STIGMA TOWARDS PEOPLE LIVING WITH SICKLE CELL DISEASE IN MOKOLA COMMUNITY, IBADAN NORTH LOCAL GOVERNMENT AREA, OYO STATE.

BY

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CERTIFICATION

This is to certify that this research work was carried out by **Olawuyi Adcola Abiodun**, a postgraduate student at the Department of Epidemiology and Medical Statistics, Faculty of Public Health, College of Medicine, University of Ibadan under our supervision.

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DEDICATION

I dedicate this research work to God Almighty, Maker of Heaven and Earth who helped me to successfully complete this project.

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ABSTRACT

Introduction: Sickle cell disease is an inherited disorder of public health importance that has contributed significantly to high infant mortality rate Worldwide. People living with sickle cell disease are at risk of stigmatization due to perceived negative attitudes about their illness hence it has been observed that stigmatizing attitude is increasingly being recognised among people living with sickle cell disease. The aim of this study is to determine the level of stigma towards people living with sickle cell disease in Mokola community.

Method: A cross sectional study was carried out using multi-stage cluster sampling technique to select 500 respondents. A semi-structured interviewer administered questionnaire consisting of socio-demographics, knowledge and beliefs about sickle cell disease and stigmatizing attitude towards people living with sickle cell disease was used to elicit information from study participants. Stigmatisation was measured using social distance scale by Bogardus. Data collected was analyzed using descriptive statistics, chi-square for test of association and multinomial logistic regression to determine predictors of stigmatizing attitude at 5% significant level.

Results: The mean age of respondents 33.4±10.4years, 56.4% were females, 58.4% were Christians and 37.8% had completed secondary school education. Among respondents' with low intimacy, 58.9% reported high stigma and 40.6% of those with moderate intimacy had low stigma while 73.3% of respondents with high intimacy had low stigma. Level of awareness was high (100%), 52.6% had poor knowledge, 55% had good belief, 52.4% had good attitude and 52.2% knew their genotype status. Monogamous setting (OR=8.25, CI=1.339-50.839) was the only predictor of moderate relative to low stigmatizing attitude while secondary education (OR=2.04, CI=1.166-3.570), good belief (OR=0.49 CI=0.313-0.792), high intimacy (OR=0.25, CI=0.145-0.455) and moderate intimacy (OR=0.32,

CI=0.191-0.546) were the predictors of high relative to low stigmatizing attitude towards people living with sickle cell disease.

Conclusion: There is need for more health education about knowledge on causes, treatment and prevention of sickle cell disease. Anti-stigma intervention programmes should be put in place to reduce stigma towards people living with sickle cell disease.

Keywords: Sickle cell disease, Intimacy, Stigma

Number of words: 334

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LIST OF ABBREVIATIONS (ACRONYMS)

SCD - Sickle Cell Disease

WHO - World Health Organisation

SSA - Sub-Sahara Africa

NCD - Non Communicable Disease

PRB - Population Reference Bureau

CHAPTER ONE

INTRODUCTION

1.0 Background

Sickle cell disease (SCD) is an in-born error of metabolism and a non-communicable disease (NCD) of public health importance that has significantly contributed to high infant mortality rate worldwide. Sickle cell disease (SCD) is an autosomal recessive disorder caused by mutation of sickle cell haemoglobin (Hb S) due to change of the 17th nucleotide of beta globin gene from thymine to adenine and replacement of an amino glutamic acid with valine at position 6 (Rees et al., 2010).

Sickle cell disease (SCD) is an inherited disorder that affects people from sub-Saharan Africa (SSA), India, Saudi Arabia and Mediterranean countries with the greatest burden in sub-Saharan Africa (WHO 2006; Afolayan and Jolayemi 2011). The proportion of people living with SCD varies widely; approximately 20-25 million people have SCD, about 100,000 people in United State of America (Hassell 2010), 12-15 million people in sub-Saharan Africa (Akingbola et al., 2014) and a prevalence rate of 2-3% in West and Central Africa (Weatherall and Clegg 2001). Nigeria has the highest burden of SCD worldwide, about 1 million are living with SCD and 40 million are carriers of sickle cell trait (Akinyanju 2010).

The major sickle cell genotype disorder includes: Hb SS (sickle cell disease), Hb SC disease, Hb S (beta with thalasemia) or Hb E syndrome (Stuart and Nagel 2004). Hb SS is the commonest with a severe homozygote phenotype for sickle cell disease (Galadanci et al., 2013). Currently the prevalence of Hb SS in Nigeria is about 1-3% (Olarenwaju et al., 2013).

The cost implication for the management of SCD as regards drugs, nutrition, hospitalization and management of crisis is enormous (Kabiti 2008). Sickle cell disease often comes with episodes of painful crises which could be life threatening hence people living with SCD require adequate care from health care provider, families and loved ones (Jenerette and Brewer 2010). Society's attitude to SCD and people living with SCD inflicts both psychological and psychosocial physical strains on the patients, their parents and relations (Afolayan and Jolayemi 2011).

Stigmatization is the process of identifying an attribute of a person or group and its association with a stereotype that negatively used to qualify someone in a way that is perceived as disgraceful by society (Jenerette and Brewer 2010). The lifelong challenges of SCD create opportunities for people living with the disease to be stigmatised (Jenerette and Brewer 2010). Stigma is a result of ignorance and insensitivity which can be felt by families and relations of people living with SCD. Stigma related with SCD can be attributed to ignorance due to poor knowledge, misinformation, myths, superstition, wrong belief and misconception about SCD (Akinyanju 2010). Stigma associated with SCD may impose negative stereotype on children and adolescent from both racial and ethnic groups (Burnes et al., 2008). Individuals living with SCD may also experience low self esteem, embarrassment, hopeless feelings and other complications as a result of stigma. Literatures have shown association between stigma and depression (Jenerette et al., 2005). Most studies on stigma associated with SCD were among school children, secondary school students and undergraduates. Community studies on stigma towards people living with SCD are inadequate hence the aim of this study is to determine the level of stigma towards people living with SCD in Mokola community, Ibadan North Local Government Area, Oyo State.

1.2 PROBLEM STATEMENT

Sickle Cell Disease (SCD) affects all races of the World with the greatest burden in countries with black and Mediterranean ancestry origin especially in Sub Saharan Africa (WHO 2006). Nigeria, the most populous country in Africa with approximately160 million persons and a national growth rate estimate of 3.2% per annum (PRB 2007) has the highest burden of SCD accounting for 20 per 1000 births annually and 2.3% are living with SCD (Afolayan and Jolayemi 2011).

Sickle cell disease (SCD) is a preventable haemoglobin disorder that is not receiving attention as other non-communicable diseases (NCD). Sickle cell disease (SCD) is the leading cause of death among under 5 children accounting for 5% in Africa, more than 9% in West Africa and up to 16% in individual West African countries (WHO 2006). Nigeria accounts for 100,000 deaths annually and majority of these deaths occur in rural communities. Sickle cell disease occurs in approximately 2% of all births but it has been estimated that approximately 1 million survive past childhood (Galadanci et al., 2013).

Despite the burden of SCD, many people are not aware of their haemoglobin genotype. A study showed that only 59% of their respondent knew their haemoglobin genotype (Olarenwaju et al., 2013) which is low for a country with the highest burden of the disease.

Stigma towards people living with SCD is increasingly being recognised but there is minimal information in the literature about stigmatizing attitude associated with SCD (Jenerette and Brewer 2010). A study reported that 76% showed wrong attitude involving stigmatizing attitude towards individuals with sickle cell disease (Olarenwaju et al., 2013).

1.3 JUSTIFICATION

The burden of sickle cell disease (SCD) will still increase due to the fact that people are not aware of their haemoglobin genotype status and the importance of genotype screening despite the high burden of SCD in Nigeria. The recommendation made by this study will help policy makers to develop informative programmes to increase awareness of the populace on genotype screening and need for genotype screening before marriage and conception to combat high mortality rate associated with SCD among children and adult.

Sickle cell disease (SCD) imposes challenge as regards cost of care and management of SCD on both people living with SCD and their families. The findings of this study will help to create policy action to improve care and treatment for SCD patients and to lay emphasis on socio-economic measures to assist SCD-affected families.

People living with SCD are at risk of stigmatization due to perceived negative attitudes about their illness hence level of stigma reported by this study will help to develop and implement stigma reduction strategies aimed at individual and community level to reduce stigma and discrimination associated with SCD.

The relevance of stigmatizing attitude is increasingly being recognised among people living with SCD (Dyson et al., 2011). Stigmatizing attitude has been identified among peer group children in schools, teachers and secondary school students but not so much has been done in the community where people with this disease live hence the need for this study to determine the level of stigma towards people living with SCD in Mokola community, Ibadan North Local Government Area, Oyo State.

1.4 RESEARCH QUESTIONS

1. What do respondents know about sickle cell disease?
2. What do respondents belief about sickle cell disease?
3. What proportions of respondents are aware of their haemoglobin genotype status?
4. What stigmatizing attitudes are shown to people living with sickle cell disease?
5. Is there a relationship between stigmatizing attitude and socio-demographic variables?

1.5 AIM AND OBJECTIVES

1.5.1 Broad Objective

To determine the level of stigma towards people living with sickle cell disease in Mokola community, Ibadan-North Local Government Area, Oyo State.

1.5.2 Specific Objectives

The objectives of this study are to:

1. Assess respondents' knowledge about sickle cell disease.
2. Assess respondents' belief about sickle cell disease.
3. Determine the proportion of respondent who are aware of their haemoglobin genotype status.
4. Determine stigmatizing attitude towards people living with sickle cell disease.
5. Determine the association between stigmatizing attitude and socio-demographic variables.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Sickle Cell Disease (SCD) also known as sickle cell anaemia or sickle cell disorder is a common autosomal condition due to haemoglobin disorder (WHO 2006). Sickle cell disease is an autosomal recessive disorder which is as a result of mutated sickle cell haemoglobin (Hb S).

2.1 Pathogenesis

Mutations of sickle cell haemoglobin (Hb S) occur from the change of the 17th nucleotide of beta globin gene from thymine to adenine and replacement of an amino glutamic acid with valine at position 6 causing the red blood cell to become sickle shape (Rees et al., 2010). Sickle cell disease (SCD) is a life-long haemoglobin disorder characterized by red blood cells that assume an abnormal and rigid sickle cell shape (Ebrahim et al., 2010). Sickle cell disease is a preventable inherited haemoglobin disorder caused by a defective gene which produces an abnormal form of haemoglobin. Sickle cell disease is caused only by the Hb S allelic variant of the beta-globin gene and it exhibit significant morbidity and mortality in both children and adult living with SCD (Ashley-Koch et al., 2000). The component of the red blood cells is responsible for oxygen transportation from the lungs to the tissues (Agbanusi et al., 2007). Genes are responsible for all inherited characteristics of humans and the main function of haemoglobin is to carry oxygen and food to other parts of the body (Afolayan and Jolayemi 2011). As a result of deoxygenation, haemoglobin in the red blood cell polymerises thereby causing a change in the red blood cell from biconcave disc to an irregular sickle-shaped cell. Compared to normal red cells, sickle-shaped cells are rigid and

sticky (Serjeant 2001).The sickle-shaped red blood cell has a propensity adherence to walls of the blood vessels which then clog blood vessels preventing normal blood flow and reducing oxygen tension to organs and tissues, haemolysis occur resulting in chronic anaemia. This condition manifests with frequent episodes of vaso-occlusive pains, recurrent infections, and frequent hospitalization (Stuart and Nagel 2004). The main pathology associated with SCD is the trapping of sickle shaped red cells in small blood vessels which results in blockages and this typically manifests as bone and joint pains, which is one of the most distressing symptoms in people affected by SCD (Ola et al., 2013).

2.1.1 Classification of Haemoglobin Genotype

Human haemoglobin is formed in 2pairs of globin chains and one molecule of haem. Sani 2014, stated the major types as: Hb A- the normal condition found in adult, Hb A_2- Hb A form the characteristics of Hb S found in adult), Hb F- found in foetal life known as foetal haemoglobin and the other form Hb AC- compound heterozygous state of Hb A and Hb C.

