders' efforts towards prevention of SCD were found to be fair.

The findings further align with Adeyemo et al.'s (2007) study results, which indicated that premarital genotype screening and genetic counseling are effective methods that are used and recommended to prevent the prevalence of SCD. In addition,

Adewoyin (2015) indicated that premarital screening and genetic counseling programs and initiatives are significant in reducing the number of cases of children born with SCD and other hemoglobinopathies. This is also in relation to the findings by Omuemu et al. (2013), who found that premarital screening is a crucial initiative for the diagnosis of SCD and helps reduce the prevalence of the condition among newborns. Premarital genetic screening provides a chance for couples to become aware as well understand their genetic predisposition to SCD. This makes it a reliable method that can be recommended to prevent SCD (Oyedele et al., 2015). Fernandes et al. (2010) also supported the use of genotype counseling of parental family members of a patient as a strategy to minimize SCD-related mortalities. Hence, premarital counseling and genotype screening is an effective preventive measure of the prevalence of SCD.

It was also found out that the efforts of the religious leaders fairly led to improved marital counseling on SCD among their congregation members. This concurs with Anshel and Smith's (2014) argument that religious leaders who could influence the health behaviors of their congregations tend to be ignored. Their contribution in health delivery is not sufficiently reorganized (Widmer et al., 2011). Hence, their practices towards the fight of SCD turn out to be fair. It was established that religious leaders fairly organize genotype screening campaigns in their community. Such practices are geared towards creating awareness of SCD to the people of the community. The findings are consistent with Okyay et al. (2016) and Umar and Oche (2012), who highlighted the importance of creating awareness and knowledge about SCD in the community to encourage premarital

spouses to attend genetic counseling before they consider marriage as a way of preventing the prevalence of the disease among newborns.

The study also revealed that there was a significant relationship between religious leaders' attitudes towards SCD and their practices in preventing the prevalence of SCD through encouraging premarital testing and genetic counseling among their congregation members. The success of premarital screening and genetic counseling programs and initiatives depends on an individual's attitude towards SCD, as well as the genetic screening and counseling on SCD (Adeyemo et al., 2007; Aneke & Okocha, 2016). The findings are also consistent with Moronkola and Fadairo (2007), who established that due to the positive attitude towards SCD among Nigerians, the religious leaders may encourage more Nigerians to attend premarital screening and genetic counseling.

It was discovered that the religious leaders were poor in recommending other practices of preventing SCD rather than genotype screening among their congregation. SCD has only one known cure; hence, there were limited practices that could be exercised in preventing SCD. The result aligns with findings by Okyay et al (2016), who indicated that bone marrow transplant is the only known cure of SCD, and it is rarely done due to the significant risks involved, as well as the high cost of undertaking the procedure. Additionally, Abioye-Kuteyi et al. (2009) indicated that the medical need for the treatment of SCD is long term due to the chronic nature of the disease and may have further psychological and economic impacts on the patients and affected families. The high knowledge of such information on SCD by the religious leaders would prevent them in recommending such practices among their congregations.

Religious Leaders' Knowledge and Testing and Genetic Counseling

There was no relationship between the religious leaders' knowledge and positive recommendation on SCD, and their efforts in encouraging testing and genetic counseling. The findings are inconsistent with the results of Moronkola and Fadairo (2007), who contended that the high knowledge that religious leaders have on SCD would enable them to influence an increase in the number of Nigerians who attend premarital screening and genetic counseling. However, this was not the case in the current study, as there was neither a positive nor a significant relationship between knowledge and the practices of religious leaders to recommend testing and genetic counseling among their congregation members. The findings are contrary to the argument that premarital screening and genetic counseling programs and initiatives depend on the extent of knowledge that an individual has of SCD and understanding of the consequences of having an affected child (Adeyemo et al., 2007; Aneke & Okocha, 2016). Through sharing their knowledge on SCD to their congregation as an engagement strategy, it is expected that it would likely influence the decision making of the members of the congregation, especially the premarital couples who would then take the initiative to have genotype testing and genetic counseling as a measure to prevent the prevalence of SCD in Nigeria.

Interpretation in a Theoretical Perspective

The study was based on two theoretical frameworks. The first framework was based on perceived susceptibility/severity and readiness to act, which are constructs of the HBM that was developed by Hochbaum et al. (1952). The other theoretical framework was collective or group efficacy, a construct from Bandura's (1986) SCT.

Hochbaum et al.'s model is aimed at elucidating and predicting preventive health-related behaviors. Collective efficacy was adapted in the study to find out the level of the religious leaders' knowledge on SCD and its prevention and explore their interest in bringing about the desired behavioral change among their followers.

Under SCT framework, the intervention of religious leaders in the prevention of SCD was expected to influence their members in taking health-related action to prevent the prevalence of SCD. I established that religious leaders had a high knowledge of genotype screening and believed that premarital genotype screening was important in the prevention of SCD. The religious leaders also believed that SCD could be prevented. The findings concurred with the model, as religious leaders perceived that SCD was a serious disease and believed that they could help their members to make healthy choices before getting married.

The religious leaders believed that their members were susceptible to the disease and made efforts to recommend genotype screening and genetic counseling to their congregations as a preventive measure. Through their perception that genotype testing is important in the prevention of SCD, the religious leaders offered a positive recommendation to their congregation to undergo genotype screening. Consequently, it was established that there was a relationship between the religious leaders' attitude towards SCD and their efforts in encouraging their congregation to undergo testing and genetic counseling. The religious leaders' attitude and perception of the benefits of premarital counseling influenced them to offer and recommend testing and genetic counseling among their members.

SCT provided a framework of influencing testing and genetic counseling as an intervention to the prevalence of SCD. It was also established that the religious leaders had a high knowledge of SCD, which corresponds to collective efficacy as reflected in SCT. Because of the religious leaders' knowledge, they are more likely to influence the members of their congregation to undergo testing and genetic counseling as a preventative measure on SCD among the premarital couples. Additionally, the religious leaders' attitude towards SCD significantly dictated their efforts to advise their members on premarital genotype testing and genetic counseling among their members. The SCT framework was consistent with the study findings relating to the attitude of religious leaders on SCD, premarital genotype testing, and genetic counseling among their members.

Limitations of the Study

The study had some limitations that impacted it generalizability, validity, and reliability. Primary information provided by participants was entirely relied upon.. Although measures to ensure the validity and reliability of the information provided was put in place through the survey conducted in the study, the information might have been exaggerated and participants may not have answered all of the questions in the study correctly. The multiple selection questions may also have encouraged guessing (Onwuegbuzie & Johnson, 2006). The results may have been influenced by the bias of the participants. Use of secondary sources of information would have enhanced the generalization of the findings obtained in the study. Moreover, the information provided and analyzed in the study could only be generalized to religious leaders in Ibadan,

Nigeria; it cannot be generalized to other parts of the country. A similar study in other countries or a similar study that sources information from different countries is needed to generalize the findings of the research to other geographical regions.

Additionally, the exclusion of religious leaders who had served for fewer than 3 years was a limitation in the study. The exclusion limited the scope and number of individuals who could participate in the study. The exclusion was made in an attempt to maximize the validity of the information provided. This was grounded on having information obtained from experienced religious leaders, which was measured by the number of years that they had served as religious leaders. The study was limited to a quantitative nature through the use of a quantitative questionnaire instrument. Information on knowledge and attitude can best be captured using a qualitative survey instrument. This limited the validity and reliability of the study, which could be enhanced in a mixed-method approach.

The external variables that might have influenced or affected the relationships of the variables under study and limited the validity of the results were not controlled. These external variables might have affected the relationships between the study variables. Such variables are confounded to improve the validity of the results obtained. Therefore, readers should take caution while interpreting the findings of the study because the results might be different if other factors are taken into consideration.

Recommendations

Quantitative approach was employed to examine knowledge, attitude, and practice. It is recommended that future scholars examine such constructs using a mixed-

methodology approach. A qualitative approach could be designed that might provide more comprehensive evidence and an in-depth examination of knowledge, attitude, and practices of religious leaders regarding SCD, its prevalence, and premarital genotype testing and genetic counseling. A correlation design was employed to establish the nature of the relationship of the variable in the study.

Other methods that measure the cause and effects between the response and dependent variables could be used in future research to measure the impact of knowledge and positive recommendation on SCD, and attitude on premarital testing and genetic counseling as a dependent variable. Additionally, future researchers should consider confounding the external variables that might have influence on either or both the dependent variable and the independent variables of the study. This would improve the internal validity and ensure that the results obtained better reflect the research objective and better represent the population.

The hypothesis that there is a significant relationship between religious leaders' knowledge and positive recommendations on SCD and their efforts in encouraging premarital genotype testing and genetic counseling was rejected. It was found that religious leaders did not require having knowledge on SCD to implement practices that lead to premarital genotype testing and genetic counseling. This goes contrary to many of the prior studies. It is recommended, therefore, that future scholars examine the relationship between individuals having knowledge on SCD and its impact in having them or related members attend genotype testing and genetic counseling. It is recommended that future studies be conducted in other areas of Nigeria, as well as other

countries, in relation to the role of religious leaders in influencing premarital genotype testing and genetic counseling among the members before marriage as a preventive measure on SCD. This would enable generalization of the findings of the current and future research on the topic.