2.1.2 Classification of Haemoglobin Genotype for Sickle Cell Disease

The sickling disorders include; Heterozygous (AS) the genotype for sickle cell trait and Homozygous (SS) the genotype for sickle cell disease. Stuart and Nagel 2004 stated the major sickle cell genotype disorder as: Hb SS (sickle cell anaemia) - severe homozygote for beta s-globin, Hb S (Beta thalasaemia) – severe double heterozygote for Hb S and Beta thalasemia, Hb S (Beta with thalasaemia) – mild to moderate severity with variable in different ethnic group and Hb SC disease – clinical severe double heterozygote for Hb S and Hb C, Hb S or Hb E syndrome – very rare syndrome.

Galadanci et al., (2013) stated the three major types of sickle cell disease as sickle cell anaemia (Hb SS), sickle cell haemoglobin C (Hb SC) and sickle cell thalasaemia (Hb SSthal). Hb SS (sickle cell anaemia) is the most common homozygote clinical phenotype.

2.2 Epidemiology

Sickle cell disease (SCD) is a major public health concern that has a great impact on both individuals and society (Ashley-Koch et al., 2000). The magnitude of the morbidity and mortality associated with sickle cell disease coupled with its relatively high frequency makes it important from the Epidemiological point of view (Animasahun et al., 2012).

Sickle cell disease is a genetic disorder that occurs mainly in people (or their descendants) living in tropical and subtropical areas but is also seen in people from other parts of the World such as Middle East, Central India and countries bordering the Mediterranean Sea, especially Italy and Greece where malaria is or was common (Delicat-Loembet et al., 2014). Those at risk of SCD are people of Afro-Carribean, Middle Eastern and Asian origins (WHO 2006). Majority of births with SCD are in Sub-Saharan Africa especially in Low and Middle Income Countries in Africa. In Africa, Nigeria has the highest population of people with SCD (Anie et al., 2010). In Nigeria, the spectrum of SCD is not well described majority of cases are in rural areas and only a few are followed up in urban areas (Afolayan and Jolayemi 2011). Sickle cell disease was traditionally found in populations of African descent in Northern Europe, but this is changing with increasing numbers of mixed race people as a result of migration, particularly in large cities such as London and Paris (Brousse et al., 2014). Apart from high morbidity and mortality, the burden of SCD inflicts economic, psychological and physical strains on people living with the disease and their relations (Afolayan and Jolayemi 2011).

2.2.1 Incidence and Prevalence of sickle cell disease

The incidence of sickle cell gene varies Worldwide, reaching its peak in Equatorial Africa and also occurring in parts of Sicily, Southern Italy, Northern Greece, Southern Turkey, Middle East and Central India (Serjent 2004). The current estimated incidence of sickle cell disease in the United Kingdom (UK) is about 1 in 1,800 births (Davies et al., 2000). In

Nigeria, the incidence of homozygous gene (SS) is approximately 2-3% (Jumah et al., 2004), which can be determined at birth by the prevalence of carriers in the population (WHO 2006; Anie et al., 2010).

Sickle cell disease (SCD) is the commonest inherited conditions and its prevalence varies widely (Akingbola et al., 2014). Cases of SCD have spread all over the world because of migration (Ola B et al, 2013). Sickle cell disease is prevalent in countries of the World where malaria is endemic especially in Nigeria (Galadanci et al., 2013). Sickle cell disease is prevalent in countries like sub-Saharan Africa, India, Saudi Arabia and Mediterranean (WHO 2006; Afolayan and Jolayemi 2011).

In the United States, SCD affects about 1 in 365 African Americans, with approximately 89,079 are living with the disease (Jenerette and Brewer 2010). In Tropical Africa, Sub-Saharan Africa has the highest prevalence of SCD. Worldwide, approximately 20-25 million people have SCD with the greatest burden in Sub Saharan Africa (SSA) which accounts for 12-15 million people living with SCD (Akingbola et al., 2014). The Prevalence of SCD in West and Central Africa among black people is 2-3% (Weatherall and Clegg 2001). It has been estimated that 2-3 million Nigerians have SCD (Tunde-Ayinmode 2011). The number of newborn affected by SCD is estimated to be 300,000 per year in the World (Komba et al., 2010; Makani et al., 2011) with 200,000 in Africa alone (Diallo and Tchernia 2002). In Africa, Nigeria has the highest number of people living with SCD accounting for 2.3% of the estimated population of 150million and about 25% are healthy carriers of haemoglobinopathy. Worldwide, the annual birth with SCD is over 300,000 in which Nigeria alone accounts for 150,000 births with SCD (WHO 2006; Afolayan and Jolayemi 2011).

Generally, the prevalence of healthy carriers (sickle cell trait) ranges between 10% and 40% across equatorial Africa which decreases between 1% and 2% in Northern Africa with less

than 1% in Southern Africa. In West African countries such as Ghana and Nigeria, the frequency of mutant gene carriers is 15% to 30% while in East African countries such as Uganda and Tanzania it shows wide variations of up to 45% in some areas (WHO 2006). In Nigeria, the prevalence of carrier has been estimated to be 24% (WHO 2006). In 2010, out of the annual 300,000 babies born with SCD, Nigeria accounts for 90,000 of these birth and 40,000 births in Democratic Republic of Congo. Affected number of children with SCD include: 40,000 in India, 10,000 in America, 10,000 in Eastern Mediterranean and 2000 in Europe (Piel et al., 2013). There is a 1-in-4 chance of their child developing the disease and a 1-in-2 chance of being just a carrier (Ashley-Koch et al., 2000). Using population and mortality projections, they predicted an increase in the numbers of newborns with sickle cell anaemia to over 400,000 in 2050 (Fottrell and Osrinn 2013).

2.2.2 Risk factor for sickle cell disease

Genotype is the most important risk factor for severity of the disease. Individuals with Hb SS (sickle cell anaemia) are the most severely affected, followed by individuals with beta-thalassemia (Hb SC).

Individuals can inherit SCD from parents if each parent has a single defective haemoglobin gene. If two carriers marry, a one in four chance exist that each child will inherit a defective gene from each parents (Weatherall and Clegg et al., 2001). When Hb S is inherited from only one parent, the heterozygous (Hb A/Hb S) child is usually an asymptomatic carrier, although some symptoms may be present depending on the expression level of each allele (Serjeant 2001).

2.2.3 Symptoms of sickle cell disease

The symptoms of sickle cell disease (SCD) can begin between the ages of 3-6 months when fetal haemoglobin (Hb F) are falling. Symptoms of SCD include: haemolytic anaemia, jaundice, pallor, lethargy, growth retardation and general weakness (De Montalembert

2008). The most distressing symptom of SCD is episodes of painful crisis (Wethers 2000). Vaso-occlusive crisis is due to obstruction of the microcirculation by sickled red blood cells which causes ischaemia (Hatree and Gronow 2012). Symptoms of acute and chronic pains especially in the bones which can be severe and could last for hours or days (Ola et al, 2013). Sequestration crisis due to enlargement of the spleen thereby decreasing haemoglobin concentration, circulatory collapse and hypovolaemic shock occur mainly in babies and young children (Stuart and Nagel 2004). SCD is associated with other physical complications such as anaemia, jaundice, infections, stroke, gall stones and kidney failure (Wethers 2000). Some affected person might have potential stigma signs such as jaundice, leg ulcer and short stature which are often precipitated by infection, exhaustion, change in temperature and dehydration resulting in hospitalization (Olarenwaju et al., 2013).

2.2.4 Clinical diagnosis of sickle cell disease

Hatree and Gronow (2012) stated that sickle cell disease (SCD) can be diagnosed using: Haemoglobin analysis (full blood count), the haemoglobin level ranges between 6-8g/dl with a high reticulocyte count of 10-20%. Electrophoresis is a confirmatory test for the diagnosis of SCD. Sickle cell trait is diagnosed by the finding of a positive sickling test together with haemoglobin A and S on electrophoresis. Sickling solubility test can also be used to diagnose SCD by mixing Hb S in a reducing solution (sodium dithionite) which gives a turbid appearance of Hb S and a clear solution for normal haemoglobin. Blood film with 2% metabisulphite which may show a sickled erythrocytes and features of hyposplenism can also be used to diagnose SCD. Perinatal diagnosis from aminocentesis, chorionic villus and fetal blood sampling can be used to diagnose SCD in pregnancy and neonates (De Montalembert 2008).

2.3 Complications

Sickle cell disease is associated with physical complications such as anaemia, jaundice, infection, stroke, gall stones and kidney failure (Wethers 2000). By age 20, evidence of stroke occurs in 11% of people with SCD (De Montalembert 2008), cardiac failure occurs in 13% of adults which is an independent risk for mortality (Rees et al, 2010), in pulmonary hypertension occurs in 30% of adult which is associated with high rates of leg ulcer, priapism and renal dysfunction (De Montalembert 2008). Chronic kidney disease occurs in up to 5% of patient with SCD (Claster and Vichinsky 2003). Other complications associated with sickle cell disease include:

2.3.1 Painful Crisis

Painful inflammation of entire digit (dactylitis) is a common early manifestation that may occur before 6 months. Recurrent episodes of painful crisis are a known complication said to be associated with sickle cell disease (SCD). Over 90% of patient with SCD are admitted because of painful crisis. In children, pain occurs 30% of days with loss of 10% school days (Hatree and Gronow 2012). The major painful crisis associated with SCD includes: Vaso-occlusive crisis- It is the most common type of sickle cell crisis. This crisis is due to obstruction of the microcirculation by sickled red blood cells which causes ischaemia (Hatree and Gronow 2012). The sickle shape of the red blood cell causes obstruction in the capillaries and restricts blood flow to organs resulting in ischemia, pain, necrosis and often organ damage (Delicat-Loembet et al., 2014). Pain experienced in a vaso-occlusive crisis results from oxygen deprivation of tissues and avascular necrosis of the bone marrow (Hatree and Gronow 2012). Katibi (2008) stated that patients with sickle cell disease may have recurrent illness and be hospitalized due to this crisis. The risk of vaso-occlusive episodes is increased through exposure to cold, fever and dehydration. Vaso-occlusive also

affects the lungs resulting in acute chest syndrome. Lung infection predominates in children and infarcts in adults (Hatree and Gronow 2012).

Sequestration crisis- this is due to enlargement of the spleen thereby decreasing haemoglobin concentration, circulatory collapse and hypovolaemic shock which occur mainly in babies and young children (Stuart and Nagel 2004).

Aplastic crisis- This is due to the temporary cessation of erythropoiesis thereby causing severe anaemia which in turn may result in congestive heart failure. Aplastic crisis is usually precipitated by infection with parovirus B19 (NHS England).

Hyperhaemolytic crisis (excess crisis) – this is due to increase in haemolytic rate with fall in haemoglobin level during crisis. This crisis is not often common (Hatree and Gronow 2012).

2.3.2 Infection

Infection is one of the leading causes of death among children living with SCD. The commonest infection includes: malaria, pneumonia, bacteremia, pharyngitis, Meningitis and osteomyelitis. Many severe infections such as pneumonia often occur without concurrent painful or anaemic crises (Akinkanju 2010). Malaria contributes not only to mortality but also to anaemia and other crises (Williams et al., 2011; McAuley et al., 2010). Malaria and other complications further worsen morbidity and mortality associated with SCD (Afolayan and Jolayemi 2011).

2.3.3 Mortality

Sickle cell disease (SCD) is a major cause of child ill-health and death in Africa (Kumar et al., 2012). Median life expectancy is currently 40-60 years in high income countries but much less in low income areas (Hamideh et al., 2013). Before age five, majority of children born with SCD die (Weatherall et al., 2006). SCD contributes an equivalent of 5% of death in under-five children in Africa and 16% in West Africa (Weatherall and Clegg 2001). Infections and acute anaemic sequestration crisis were the most common causes of death in

children with SCD (Odunvbun et al., 2008). In West Africa, risk factors for death of children born with SCD include infections, low haemoglobin and fetal haemoglobin (HbF), high white blood cell count and haemolysis (Makani et al., 2011). In Africa, SCD is reported to be associated with a very high rate of childhood mortality, 50%–90%, yet there is a lack of reliable and recent information (Grosse et al., 2011).

2.4 Prevention

The major approaches to the prevention of sickle cell disease are education, genetic counselling, genetic screening and prenatal diagnosis.

2.4.1 Education

Educative information should be given to parents, families, relation and people living with SCD to increase awareness about SCD. Comprehensive knowledge about the causes and prevention of SCD will help minimise stigma, misconception and myth about SCD. Understanding knowledge about inheritance of SCD, reproductive health implication and health-related behaviour towards people with SCD among school children, peer groups, community and the entire populace will help limit the spread of the disease (Olarenwaju et al., 2013). Public awareness and education should target the lower age group to sensitize them on SCD (Oludare and Ogili 2013).

Parents should be given proper education on vaccination against childhood infections and routine childhood immunization should include: H influenza type B, S pneumonia, meningococcus and hepatitis B (De Montalembert et al., 2011).

2.4.2 Genetic Counselling

Genetic counselling has been defined as "the process by which patients or relatives at risk of a disorder that may be hereditary are advised of the consequences of the disorder, the probability of developing or transmitting it and the ways this may be prevented, avoided or

ameliorated. The process of premarital genetic counselling is primarily educational but non-directive in nature (Abdel-Meguid et al, 2000). Genetic counselling helps to reduce morbidity and mortality associated with SCD. Premarital counselling for haemoglobin disorder has been introduced in several countries in the Arab region including Saudi Arabia, Bahrain, United Arab Emirates, Tunisia, Iran, and Jordan (Memish and Saeedi 2011; Al-Gazali et al, 2005). In Nigeria, premarital genetic counselling is voluntary but most religious bodies make genetic testing mandatory before the couples can be joined together (Oludare and Ogili 2013). Proper genetic and marriage counselling with awareness campaign will help to reduce incidence of SCD (Taiwo et al, 2010).

2.4.3 Genotype Screening

In Africa, children with sickle cell disease are often first diagnosed following an acute illness and not by screening. SCD is a preventable health problem that is commonly occurring in couples who are not aware of their genotypes (Afolayan and Jolayemi 2011). Newborn (neonatal) screening programmes have been established in developed countries, Ghana and Republic Benin to ensure early diagnosis (Ohene-Frempong et al., 2008). The cost implication of screening test determines the choice of screening method. Period of antenatal or postnatal visit for immunization can be used to educate mothers on the importance of neonatal screening for SCD (Tshilolo et al., 2007). In Nigeria, despite the fact that SCD is prevalent newborn screening for SCD is yet to be establish.

Acceptance and knowledge of haemoglobin genotype is important because many people are not aware of their genotype and they see no need for them to be screened. Although marital union of heterozygous has been discouraged in the society (Taiwo et al., 2011) and most religious bodies make genetic testing mandatory before the couples can be joined together (Oludare and Ogili 2013) but people don't go for voluntary screening thereby increasing burden of disease.

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In Africa, children with sickle cell disease are often first diagnosed following an acute illness and not by screening. SCD is a preventable health problem that is commonly occurring in couples who are not aware of their genotypes (Afolayan and Jolayemi 2011). Newborn (neonatal) screening programmes have been established in developed countries, Ghana and Republic Benin to ensure early diagnosis (Ohene-Frempong et al., 2008). The cost implication of screening test determines the choice of screening method. Period of antenatal or postnatal visit for immunization can be used to educate mothers on the importance of neonatal screening for SCD (Tshilolo et al., 2007). In Nigeria, despite the fact that SCD is prevalent newborn screening for SCD is yet to be establish.

Acceptance and knowledge of haemoglobin genotype is important because many people are not aware of their genotype and they see no need for them to be screened. Although marital union of heterozygous has been discouraged in the society (Taiwo et al., 2011) and most religious bodies make genetic testing mandatory before the couples can be joined together (Oludare and Ogili 2013) but people don't go for voluntary screening thereby increasing burden of disease.

2.4.4 Prenatal diagnosis

Prenatal screening is one of the methods used to reduce the prevalence of this disease. Prenatal diagnosis such as amniocentesis, chorionic villus and fetal blood sampling can be used to diagnose SCD (De Montalembert 2008). Early pregnancy diagnosis could make parents opt for abortion of affected foetus (Oloyede 2005). In Nigeria, prenatal diagnosis is yet to be established because of the cost implication not everyone can afford it.

2.4.5 Management of symptoms

The management of SCD requires that people living with SCD should attend special clinics whether they are ill or not (Taiwo et al., 2011). Sickle cell disease often comes up with episodes of painful crisis which can be managed with analgesic and hydration. People living with SCD should avoid exposure to cold, fever, dehydration and stress. Stuart and Nagel 2004 reported that stress is a potential initiation factor for vaso-occulsive. The management of painful may include oral analgesia, increased fluid intake, warmth and rest (Hatree and Gronow 2012). Among children the central management for SCD are oral penicillin prophylaxis and vaccination against infection such as hepatitis B, H influenza B, S pneumonia and meningococcus (De Montalembert et al., 2011). Patient with un-subsided prompt pain should be admitted and strong opoid treatment should be given if needed (De Montalembert 2008).

Folic acid supplementation may be required and zinc supplementation may also be necessary for growth retardation. Vitamin D supplementation should be given to patient with SCD living in countries where vitamin D is deficient (Hatree and Gronow 2012).

2.5 Control

The treatment therapy for vaso-occlusion and other complications include prophylactic antibiotics, blood transfusion, bone marrow transplant, hydroxyurea (hydroxycarbamide) and pain management (Haywood et al., 2009).

2.5.1 Pain Medication

Analgesic medications given can range from paracetamol for mild pain to morphine for severe pain (Anie et al, 2010).

For treatment of vaso-occlusion, oral anagelsic starting from paracetamol or ibuprofen can be used to reduce pain (Hatree and Gronow 2012). Weak opoids such as codeine or dextropropoxylene can be used for patients with mild pain. Benzodiazepine can be used to reduce anxiety (De Montalembert 2008).

For treatment of priapism, it requires hydration and analgesia; oral etilefrine may help reduce frequency of stuttering priapism. Emptying of bladder, jogging, warm baths and analgesia may also help to abort attack (Hatree and Gronow 2012).

For treatment of acute chest syndrome, antibiotics in combination with macolides and intravenous cephalosphrin may be given to reduce pain (De Montalembert 2008).

2.5.2 Blood Transfusion

Blood transfusion can be used to treat anaemia by replenishing red blood cell and preventing other complications such as cerebrovascular accident (Agbani et al., 2007). Blood transfusion may be required for patients with stroke and other complications (De montalembert 2008). Transfusion may be required for severe anaemia or to reduce proportion of Hb S if there are lungs or central nervous system complications. Iron chelation should be started with children that are receiving blood transfusion to reduce iron overload (Hatree and Gronow 2012).

2.5.3 Hydroxyurea

Hydroxyurea is effective for reduction of sickling processes and painful crisis. It is the only cytotoxic drug that reduces the frequency of acute vaso-occulsive complications (Ballas et al., 2010). Hydrocarbamide decreased the episode of acute chest syndrome among people living with SCD in one multicentre study (De montalembert 2008). The benefit of

hydroxyurea is to increase in haemoglobin concentration and decrease in platelet and white blood cell (Rees et al., 2010).

2.5.4 Bone Marrow Transplant

Bone marrow transplant is a possible cure but requires matched donors (Bhatia and Walters 2008). Haemopoietic cell transplantation is the only cure treatment for SCD (Rees et al., 2010). Frenette and Atweh (2007) stated that risk of bone marrow transplant procedure is high but it is not readily available for people especially those in Low and Middle Income Countries like Nigeria.

2.6 Stigmatisation

Stigma is a major public health issue that has been increasingly recognised among people living with SCD. Stigmatisation is the process of identifying an attribute of a person or group and its association with a stereotype that negatively used to qualify someone in a way that is perceived as disgraceful by society (Jenerette and Brewer 2010). Weiss et al., (2006) referred health-related stigma to a form of devaluation, judgement or social disqualification of individuals based on a health related condition. Individuals living with SCD are at risk of being stigmatized due to life-long challenges they often face while managing their disease. Onset of stigma may begin from mother to affected, a study done in Canada mothers reported that racial and ethnic group made SCD worse (Burnes et al., 2008). Also Anie et al., (2010) stated that cultural and religious value has impact on parental attitude towards people living with SCD. Stigma may be recognised among peer groups, a study among secondary school students in Jos (Olarenwaju et al., 2013) reported that 76% showed wrong attitude involving stigma. A study by Ani et al., (2013) showed that male trainee teachers had more stigmatizing attitude than female trainee teachers.

2.6.1 Effect of Stigmatisation on sickle cell disease patients

Stigmatisation contributes to burden of SCD which may affect the families and individuals living with SCD physiologically and psychosocially (Jenerette et al., 2010). Psychosocial issues for people with SCD and their families mainly result from the impact of pain and symptoms on their daily lives, and society's attitudes to SCD and people living with SCD (Anie et al., 2010). According to Sartorius, "stigma evokes negative attitudes and feelings and usually results in discrimination of the person or institution in various walks of life." This level of stigma can bring about unjust disadvantages on people living SCD resulting in direct discrimination on the job, in schools, and within families which may also have an impact on quality of health care received. As a result of stigma, children and adolescents may experience embarrassment, low-self -esteem and other complications. Sickle cell is a problem that begins from childhood to adulthood bringing about prolonged stay in hospital, absentee from work and school thereby creating a negative impact about SCD resulting in stigmatization (Jenerette et al., 2010). Mainstream society may impose negative stereotypes on children and adolescents from racial and ethnic groups which may result in stigmatization (Sankar et al., 2006; Burnes et al., 2008). In Nigeria, beliefs are usually influenced by cultural and religious values which affect individual's attitude towards people living with a certain health condition. The cultural belief of Nigerians is that SCD can be caused by witches, wizard and other malevolent human (Afolayan and Jolayemi 2011).

Stigmatizing attitude towards people living with SCD can be attributed to ignorance due to poor knowledge, misinformation, myths, superstition, wrong belief and misconception about SCD (Akinyanju 2010). There is an association between stigma-related attitude and depression (Jenerette et al., 2005).

2.7 Intervention

Intervention programmes to reduce stigmatizing attitude towards people living with SCD are done at both individual and community level. The Individual or intrapersonal strategies include treatment, counselling, cognitive-behavioural therapy, empowerment, group counselling and self-help, advocacy, or support groups. Community-level strategies include education, contact, advocacy, and protests. Currently, there are no published SCD-specific theory-based interventions aimed at preventing or treating health-related stigma (Jenerette et al., 2010).

In Nigeria, intervention programs for the control of SCD at community level to reduce mortality and incidence of complication of disease includes: public awareness about SCD, newborn screening, screening for SCD at primary health care centres, registration of people living with SCD for prospective follow-up, genetic counselling for individuals with abnormal haemoglobins, education of patient and care giver about SCD, prophylaxis for infection and nutrition (Nnodu 2014).

Framework for intervention programs can be developed with revised theory of self-care management for sickle cell disease. The theory based intervention designed in the context the health-related stigma emerged helps to empower young adults living with SCD to advocate and communicate their need in a timely and effective manner (Jenerette and Brewer 2010). Positive self-presentation can be improved through communications skills and therefore, adults with SCD may be more likely to get individualized, proactive pain strategies to improve the quality of their pain management experience (Malat et al., 2006)

Efforts from international, national, and local agencies addressing the problem of SCD include community-based approaches for education, prenatal and postnatal diagnosis, counselling, surveillance, and management (WHO 2006; Oloyede 2005). SCD control intervention programmes for Africa region includes (WHO 2010): improvements in health

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care provision: clinical and laboratory management at a levels of the health system, screening of newborns and training of health professionals, genetic counselling and testing, geographical and financial accessibility to health-care services, public awareness in schools, communities, , media and associations, health institution. Also, establishment of patient support groups, advocacy and policies on employment for SCD patients.

In Nigeria, SCD is taught as part of social studies to increase awareness of SCD in rural communities (Olarenwaju et al., 2013). World sickle-cell day, June 20 is the date set aside for people living with sickle cell disease. The Non-governmental organizations in Nigeria include: Sickle Cell Hope Alive Foundation (SCHAF), Sickle Cell Awareness Foundation (SCAF), Dabma Sickle cell foundation and Sickle Cell Aid Foundation (SCAF) and sickle cell club are some of the organizations helping to raise the level of awareness, cure and management of SCD. In 2012, the Federal Government set up six geopolitical zones with variant new born high performance lipid chromatography (HPLC) equipment (Nnodu 2014).

CHAPTER THREE

METHODOLOGY

3.1 Study Area

The study was conducted in Ibadan Metropolis. Ibadan is the capital of Oyo state and the third largest city in the nation after Lagos and Kano. According to 2006 estimates, Ibadan has a population of about 4 million and has the largest metropolitan geographical area. At Nigerian independence, the city was the largest and most populous in the country and the third in Africa after Cairo and Johannesburg.