Implications

The role of religious leaders in the prevention of SCD through exploring their knowledge, attitude, and practices in relation to SCD was investigated. Due to the lack of studies on the role of religious leaders in the prevention of SCD, more studies on the influence of religious leaders on their members in undergoing premarital genotype testing and genetic counseling as a prevention of SCD are needed. Consequently, the study opens the door for future research about the role of religious in the prevention of SCD and other hemoglobinopathies.

The findings of the study provided many possible outcomes. It revealed the influence of religious leaders' knowledge in translating to improved counseling on prospective couples. Despite not obtaining a significant relationship between religious leaders' knowledge on SCD and their efforts in encouraging premarital genotype testing and genetic counseling, knowledge on SCD by both the religious leaders and members of the society and its impact in influencing premarital genotype testing and genetic counseling is necessary for further research development (Adeyemo et al., 2007; Aneke & Okocha, 2016; Asekun-Olarinmoye et al., 2013; Moronkola&Fadairo, 2007). Religious leaders should use more of the knowledge gained on SCD to persuade their members to attend premarital genotype screening and genetic counseling programs. The study

provides knowledge on the role of religious leaders in the prevention of SCD through implementing various practices to encourage premarital genotype testing and genetic counseling of their congregation members, especially would-be spouses who are enabled to make informed decisions before marriage.

Conclusion

The prevalence of SCD in Nigeria is a serious course of concern that requires the attention of influential persons in the community, such as religious leaders. Although research has been conducted on preventative measures of SCD, little has been done regarding the role of religious leaders in preventing SCD. SCD has only one known cure, bone marrow transplant, which is costly for the majority of affected newborns and has a significant risk involved in undertaking such medical procedures that could also be fatal.

Other methods can be put in place, such as premarital genotype screening and genetic counseling, to counter the high prevalence in newly reported incidences of the disease. Religious leaders can suggest such measures to members of their congregations, especially the premarital couples who are considering marriage. It is important to understand the role that religious leaders play in preventing SCD and factors that influence the impact of their interventions. The knowledge of SCD and attitude towards SCD among the religious leaders plays a part in influencing their practices to encourage premarital genotype screening and genetic counseling. It was found out that the religious leaders' attitude towards SCD was a significant contributor to their practices in preventing the disease while extant researchers indicated that knowledge on SCD among the religious leaders is influential in their campaigns to prevent the prevalence of the

disease. Religious leaders should focus their attention on having a positive attitude towards the disease, as well as gaining knowledge on the disease to influence people to have genotype testing and premarital counseling as a way to prevent SCD. With time, no Nigerian will go into a marital relationship without adequate understanding of their genotype status and genetic counseling where necessary.

Also highlighted was the role the religious leaders can play in the prevention of SCD in Nigeria by acting as change agents in making sure that every prospective couple is aware of their genotype status before becoming parents. Religious institutions must include genotype screening as part of their premarital counseling topics for would-be couples. The government can make it mandatory for prospective couples to present their genotype certificates prior to wedding authorization in any government-approved institutions or registries. However, continued research on the role of religious leaders in preventing SCD is needed to prove their significance in influencing genotype testing and genetic counseling of people in different societies. This can lead to more interventions of the religious leaders and the reduction in the prevalence of SCD as well as better health care outcomes.

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Appendix A: Letters of Cooperation from Religious Organizations

Letter of Cooperation

Nigerian Religious Council (Christian Council of Nigeria, League of Imams & Others)

Ibadan North Branch`

Ibadan.

Date

Dear Ms. Awe,

Based on my review of your research proposal, I give permission for you to conduct the study entitled "Exploring the Role of Religious Leaders in Preventing Sickle Cell Disease in Nigeria" among the members of the Nigerian Religious Council. As part of this study, I authorize you to collect members' cell phone numbers from the leaders of our religious groups without collecting their names. Individual cell phone numbers will be used to contact participants and their participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include the provision of members' cell phone numbers. We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this organization and that this plan complies with the organization's policy.

I understand that the cell phone numbers collected will remain entirely confidential and may not be provided to anyone outside of the student's supervising faculty/staff without permission from Walden University IRB.

Sincerely.

High Chif In Ifa/Orisa religion

23/01/07

Traditional Religion

Letter of Cooperation

Nigerian Religious Council (Christian Council of Nigeria, League of Imams & Others)

Ibadan North Branch`

Ibadan.