Ibadan is located in South-Western Nigeria with 128km inland northeast of Lagos and 530km Southwest of Abuja, FCT. It has a total area of 1,190 square miles (3,080 km^2) and ranges in elevation from 150 miles in the valley area, to 275 miles above sea level. The principal inhabitants of the city are the Yorubas. There are eleven Local Governments Areas in Ibadan which consist of five urban local governments and six semi-urban Local Government Area.

3.2 Study site

This study was carried out in Mokola. Mokola is an area in Ibadan North Local Government consisting of low, middle and high income people. Mokola inhabitants are traders, artisans and civil servants belonging to the Yoruba ethnic group. Ibadan North Local Government is one of the 11 Local Governments in Ibadan with it's headquarter situated in Agodi-Gate Ibadan. Ibadan-North Local Government has an area of 27km^2 and has a population of over 400,000. Ibadan North Local Government is bounded in the West by Ido and Ibadan North-West, East by Lagelu, Egbeda and Ibadan South East respectively and North by Akinyele.

Sickle cell associations/ clubs and care centres are not available for people living with SCD in Mokola community. Medical care is available for people living with SCD at the

Haematology day care unit, University College Hospital (tertiary health care facility) in Ibadan North Local Government area.

3.3 Study Design

This study is a cross sectional community-based study. Individuals 18 years and above residing in Mokola community were recruited for this study

3.4 Study Population

Individuals 18 years and above who reside in Mokola community, Ibadan-North Local Government Area, Oyo State participated in this study.

3.4.1 Inclusion criteria

The inclusion criteria for this study include those aged 18 years and above who reside in Mokola community and were willing to participate in the study

3.4.2 Exclusion criteria

1. Individuals living with sickle cell disease were excluded.

2. Individuals that came visiting during the course of this study were excluded.

3.5 Sample Size Determination

The sample size determination for this study was calculated using the formula for single proportion (Kirkwood and sterne 2003) which was given as:

$$n = \frac{Z_{1-\alpha/2}^2 \, p\,(1-p)}{d^2}$$

Where $Z_{1-\alpha/2}^2$ = is standard normal variate (at 5% type 1 error $p<0.05$) which is 1.96.

P = 76% proportion who showed wrong attitude involving stigmatization towards individual living with sickle cell disease (Olarenwaju et al., 2013).

q=1-0.76 = 0.24

d = absolute error/ precision which is 5%

Calculation:

$$n = \frac{(1.96)^2 * 0.76 * 0.24}{(0.05)^2} = \frac{0.70071}{0.0025} = 280.28$$

Adjusting for non-response rate = n (1/1-10%) = 311.42

Due to cluster sampling, Design Effect of 1.5 was applied = 311.42 * 1.5 = 467.13

The sample size used for this study was 500. Therefore, 500 respondents were recruited for this study.

3.6 Sampling Technique

A multistage cluster sampling was used for this study.

Stage 1: A total number of 25 streets were purposively selected from Mokola community. These streets are long enough to get the desired number of houses per street.

Stage 2: Houses were selected starting from the first house on each street moving house to house until the desired number of houses per street was reached. A total of 20 houses were selected per street.

Stage 3: One household was selected per house provided they fall within the inclusion criteria using simple random sampling (balloting).

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Stage 3: One household was selected per house provided they fall within the inclusion criteria using simple random sampling (balloting).

Stage 4: One respondent who met the inclusion criteria was selected per household using simple random sampling (balloting).

3.7 Data Collection Method

Data collection method involves the following steps:

1. Research assistants were trained on how to administer the drafted questionnaire which lasted for a period of 2 days for easy understanding. The interviewers were selected based on their ability to speak Yoruba and English fluently.
2. The instrument for data collection was pre-tested in another Local Government area among 50 respondents residing in Eleyele, Ibadan North-West Local Government area. A face validation of the questionnaire was done by my supervisors.
3. Data was collected by six research assistants and one principal investigator. The field work lasted for five weeks from 24th November, 2014 to 29th December, 2014.

A semi-structured interviewer administered questionnaire was used to elicit information from study participants. The questionnaire consisted of 3 sections, **SECTION A**: Socio-Demographic Characteristics **SECTION B**: Knowledge and Beliefs about sickle cell disease and **SECTION C**: Stigmatizing attitude towards people living with sickle cell disease (see appendix III and V). The questionnaire was adopted from past literatures, questions on knowledge, belief and attitude from (Olarenwaju et al., 2013; Ola et al., 2013; Zounon et al., 2012). Standardized tools such as level of personal contact from and social distance were from Ani et al., 2012.

3.7.1 Knowledge and Belief about SCD

Questions on knowledge and belief were coded as (No=0, Yes=1). For each question answered correctly, respondents obtained a point each. The sum of points produced a

minimum score of 18 and maximum score 40. Mean score of 27 was used to categorise their scores, those who had scores below the mean were said to have "Poor knowledge" while those who had scores above the mean were said to have "Good knowledge" about SCD.

For belief, the sum of points produced a minimum score of 5 and maximum score 23. Mean score of 14 was used to categorise their scores, those who had scores below the mean were said to have "Poor belief" while those who had scores above the mean were said to have "Good belief" about SCD.

3.7.2 Level of personal contact

To identify stigmatizing attitude, respondents' intimacy with people living with the disease was assessed using level of personal contact (Corrigan et al., 2001; Ola et al., 2013; Ani et al., 2012). The level of personal contact list which include 6 questions: I have "a son/daughter (score=6), brother/sister (score=5), relative (score=4), friend/neighbour (score=3), seen anyone (score=2), heard (score=1) who has SCD". For example those who tick two options from list "I have heard of...." (Score=1) and "I have a son/daughter" (score=6) will receive a score of 6 because "I have a son/daughter has the highest level of personal contact with SCD. The sum of ratings gave a score of 6 was used to categorise scores into tertiles such that a score of 1-2 represents "Low intimacy", score 3 represents "Moderate intimacy" and score 4-6 represents "High intimacy" with people living with SCD (Ani et al., 2012).

3.7.3 Attitude

Attitude was assessed using 15 questions which include: Negative questions, cost and care and positive attitude questions towards people living with SCD. Positive attitude, cost and care of people living with SCD were coded as "Strongly agree=5, Agree=4, Undecided=3,

minimum score of 18 and maximum score 40. Mean score of 27 was used to categorise their scores, those who had scores below the mean were said to have "Poor knowledge" while those who had scores above the mean were said to have "Good knowledge" about SCD.

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Disagree=2, strongly disagree=1" and negative questions were coded as "Strongly disagree=5, Disagree=4, Undecided=3, Agree=2, strongly agree=1". The sum of points was computed to produce minimum score of 35 and maximum score of 72. Mean score of 55 was used to categorise their scores, those who had scores below the mean were said to have "Poor attitude" while those who had scores above the mean were said to have "Good attitude" towards people living with SCD.

3.7.4 Bogardus Social Distance scale

Stigmatisation was measured using social distance scale which was originally modelled after Bogardus (Bogardus 1933). Original Bogardus scale was adapted to measure stigmatizing attitude among trainee-teachers and school children (Ani et al., 2011; Ola et al., 2013). The social distance question include: would you "gossip, say bad things, avoid sharing food or eat, avoid being friends, avoid having personal contact" with anyone who has SCD. Responses was coded as (Yes=2, No=0, May be=1), the sum produced a score of 10. Using cut off tertiles, social distance scale was categorised into 3-point likert scale Low, Moderate and High social distance. Score of 0-4 represents "Low social distance", score of 5 represents "Moderate social distance" and Score 6-10 represents "High social distance"(Ani et al., 2012). Those with high social distance score are said to have high stigmatizing attitude.

3.8 Data Management and analysis

All field work was supervised and questionnaire was checked for completeness. Data was entered, cleaned to check for inconsistencies and analysed using Statistical Package for Social Sciences (SPSS) version 20 and back-up to an external hard-drive. All questionnaires were stripped of its identifiers, only the Principal Investigator and other qualified personnel were allowed to have access to the data.

3.8.1 Data Analysis

The outcome variable was stigmatization and the explanatory variables were socio-demographic characteristics, knowledge and beliefs about SCD, attitude and level of personal contact with people living with SCD.

Descriptive statistics was used to assess knowledge, belief and attitude. Chi-square was used to determine association dependent and independent categorical variables and multinomial logistic regression analysis was used to determine predictors of stigmatizing attitude.

3.9 Ethical Considerations

Approval for this study was obtained from Ethical Review Committee at Oyo State Ministry of Health (see Appendix I). Permission was taken from elders of the community.

Informed consent: Informed consent form was made available in English and Yoruba (see Appendix II and IV) which was signed by each participant.

Confidentiality of data: All forms and documents were stripped of identifiers such as participants name, phone number and address. Only concerned individuals were allowed to handle documents containing participants' information.

Beneficence to participants: Participants were counselled on the importance of genotype screening and effect of stigmatizing attitude on people living with sickle cell disease. Each participant was given bath soap in appreciation for participating in the study.

Non-maleficence to participants: No risk or harm to study participants. Information provided was saved on password protected computerized system.

Voluntariness: Participation in this research is entirely voluntary. Eligible individuals were assured of their right to decide whether or not to participate in the study.

3.10 Dissemination of Findings

The results of this study will be disseminated to the health administrators (permanent secretaries and directors in Ministry of Health) and policy makers of health in the state.

CHAPTER FOUR

RESULTS

4.1 Socio-demographic characteristics

The socio-demographic characteristics of respondents are presented on Table 4.1. A total of 500 respondents residing in Mokola community in Ibadan North Local Government Area of Oyo State participated in the study. The respondent's age ranged from 18 to 65 years with a mean age of 33.4±10.4years. The age distribution of the respondents showed that 180(36.0%) were in between age group 20-29years. More than half 282(56.4%) of the respondents were females, 269(53.8%) were married and 292(58.4%) were Christian. A vast majority 373(74.6%) of the respondents were Yoruba, 360(72.0%) were from monogamous family setting and 161(32.2%) had no children.

Table 4.1: Respondent's socio-demographic characteristics (N= 500)

Characteristics	Frequency	Percentages
Age (years)		
<19	29	5.8
20-29 *	180	36.0
30-39	158	31.6
40-49	88	17.6
50-59	35	7.0
60 and above	10	2.0
Sex		
Male	218	43.6
Female	282	56.4
Marital status		
Single	169	33.8
Married	269	53.8
Widowed	23	4.6
Separated	21	4.2
Divorced	14	2.8
Co-habiting	4	0.8
Religion		
Christianity	292	58.4
Muslim	191	38.2
Traditional	17	3.4
Ethnicity		
Yoruba	373	74.6
Igbo	58	11.6
Hausa	51	10.2
Others	18	3.6
Family setting		
Monogamy	360	72.0
Polygamy	140	28.0
Occupation		
Self employed	262	52.4
Unemployed	139	27.8
Employed	99	19.8
Parity(Number of children)		
0	161	32.2
1	67	13.4
2	92	18.4
3	77	15.4
4	47	9.4
5 and above	56	11.2

4.1.1 Respondents' Educational Status

Figure 4.1 shows frequency distribution of respondents' educational status. Few 189(37.8%) had completed secondary school, 177(35.4%) had tertiary education, 97(19.4%) had primary school education and 37(7.4%) had no formal education.

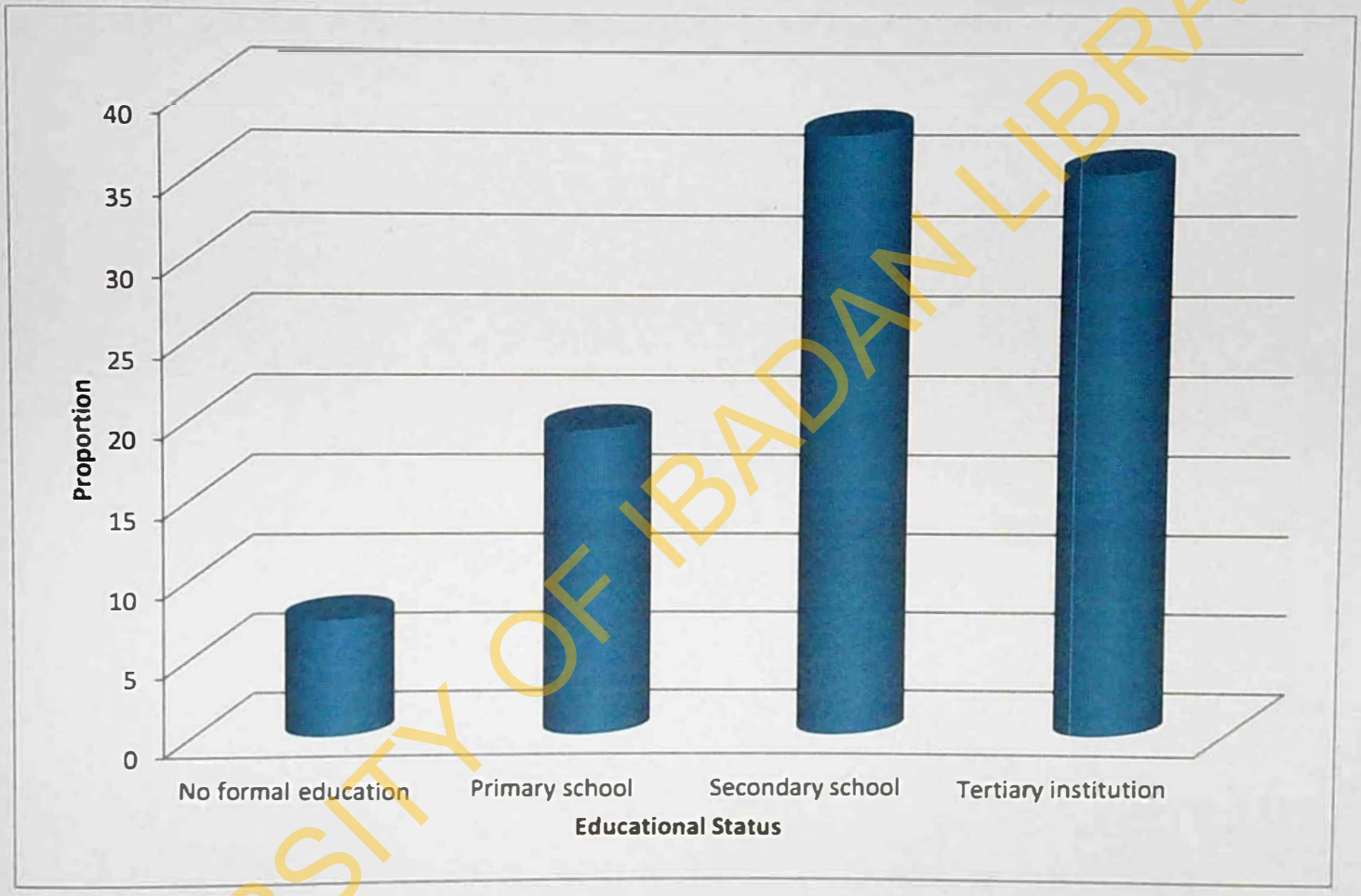

Figure 4.1: Frequency distribution of respondents' educational status

4.2 Awareness about Sickle Cell Disease

The frequency distribution of respondent's sources of information about sickle cell disease (SCD) is presented on figure 4.3. All the respondents were aware of sickle cell disease. Their major sources of information were from Friends/relatives 314(35.8%), radio/TV 237(27.1%) and 20(2.3%) of the respondents heard from no particular source.

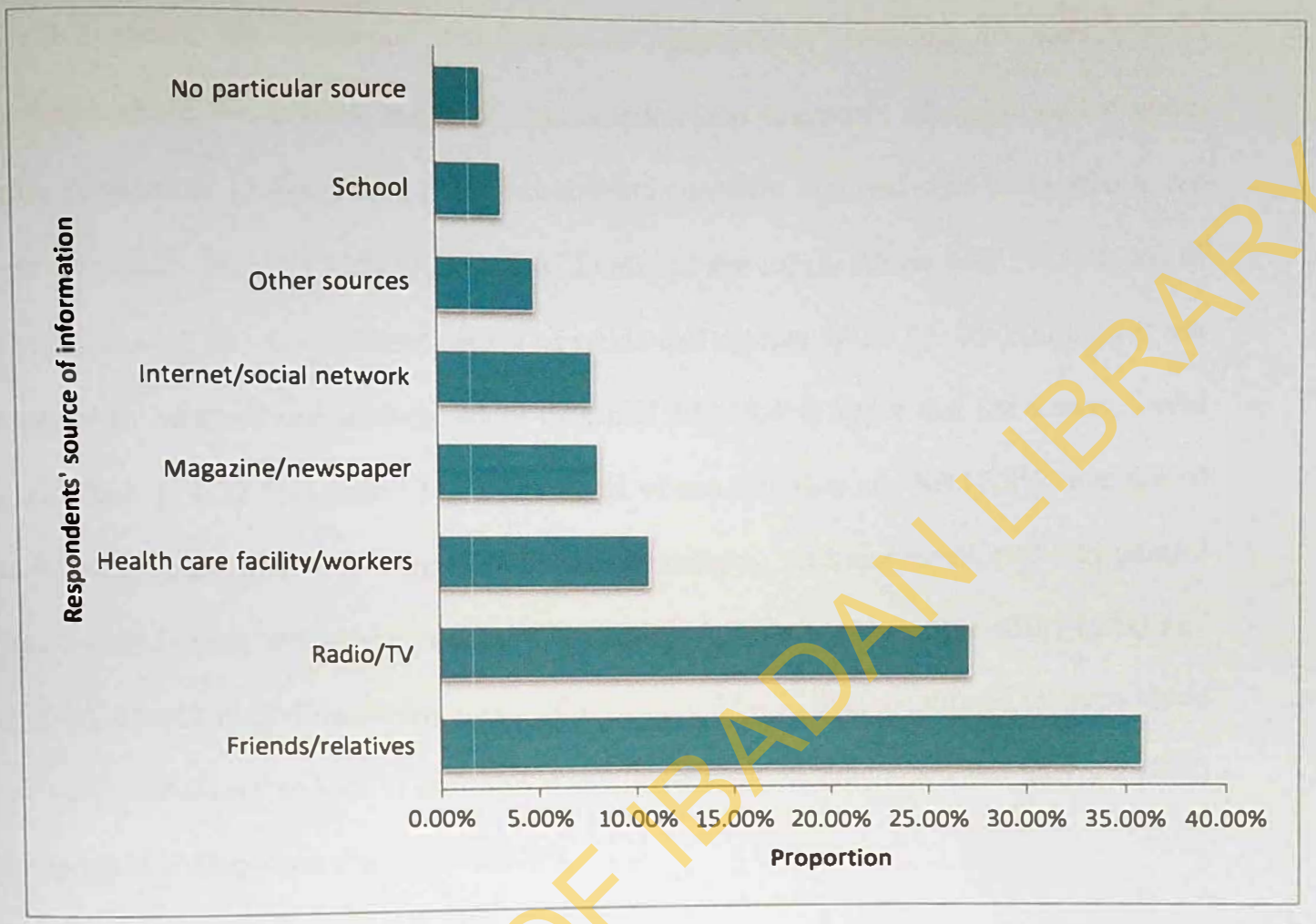

Figure 4.2: Frequency distribution of respondents' sources of information about SCD

4.3 Knowledge about Sickle Cell Disease

Table 4.2 shows the frequency distribution of respondents' response to questions on knowledge about the causes, mode of transmission and diagnosis of sickle cell disease. Higher proportion 323(64.7%) of the respondents correctly reported that SCD affects red blood cell while only 15(3.0%) reported SCD affects the lungs. About half 251(50.2%) of the respondent didn't know about causes of sickle cell disease while 3(0.6%) thought it can be caused by witches and wizards. More than half 297(59.4%) knew that the disease could be inherited, 114(22.8%) didn't know the mode of transmission and 89(17.8%) mentioned that it could be acquired. In terms of signs and symptoms, the most mentioned was painful crisis. Painful crisis was mentioned by 473(14.9%), followed by jaundice 450(14.2%) and pale look 414(13.0%). Concerning mode of diagnosis, 334(66.8%) mentioned through blood test, 145(29.0%) had no idea of how sickle cell disease can be diagnosed and only 21(4.2%) responded it is diagnosed through urine test.

Table 4.2: Frequency distribution of respondents' response to questions on knowledge about causes, mode of transmission and diagnosis of SCD (N=500)

Characteristics	Frequency	Percentages
SCD affects		
Red blood cell	323	64.7
Lungs	15	3.0
Don't know	162	32.4
Causes of SCD		
Malnutrition	12	2.4
Genotype problem	100	20.0
Red blood cell	115	23.0
Bad blood	19	3.8
Witches and wizards	3	0.6
Don't know	251	50.2
Transmission of SCD		
Inherited	297	59.4
Acquired	89	17.8
Don't know	114	22.8
***Signs and symptoms of SCD**		
Painful crises	473	14.9
Jaundice	450	14.2
Pale look	414	13.0
Painful swelling of hand and feet	398	12.5
Frequent illness	374	9.6
Abdominal swelling	357	11.2
Low blood level	343	10.8
Stunted growth	305	9.6
Others	60	1.9
Diagnosis of SCD		
Through blood test	334	66.8
Through urine test	21	4.2
Don't know	145	29.0

*Multiple response questions

4.3.1 Knowledge about hereditary, treatment and Prevention of SCD

Table 4.3 shows frequency distribution of respondents' response to questions on knowledge about hereditary, treatment and prevention of SCD. On the basis of one parent being a carrier, only 132(26.4%) responded correctly that 2 out of 4 children will have the trait and 97(19.4%) answered correctly that 1 out of 4 children will have the disease if both parents were carriers. About half 257(51.4%) knew correctly that a child could inherit the disorder if both parents are carriers while only 85(17.0%) didn't know. Frequency distribution of respondents' response on spouse/partner who discovers that their genotype predisposes them to having children with SCD shows that majority 354(70.8%) wants the relationship discontinued. Some 235(47.0%) responded that SCD could be treated medically and 197(39.4%) mentioned genotype screening as means of prevention for SCD.

Table 4.3: Frequency distribution of respondents' response to questions on knowledge about hereditary, treatment and prevention of SCD (N=500)

Characteristics	Frequency	Percentages
In cases where one parent is a carrier, what is the number of children who will have SCT?		
All the children	46	9.2
None of the children	79	15.8
1 out of 4	227	45.4
2 out of 4	132	26.4
3 out of 4	7	1.4
Don't know	9	1.8
In cases where both parents are carriers, What is the number of children who will have SCD		
All the children	118	23.6
None of the children	29	5.8
1 out of 4	97	19.4
2 out of 4	228	45.6
3 out of 4	21	4.2
Don't know	7	1.4
Child can inherit SCD if;		
Both parents are carriers	257	51.4
Father/mother is a carrier	158	31.6
Don't know	85	17.0
What should spouse/partner do when they discover that their genotype predisposes them to having a child with SCD?		
Discontinue the relationship	354	70.8
Continue with the relationship and damn consequences	30	6.0
Don't know	116	23.2
How SCD can be treated		
Medically	235	47.0
No treatment is available	91	18.2
Spiritually	72	14.4
Traditionally	64	12.8
Don't know	34	6.8
Others	4	0.8
How SCD can be prevented		
Genotype screening	197	39.4
Genetic counselling	162	32.4
Through prayer	74	14.8
Don't know	61	12.2
Others	6	1.2

4.3.2 Respondents' genotype screening practice

Table 4.4 shows the frequency distribution of respondents' genotype screening practice. High percentage 390(78.0%) of the respondents consider haemoglobin genotype screening important, however 270(54.0%) had ever gone for genotype screening, 261(52.2%) knew their genotype status and 239(47.8%) didn't know their genotype status. Among those 239(47.8%) who didn't know their genotype status, 94(39.3%) had no reason for not knowing while 9(239) claim they can't remember their genotype status.

Almost half 124(47.5%) had genotype screening in Government hospital, 69(26.4%) in Laboratory and 68(26.1%) in Private hospital. For the number of times had genotype screening, 124(47.5%) had it once and 15(5.7%) had it several times. 348(69.7%) knew correctly the genotype responsible for SCD to be SS, 127(25.4%) don't know and 8(1.6%) knew it to be AA.