Date

Dear Ms. Awe,

Based on my review of your research proposal, I give permission for you to conduct the study

entitled "Exploring the Role of Religious Leaders in Preventing Sickle Cell Disease in Nigeria"

among the members of the Nigerian Religious Council. As part of this study, I authorize you to

collect members' cell phone numbers from the leaders of our religious groups without collecting

their names. Individual cell phone numbers will be used to contact participants and their

participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include the provision of members' cell

phone numbers. We reserve the right to withdraw from the study at any time if our circumstances

change.

I confirm that I am authorized to approve research in this organization and that this plan

complies with the organization's policy.

I understand that the cell phone numbers collected will remain entirely confidential and may not

be provided to anyone outside of the student's supervising faculty/staff without permission from

Walden University IRB.

Sincerely.

on behalf of P.F.M. Ibd North L.G. Chapter. (C.A.N)

Letter of Cooperation

Nigerian Religious Council (Christian Council of Nigeria, League of Imams & Others)

Ibadan North Branch˙

Ibadan.

Date

Dear Ms. Awe,

Based on my review of your research proposal, I give permission for you to conduct the study entitled "Exploring the Role of Religious Leaders in Preventing Sickle Cell Disease in Nigeria" among the members of the Nigerian Religious Council. As part of this study, I authorize you to collect members' cell phone numbers from the leaders of our religious groups without collecting their names. Individual cell phone numbers will be used to contact participants and their participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include the provision of members' cell phone numbers. We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this organization and that this plan complies with the organization's policy.

I understand that the cell phone numbers collected will remain entirely confidential and may not be provided to anyone outside of the student's supervising faculty/staff without permission from Walden University IRB.

Sincerely,

Dr M.A. Noibi
For League of Imans
Ibadan North Local Government

Appendix C

Appendix B: Survey Questionnaire

SCD Survey Questionnaire

1. Form No.:

2. Date

Questionnaire Part 1: Demographic Information
(Please tick appropriately)

1. What is your gender?
   Male [ ]   Female [ ]

2. What is your age?
   18-35 [ ]   36-49 [ ]   50-64[ ]   >65[ ]

3. What is the highest level of education you have achieved?
   Lower than High School [ ]   High School [ ]   College [ ]
         Graduate [ ]
   Post graduate [ ]

4. What is your Marital Status?
   Single [ ]   Married [ ]   Other [ ]

5. What is your Religion?
   Christian [ ]   Muslim [ ]   Other [ ]

6. How long have you been serving as a religious leader in the current church

   /Mosque/other religion structures?

   3 year [ ]   4-7years [ ]   8-10 years [ ]   10-15 years [ ]
   More than 15 years [ ]

7. What is your denomination/sect?

   _____

   _____

Questionnaire Part 1: Knowledge and Recommendation of SCD
(Please tick appropriately your personal evaluation of your knowledge on SCD)

Statement/Questions	1 (Low)	2	3	4	5	6	7	8	9 (High)
I have knowledge on genotype testing									
Genotype screening is important									
I have adequate knowledge on sickle cell disease									
I have knowledge on the symptoms of Sickle cell disease									
I believe sickle cell disease can be prevented									
premarital genotype screening is important									
I would you recommend genotype screening for a couple during pre-marital counseling									
genotype screening help in preventing sickle cell disease									
What is your level of religious belief towards sickle cell disease?									
How often do you talk about health to your congregation?									
What is the level of your religious beliefs towards SCD and its prevention?									

Questionnaire Part 2: Attitude on SCD
(Please tick appropriately your personal evaluation of the attitude on SCD)

Statement/Questions	1 (Low)	2	3	4	5	6	7	8	9 (High)
How important is interpretation of statistics concerning SCD among the newborns in Nigeria?									
How important is it for couples to be counseled about SCD during pre-marital counseling									
Attitude of your congregation towards sickle cell disease									
I receive positive feedback from potential couples after counseling them about the importance of genotype testing									
Parents who have children with sickle cell disease among my congregation feel they can prevent the disease.									

Questionnaire Part 3: Religious Practices in Regard to SCD
(Please tick appropriately your personal evaluation of the religious practices)

Statement/Questions	1 (Low)	2	3	4	5	6	7	8	9 (High)
I initiate several programs in the Church/Mosque/organization to support family members with SCD									
I recommend other practices than genotype screening for preventing sickle cell disease									
I have initiated several programs in my Church/Mosque/organization to support family members with SCD									
I frequently organize genotype screening campaign in my community									
My community positively responds to the organized genotype screening campaigns.									
I organise various other activities geared towards prevention of SCD.									
I recommend that youth in my Church/Mosque/organization to attend counseling and seek genotype screening as a prevention measure for sickle cell disease in their offspring									
My efforts leads to improved marital counselling on SCD									
My congregation participates in testing and genetic counseling									