Table 4.4: Frequency distribution of respondents' genotype screening practice

Characteristics	Frequency	Percentage
Consider haemoglobin genotype screening important (N=500)		
Yes	390	78.0
No	110	22.0
Ever gone for genotype screening (N=500)		
Yes	270	54.0
No	230	46.0
Know your genotype (N=500)		
Yes	261	52.2
No	239	47.8
***Reason for not knowing their genotype (N=239)**		
No reason	94	39.3
Don't think it's necessary/important	64	26.8
Unaware	32	13.4
Because I don't have the disease	23	9.6
Never gone for the test before	17	7.1
Can't remember	9	3.8
Place of screening (N=261)		
Government Hospital	124	47.5
Private Hospital	69	26.4
Laboratory	68	26.1
Number of times had genotype screening (N=261)		
Once	124	47.5
Twice	75	28.7
Thrice	47	18.0
Others	15	5.7
Genotype responsible for SCD (N=500)		
SS	348	69.7
AS	17	3.4
AA	8	1.6
Don't know	127	25.4

*N=239, number of respondents who don't know their genotype status

**N=261, number of respondents who were aware of their genotype status

4.3.3 Respondents' Genotype Status

Figure 4.4 shows frequency distribution of respondents' genotype status. More than half 261(52.2%) of the respondents knew their genotype status. Among those who claim to know their genotype, 153(58.6%) were HbAA, 104(39.8%) were HbAS and 4(1.5%) were HbAC.

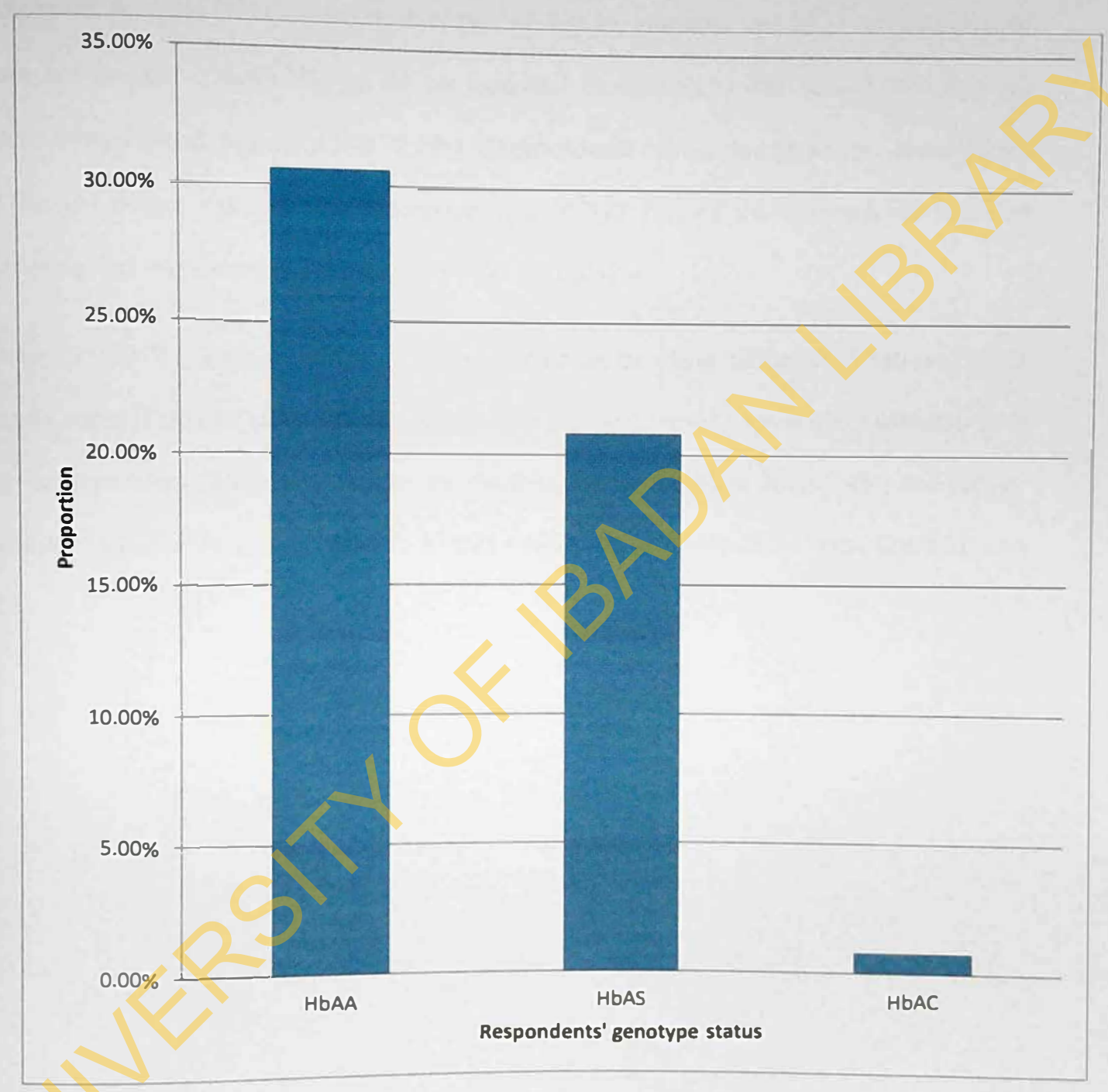

Figure 4.3: Frequency distribution of respondents' genotype status

4.4 Beliefs about Sickle Cell Disease

Table 4.5 shows respondent's belief about sickle cell disease. Majority 401(80.2%) of the respondent believed SCD is life threatening, 448(89.6%) admitted that SCD can be inherited from parents and 326(65.2%) of the respondents' thought SCD can be acquired through contaminated blood. Majority 388(77.6%) of respondents opined that genotype status should be known before marriage or conception and 357(71.4%) of the respondents believed screening test that can reveal presence of SCD is available.

Some 195(39.0%) thought SCD can be cured with herbs while 220(44.0%) believed SCD can be cured if treated early. Respondents' belief that SCD could induce other diseases such as; lungs problem 183(36.6%), stroke 191(38.2%), cardiac problem 202(40.4%) and kidney disorder 193(38.6%). A vast majority 478(95.6%) of the respondents believed that SCD can kill.

Table 4.4: Frequency distribution of respondent's belief about SCD (N=500)

Beliefs about sickle cell disease (SCD)	Yes n (%)	No n (%)
SCD is life threatening	401(80.2)	99(19.8)
SCD is infectious	162(32.4)	338(67.6)
SCD can be caused by witches, wizards & evil spirits	195(39.0)	305(61.0)
SCD can be inherited from parents with sickle cell trait	448(89.6)	52(10.4)
SCD can be acquired through contaminated blood	326(65.2)	174(34.8)
SCD can be caused by bad food	126(25.2)	374(74.8)
Cause of SCD is unknown	189(37.8)	311(62.2)
You can be a carrier of sickle cell trait without being sick	116(23.2)	314(62.8)
Black people are the ones at risk of having SCD	186(37.2)	314(62.8)
Only men are at risk of SCD	10(2.0)	490(98.0)
Women who are unfaithful are at risk of having SCD	34(6.8)	466(93.2)
SCD can be transmitted through mosquito bite	40(8.0)	460(92.0)
SCD can be transmitted by utilizing personal object belonging to infected person with the disease	134(26.8)	366(73.2)
Genotype status concerning SCD should be known before marriage or conception	388(77.6)	112(22.4)
Screening test that reveals presence of SCD is available	357(71.4)	143(28.6)
SCD can be cured with herbs	195(39.0)	305(61.0)
SCD can be cured if treated early	220(44.0)	280(56.0)
Vaccine has been developed to prevent SCD	50(10.1)	450(90.0)
SCD can induce lungs problem	183(36.6)	317(63.4)
SCD can induce stroke	191(38.2)	308(61.8)
SCD can induce cardiac problem	202(40.4)	298(59.6)
SCD can induce kidney disorder	193(38.6)	307(61.4)
SCD can kill	478(95.6)	22(4.4)

Note: Multiple responses

4.5 Level of personal contact

Table 4.6 shows frequency distribution of respondent's level of personal contact with people living with SCD. Only 14(2.8%) of the respondent had a son/daughter with SCD, 67(13.4%) had brothers/sisters living with SCD, 104(20.8%) had relatives living with SCD and 223(44.6%) of the respondents had a friends/neighbours who had SCD. Majority 482(96.4%) had seen and 497(99.4%) had heard of someone living with SCD.

Table 4.6: Frequency distribution of respondents' level of personal contact with people living with SCD (N=500)

Level of personal contact question	Yes n (%)	No n (%)
I have a son/daughter who has sickle cell disease	14(2.8)	486(97.2)
I have a brother/sister who has sickle cell disease	67(13.4)	433(86.6)
I have a relative who has sickle cell disease	104(20.8)	396(79.2)
I have a friend/neighbour living with sickle cell disease	223(44.6)	277(55.4)
I have seen someone who has sickle cell disease	482(96.4)	18(3.6)
I have heard of someone who has sickle cell disease	497(99.4)	3(0.6)

4.5.1 Level of Personal Contact Scale

Table 4.7 shows frequency distribution respondents' level of intimacy with people living with SCD. On the level of personal contact scale, 179(35.8%) of the respondents had low intimacy, 165(33%) had moderate intimacy and 156(31.2%) had high intimacy with people living with SCD.

Table 4.7: Frequency distribution of respondents' level of intimacy with people living with SCD (N=500)

Level of personal contact scale	Frequency n	Percentage (%)
Low intimacy	179	35.8
Moderate intimacy	165	33.0
High intimacy	156	31.2
Total	500	100

4.6 Social Distance

Table 4.8 shows the frequency distribution of respondents' response to questions on stigmatisation towards people living with SCD. For all five questions, most respondents endorsed "No" while minority endorsed the ambivalent opinion "May be". Majority 277(55.4%) of the respondents would not say bad things about anyone with SCD. More than half 270(54.0%) would not avoid being friends with anyone with SCD. Also, more than half 272(54.4%) of the respondents would not avoid having personal contact with anyone who has SCD.

However, a substantial proportion also endorsed negative stigmatizing attitude towards people living with SCD; 241(48.2%) would gossip about people living SCD and 237(47.4%) would avoid sharing food or eat with anyone who has SCD.

Table 4.8: Frequency distribution of respondents' response to questions on stigmatisation towards people living with SCD

Social Distance Question	Yes n (%)	May be n (%)	No n (%)
Would you gossip about anyone with SCD	241(48.2)	33(6.6)	226(45.2)
Would you say bad things about anyone with SCD	155(31.0)	68(13.6)	277(55.4)
Would you avoid sharing food or eat with anyone who has SCD	237(47.4)	57(11.4)	206(41.2)
Would you avoid being friends with anyone who has SCD	133(26.0)	97(19.0)	270(54.0)
Would you avoid having personal contact with anyone who has SCD	132(26.4)	96(19.2)	272(54.4)

Note: Multiple responses

Table 4.8: Frequency distribution of respondents' response to questions on stigmatisation towards people living with SCD

Social Distance Question	Yes n (%)	May be n (%)	No n (%)
Would you gossip about anyone with SCD	241(48.2)	33(6.6)	226(45.2)
Would you say bad things about anyone with SCD	155(31.0)	68(13.6)	277(55.4)
Would you avoid sharing food or eat with anyone who has SCD	237(47.4)	57(11.4)	206(41.2)
Would you avoid being friends with anyone who has SCD	133(26.0)	97(19.0)	270(54.0)
Would you avoid having personal contact with anyone who has SCD	132(26.4)	96(19.2)	272(54.4)

Note: Multiple responses

4.6.1 Social Distance Scale

Table 4.9 shows respondents' level of stigmatization towards people living with SCD. On the level of social distance scale, 280(56%) of the respondents had low stigmatizing attitude, 190(38.0%) had moderate stigmatizing attitude and 30(6.0%) had high stigmatizing towards people living with SCD.

Table 4.9: Frequency distribution of respondents' level of stigmatization towards people living with SCD (N=500)

Social Distance Scale	Frequency	Percentage
Low stigmatizing attitude	280	56.0
Moderate stigmatizing attitude	30	6.0
High stigmatizing attitude	190	38.0
Total	500	100

4.7 Attitude towards people living with sickle cell disease

Table 4.10 shows frequency distribution of respondents' attitude towards people living with sickle cell disease. More than half 297(59.4%) of the respondents strongly agreed that people living with SCD cannot live normal lives. Few 136(27.2%) agreed that people living with SCD should be ashamed of their disease, 88(17.4%) strongly agreed that they should be blamed for bringing the disease into the community, 90(18.0%) agreed that SCD patients should keep secret about their disease and 102(20.4%) agreed that having less personal contact with people living with SCD will not make them have the disease.

Majority 341(68.2%) of the respondents strongly agreed that affected people with SCD who seek proper medical attention can live normal and prolonged lives and 129(25.8%) agreed that people with SCD do not usually die from disease. More than half 294(58.4%) strongly agreed that people with SCD may have other diseases caused by it and 241(48.2%) admitted that people living with SCD can live up to 60years if medical care is of high quality.

Table 4.10: Frequency distribution of respondents' attitude towards people living with sickle cell disease (N=500)

Characteristics	Strongly Agree n (%)	Agree n (%)	Undecided n (%)	Disagree n (%)	Strongly Disagree n (%)
People with SCD cannot live normal life	101(20.2)	196(39.2)	30(6.0)	90(18)	83(16.6)
People who have SCD should be ashamed of their disease	32(6.4)	104(20.8)	14(2.8)	249(49.8)	101(20.2)
People who have SCD should be blamed for bringing the disease into the community	32(6.4)	56(11.2)	20(4.0)	281(56.2)	111(22.2)
Affected people with sickle cell disease who seek proper medical care can live a normal and prolonged life	152(30.4)	189(37.8)	54(10.8)	76(15.2)	29(5.8)
People with SCD do not usually die from the disease	58(11.6)	71(14.2)	104(20.8)	176(35.2)	91(18.2)
People with SCD may have other diseases caused by SCD	120(24.0)	172(34.4)	71(14.2)	106(21.2)	31(6.2)
People living with SCD can live up to 60yrs if medical care is of high quality	123(24.6)	118(23.6)	106(21.2)	112(22.4)	41(8.2)

Note: Multiple responses

4.8 Cost and care for people living with sickle cell disease

Table 4.9 shows respondents' opinion on cost and care for people living with SCD. High percentage 483(96.6%) of the respondents opined that SCD patients need more care than others, 481(96.2%) opined that people living with SCD frequently visit the hospital because of their illness. However, most 410(82.0%) of the respondents admitted that the cost of medical care for people living with SCD is expensive and 344(68.7%) acknowledged that families who have people living SCD usually become poor due to care and management of their illness

Table 4.11: Respondents' opinion on cost and care for people living with sickle cell disease (N=500)

Characteristics	Strongly Agree n (%)	Agree n (%)	Undecided n (%)	Disagree n (%)	Strongly Disagree n (%)
Affected people with SCD need love and care	258(51.6)	225(45)	4(0.8)	9(1.8)	4(0.8)
People who have SCD need more health care than others	270(54.0)	211(42.2)	3(0.6)	10(2.0)	6(1.2)
People with SCD frequently visit the hospital because of their illness	270(54.0)	221(44.2)	3(0.6)	2(0.4)	4(0.8)
Cost of medical care for people living SCD is expensive	200(40.0)	210(42.0)	41(8.2)	43(8.6)	6(1.2)
Families who have people living with SCD usually become poor due to the care and management of their illness	186(37.2)	158(31.6)	51(10.2)	84(16.8)	21(4.2)

Table 4.11: Respondents' opinion on cost and care for people living with sickle cell disease (N=500)

Characteristics	Strongly Agree n (%)	Agree n (%)	Undecided n (%)	Disagree n (%)	Strongly Disagree n (%)
Affected people with SCD need love and care	258(51.6)	225(45)	4(0.8)	9(1.8)	4(0.8)
People who have SCD need more health care than others	270(54.0)	211(42.2)	3(0.6)	10(2.0)	6(1.2)
People with SCD frequently visit the hospital because of their illness	270(54.0)	221(44.2)	3(0.6)	2(0.4)	4(0.8)
Cost of medical care for people living SCD is expensive	200(40.0)	210(42.0)	41(8.2)	43(8.6)	6(1.2)
Families who have people living with SCD usually become poor due to the care and management of their illness	186(37.2)	158(31.6)	51(10.2)	84(16.8)	21(4.2)

4.9 Respondents' level of knowledge, belief and attitude towards people living with SCD

Table 4.12 shows frequency distribution of respondents' level of knowledge, belief and attitude towards people living with SCD. The mean level of knowledge was 28.2±4.7, about half 263(52.6%) of the respondents had poor knowledge about SCD while 237(47.4%) had good knowledge about SCD.

Respondents' mean level of belief was 14.9±3.7, less than half 225(45.0%) of the respondents had poor belief about SCD while 275(55.0%) had good belief about SCD.

Respondents' mean level of attitude was 56.3±6.7, almost half 238(47.6%) of respondents had poor attitude towards people living with SCD while 262(52.4%) had good attitude about SCD.

4.12 Frequency distribution of respondents' level of knowledge, belief and attitude towards people living with SCD (N=500)

Variables	Frequency	Percentage
Level of knowledge		
Poor knowledge	263	52.6
Good knowledge	237	47.4
Level of belief		
Poor belief	225	45.0
Good belief	275	55.0
Level of attitude		
Poor attitude	238	47.6
Good attitude	262	52.4

4.10 Association between social distance and level of personal contact

Table 4.13 shows the relationship between social distance and level of personal contact. There was a statistically significant relationship between level of personal contact and social distance (χ^2 =61.808, p=0.000). Among respondents with high intimacy, 115(73.7%) had low stigmatizing attitude while 5(3.2%) had moderate stigmatizing attitude.

Table 4.13: The relationship between respondents' social distance and level of personal contact

Variables	Social Distance						
	Low	Moderate	High	Total	χ^2	df	P-value
Level of personal contact							
Low intimacy	64(35.6%)	10(5.6%)	106(58.9%)	106			
Moderate intimacy	100(40.6%)	16(9.8%)	48(29.3%)	164	61.808	4	0.000*
High intimacy	115(73.7%)	5(3.2%)	36(23.1%)	156			

*Significant at p <0.0001

4.11 Association between social distance and socio-demographic characteristics

Table 4.14 shows the relationship between social distance and socio-demographic characteristics. There was a statistically significant association between religion (χ^2 = 22.978, p= 0.000), ethnic group (χ^2 = 7.345, p= 0.025), family setting (χ^2 = 17.637, p=0.000), level of education (χ^2 = 51.728, p= 0.000) and Social distance. Among those who were Christians, 188(64.4%) had low stigmatizing attitude while 94(32.2%) had low stigmatizing attitude towards people living with SCD. Among non-yorubas, 61(48.0%) had high stigmatizing attitude while 59(46.5%) had low stigmatizing attitude towards people living with SCD. Among those polygamous family setting, 73(52.1%) had high stigmatizing attitude while 63(45.0%) had low stigmatizing attitude. Among those who had completed secondary school, 97(51.3%) had low stigmatizing attitude while 56(29.6%) had high stigmatizing attitude. Among those who were delivered in traditional home, 21(53.8%) had high stigmatizing attitude while 15(38.5%) had low stigmatizing attitude.

There was no statistically significant association between age (χ^2 =9.252, p= 0.160), sex (χ^2 = 0.341, p= 0.843), marital status (χ^2 = 7.565, p= 0.109), occupation (χ^2 = 9.121, p= 0.058) and social distance.

Table 4.14: Relationship between social distance and socio-demographic characteristics

Variables	Social Distance Low	Moderate	High	Total	χ^2	df	P-value
Age							
18-24	51(47.7%)	4(3.7%)	52(48.6%)	107			
25-34	113(57.4%	17(8.3%)	70(34.3%)	204			
35-44	70(59.8%)	6(5.1%)	41(35.0%)	117	9.252	6	0.160
45 and above	42(58.3%)	3(4.2%)	27(37.5%)	72			
Sex							
Male	124(56.9%)	14(6.4%)	80(36.7%)	218			
Female	156(55.3%)	16(5.7%)	110(39.0%)	282	0.341	2	0.843
Marital Status							
Single	100(59.2%)	5(3.0%)	64(37.9%)	169			
Married/Co-habiting	151(53.4%)	24(8.5%)	108(38.2%)	283	7.565	4	0.109
Others	29(60.4%)	1(2.1%)	18(37.5%)	48			
Religion							
Christian	188(64.4%)	10(3.4%)	94(32.2%)	292			
Muslim	85(44.5%)	18(9.4%)	88(46.1%)	191	22.978	2	0.000*
Traditional	7(41.2%)	2(11.8%)	8(47.1%)	17			
Ethnicity							
Yoruba	221(59.2%)	23(6.2%)	129(34.6%)	373			
Non-Yorubas	59(46.5%)	7(5.5%)	61(48.0%)	127	7.345	2	0.025*
Family Setting							
Monogamy	217(60.3%)	26(7.2%)	117(32.5%)	360			
Polygamy	63(45.0%)	4(2.9%)	73(52.1%)	140	17.637	2	0.000*
Level of Education							
No formal education	11(29.7%)	9(24.3%)	5(13.5%)	37			
Primary school	41(42.3%)	27(27.8%)	22(22.7%)	97			
Secondary school	97(51.3%)	63(33.3%)	56(29.6%)	189	36.950	6	0.000*
Tertiary institution	131(74.0%)	66(37.3%)	73(41.2%)	177			
Occupation							
Unemployed	47(45.6%)	4(3.9%)	52(50.5%)	139			
Self-employed	144(55.0%)	18(6.9%)	100(38.2%)	262	9.121	4	0.058
Employed	67(67.5%)	5(5.1%)	27(27.3%)	99			

*Significant at p<0.05

4.12 Association between social distance and knowledge, belief and attitude of respondents' towards people living with sickle cell disease

Table 4.15 shows the relationship between respondents' social distance and knowledge, belief and attitude of respondents' towards people living with SCD. There was a statistically significant association between social distance and level of knowledge (χ^2= 33.759, p=0.000), level of belief (χ^2= 35.870, p=0.000), level of attitude (χ^2= 26.732, p=0.000). Among those who had poor knowledge about SCD, 179(68.1%) had low stigmatizing attitude and among those who had good knowledge, 120(50.7%) had high stigmatizing attitude.

Among those who had good belief about SCD, 187(68.0%) had low stigmatizing attitude and those who had poor belief about SCD, 115(51.1%) had high stigmatizing attitude.

However, among those who had good attitude towards people living with SCD, 175(66.8%) had low stigmatizing attitude and among those who had poor attitude, 117(49.2%) had high stigmatizing attitude.

Table 4.15: Relationship between respondents' social distance and knowledge, belief and attitude of respondents' towards people living with sickle cell disease

Variables	SOCIAL DISTANCE					
	Low	Moderate	High	Total	χ^2	P-value
Level of Knowledge						
Poor Knowledge	179(68.1%)	14(5.3%)	70(26.6%)	263		
Good Knowledge	101(42.6%)	16(6.8%)	120(50.7%)	237	33.759	0.000*
Level of Belief						
Poor Belief	93(41.3%)	17(7.6%)	115(51.1%)	225		
Good Belief	187(68.0%)	13(4.7%)	75(27.3%)	275	35.870	0.000*
Level of Attitude						
Poor Attitude	105(44.1%)	16(6.7%)	117(49.2%)	238		
Good Attitude	175(66.8%)	14(5.3%)	73(27.9%)	262	26.732	0.000*

*significant at p<0.0001

4.13 Multinomial logistic regression of the predictors of moderate relative to low stigmatizing attitude towards people living with sickle cell disease

Table 4.16 shows the multinomial logistic regression analysis of the predictors of moderate relative to low stigmatizing attitude towards people living with SCD. Using Pearson chi-square and deviance to detect the fitted model, the result showed that the significant value was more than the cut-off point ($p>0.05$) which implies that the model fit for our sample data ($\chi_p^2= 871.904$, $p=0.456$; $\chi_d^2= 654.704$, $p= 1.000$).

For moderate stigma relative to low stigmatizing attitude, respondents' from monogamous family setting were eight times (OR= 8.25, 95% CI= 1.339-50.839, p-value= 0.02) more likely to have moderate stigma relative to low stigmatizing attitude towards people living with SCD compared to those from polygamous family setting.

Table 4.16: Multinomial logistic regression analysis of the predictors of moderate relative to low stigmatizing attitude towards people living with sickle cell disease

Variables	Standard error (SE)	Odds Ratio (OR)	95% CI Lower	Upper	p-value
Age					
18-24	1.097	1.074	0.125	9.232	0.948
25-34	0.838	1.617	0.313	8.367	0.566
35-44	0.872	1.142	0.207	6.309	0.879
45 and above*					
Sex					
Male	0.443	1.206	0.506	2.872	0.672
Female*					
Religion					
Christian	1.428	0.130	0.008	2.126	0.152
Muslim	1.328	0.662	0.049	8.942	0.756
Others*					
Ethnicity					
Yoruba	0.596	1.150	0.357	3.700	0.815
Non-Yorubas*					
Marital status					
Single	1.277	1.053	0.086	12.854	0.968
Married/co-habiting	1.121	2.185	0.243	19.674	0.486
Others*					
Family setting					
Monogamy	0.928	8.252	1.339	50.839	0.023**
Polygamy*					
Level of Education					
No formal education	1.178	2.716	0.270	27.322	0.396
Primary school	1.026	0.210	0.028	1.568	0.128
Secondary school	0.542	1.118	0.387	3.235	0.836
Tertiary institution*					

*Reference category **Significant at p<0.05

Table 4.16 cont'd Multinomial logistic regression analysis of the predictors of moderate relative to low stigmatizing attitude towards people living with sickle cell disease

Variables	Standard error (SE)	Odds Ratio (OR)	95% CI Lower	Upper	p-value
Occupation					
Unemployed	0.764	1.956	0.438	8.739	0.380
Self-employed	0.608	2.248	0.683	7.397	0.183
Employed*					
Parity					
0-1	0.927	0.866	0.141	5.332	0.877
2-4	0.792	0.851	0.180	4.016	0.838
4 and above*					
Level of knowledge					
Good knowledge	0.522	1.045	0.376	2.905	0.933
Poor knowledge*					
Level of Belief					
Good belief	0.467	0.455	0.182	1.138	0.092
Poor belief*					
Level of Attitude					
Good attitude	0.488	0.666	0.256	1.731	0.404
Poor attitude*					
Level of personal contact					
High intimacy	0.684	0.335	0.088	1.279	0.110
Moderate intimacy	0.543	1.338	0.461	3.879	0.592
Low intimacy*					

*Reference category

4.14 Multinomial logistic regression of the predictors of high relative to low stigmatizing attitude towards people living with SCD

Table 4.17 shows multinomial logistic regression analysis of the predictors of high relative to low stigmatizing attitude towards people living with SCD. For high stigma relative to low stigmatizing attitude, respondents' who had completed secondary school were two times (OR= 2.04, 95% CI= 1.166-3.570, p-value= 0.01) more likely to have high stigma relative to low stigmatizing attitude towards people living with SCD compared to those who had completed tertiary education.

Table 4.17 cont'd also shows multinomial logistic regression analysis of the predictors of high relative to low stigmatizing attitude towards people living with SCD. For high relative to low stigmatizing attitude, those who had good belief about SCD were two times (OR= 0.49, 95% CI= 0.313-0.792, p-value= 0.000) less likely to have high stigma relative to low stigmatizing attitude towards people living with SCD compared to those who had poor belief about SCD. For level of personal contact, those who had high intimacy were three times (OR= 0.29, 95% CI= 0.145-0.455, p-value= 0.000) less likely to have high stigma relative to low stigmatizing attitude and those who had moderate intimacy were approximately four times (OR= 0.27, 95% CI= 0.191-0.546, p-value= 0.000) less likely to have high stigma to low stigmatizing attitude towards people living with SCD compared to those with low intimacy.

Table 4.17: The multinomial logistic regression analysis of the predictors of high relative to low stigmatizing attitude towards people living with SCD

Variables	Standard error (SE)	Odds Ratio (OR)	95% CI Lower	Upper	p-value
Age					
18-24	0.528	0.828	0.294	2.333	0.722
25-34	0.423	0.840	0.367	1.924	0.680
35-44	0.391	0.898	0.417	1.933	0.783
45 and above*					
Sex					
Male	0.229	0.663	0.423	1.039	0.073
Female*					
Religion					
Christian	0.696	1.879	0.484	7.397	0.360
Muslim	0.661	2.777	0.760	10.149	0.122
Others*					
Ethnicity					
Yoruba	0.274	0.885	0.517	1.513	0.655
Non-Yorubas*					
Marital status					
Single	0.527	1.161	0.413	3.262	0.777
Married/co-habiting	0.403	0.903	0.410	1.990	0.800
Others*					
Family setting					
Monogamy	0.279	0.700	0.406	1.209	0.201
Polygamy*					
Level of Education					
No formal education	0.630	1.581	0.460	5.432	0.467
Primary school	0.410	1.833	0.821	4.090	0.139
Secondary school	0.286	2.040	1.166	3.570	0.012**
Tertiary institution*					

*Reference category **Significant at p<0.05, ***significant at p<0.0001

Table 4.17 cont'd: Multinomial logistic regression analysis of the predictors of high relative to low stigmatizing attitude towards people living with SCD

Variables	Standard error (SE)	Odds Ratio (OR)	95% CI Lower	Upper	p-value
Occupation					
Unemployed	0.356	1.190	0.593	2.390	0.624
Self- employed	0.309	0.927	0.506	1.698	0.807
Employed*					
Parity					
0-1	0.503	0.902	0.336	2.418	0.837
2-4	0.409	0.920	0.413	2.049	0.838
4 and above*					
Level of knowledge					
Good knowledge	0.259	1.467	0.884	2.436	0.138
Poor knowledge*					
Level of Belief					
Good belief	0.237	0.498	0.313	0.792	0.003**
Poor belief*					
Level of Attitude					
Good attitude	0.243	0.837	0.519	1.348	0.476
Poor attitude*					
Level of personal contact					
High intimacy	0.292	0.256	0.145	0.449	0.000***
Moderate intimacy	0.269	0.323	0.191	0.546	0.000***
Low intimacy*					

*Reference category **Significant at p<0.05, ***significant at p<0.0001

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

Previous studies have shown stigmatizing attitude towards people living with SCD among peer group in schools but so much has not been done in the community where people living with this disease live hence this study determines the level of stigma towards people living with SCD in Mokola community, Ibadan North Local Government Area, Oyo state.

5.1.1 Socio-demographic characteristics

A total of 500 respondents returned useful and completely filled questionnaire giving the overall response rate of 91% which is similar to Ani et al., (2012) who reported 73% response rate in a smaller sample of 220 respondents. This study found that Muslims, non-Yoruba and those from polygamous family setting had high stigmatizing attitude towards people living with SCD which may be associated with their religious and cultural beliefs. Afolayan and Jolayemi (2011) reported that religious and cultural beliefs have significant impact on attitude which supports the findings of this study.

5.1.2 Awareness and knowledge about sickle cell disease (SCD)

All the respondents were aware of sickle cell disease and their major source of information about SCD were from friends/relatives (35.8%), radio/TV (27.1%) and Health Care Facility/workers (11%). A study carried out among secondary school students in Jos, Nigeria (Olarenwaju et al., 2013) reported a similar level of awareness (97.4%) but mentioned major sources of information as friends/family (32%), internet (11.1%) and Health worker (36.5%) which is similar the sources of information reported by this study.

Major signs and symptoms found by this study include: painful crises (bone and joint pains), jaundice (yellow eyes and skin), pale look (anaemia), frequent illness and abdominal swelling. A study carried out in Ilorin metropolis among secondary school students (Durotoye et al., 2013) reported yellowness of eyes, on and off bone pains, frequent illness and anaemia as the major signs and symptoms of SCD which is similar to the findings of this study.

Despite high awareness about SCD, respondents 52.6% had poor knowledge about the cause, mode of transmission from parents, treatment and prevention of SCD. A study carried out in Ilorin (Durotoye et al., 2013) reported that 36.3% had poor knowledge which is lower than the knowledge score reported by this study. This may be due to the fact that Durotoye et al., (2013) grouped knowledge score into a 3-point likert scale. Poor knowledge about SCD may result in misconception about the disease hence there is need for sensitization and more education about SCD.

The proportion of people who knew their genotype was 52% which is similar to studies which reported 52% (Durotoye et al., 2013) and 59% (Olarenwaju et al., 2013) respectively. Another study among undergraduates of Ekiti State University, Ekiti (Olubiyi et al., 2013) reported proportion of those who were aware of their genotype status to be 90.3% which is not similar to this study. The reason for this may be that genotype status was determined before admission into the University. However, this proportion (52%) is low for a country with the highest burden of this disease in Sub-Sahara Africa (SSA) hence importance of genotype screening should be emphasized.

5.1.3 Belief and Attitude about SCD

Despite respondents' good belief about SCD, some still had inaccurate belief that SCD can be infectious, caused by evil spirits and cured with herbs. A study carried out among

undergraduates of River State University of Education, Port Harcourt (Ani et al., 2012) reported that respondents had inaccurate belief that SCD can be caused by evil spirits, infections and cured by spiritual healers which support this study findings. This implies that people still have wrong belief about SCD hence there is need for continuous education among individuals (18 years and above) about SCD.

This study identified negative attitude that people living with SCD cannot live normal life. A study carried out in Lagos among secondary school students (Ola et al., 2013) also reported that respondents' feel people living with SCD cannot live normal life which support the findings reported by this study.

As regards the cost of care and management of SCD, majority agreed that the cost of medical care is enormous which is similar to the report stated by Kabiti (2008). He reported in his profile that the cost implication for the management of SCD is enormous. This support findings of this study hence policies on socio-economic measures should be developed to assist SCD-affected families.

Majority opined that SCD patients need more love and care. Jenerette and Brewer (2010) stated that SCD patient require adequate care from health care provider, families and loved ones because SCD comes with painful crises.

5.1.4 Association between Social distance and significant variables

In this study, the significant variables associated with social distance were religion, ethnicity, family setting, level of education, personal contact, knowledge, belief and attitude. Respondents who had high stigmatizing attitude were those who had low intimacy with SCD patients, poor belief and attitude about SCD.

A similar study on stigmatizing attitude among secondary school students in Nigeria (Ola et al., 2013) reported significant variables associated with social distance were gender, belief that SCD can be caused by bad foods, being unaware that the condition is heritable, not knowing SCD affects red blood cell, belief that people living with SCD cannot live normal life and having less personal contact which is not similar to the findings of this study. This may be due to their choice of statistical test for analysis (Pearson correlation coefficient) for continuous variables.

5.1.5 Stigmatizing Attitude

This study found less stigma but substantial proportion endorsed attitude associated with social distance question "would gossip about anyone with the disease" and "would avoid eating or sharing food with anyone who has the disease". A study carried out among undergraduates of River State University of Education, Port Harcourt (Ani et al., 2012) reported that 53.2% would gossip about student living with SCD which support the finding of this study. However, anti-stigma policies aimed at individual and community level should be developed.

This study revealed that those who had high intimacy with people living with SCD had low stigmatizing attitude. A Nigerian study on stigmatizing attitude among secondary school students in Lagos (Ola et al., 2013) stated that a closer level of contact or familiarity with people affected with SCD was associated with a less stigmatising attitude which support the findings of this study.

5.1.6 Predictors of stigmatizing attitude

This study revealed that family setting was the only predictor of moderate stigma relative to low stigmatizing attitude and secondary education, belief and level of personal contact were

the predictors of high stigma relative to low stigmatizing attitude. Those from monogamous family setting were eight times more likely to have relative moderate to low stigmatizing attitude towards people living with SCD. However, those who had completed secondary education were two times more likely to have high relative to low stigmatizing attitude towards people living with SCD.

A similar study on stigmatizing attitude in Lagos, Nigeria (Ola B et al., 2013) reported significant predictors of social distance scale as belief that people with SCD cannot live normal life and having less personal contact with SCD which is not similar to the findings of this study which may be due to their choice of statistical test (linear regression model) to determine significant predictors.

5.1.7 Limitation

This study was carried out in one community hence the findings from this research cannot be generalised. Questions on social distance measures attitude rather than behaviour.

5.2 Conclusion

Stigma related to SCD can be attributed to ignorance due to poor knowledge, myth and superstition about SCD. Despite high level of awareness about SCD, respondents had poor knowledge about causes, treatment and prevention of SCD while a significant proportion had good belief about SCD. Sickle cell disease is a preventable health problem if emphasis is laid on need for voluntary screening. This study found that few respondents knew their genotype status which is not encouraging for a country with the highest burden of the disease.

Although this study found less stigma but a few number of respondents' still engage in negative attitudes associated with stigma towards people living with SCD. Also, less

stigmatizing attitude was associated with high level of personal contact with people living with SCD. This study provides useful information to plan anti-stigma programmes towards people living with SCD in Mokola community, Ibadan North Local Government Area, Oyo state.

5.3 Recommendations

It is hereby recommended that:

1. There should be more public education on knowledge about causes, treatment and prevention of SCD among people living in Mokola community.
2. There should be awareness campaign on the importance of genotype screening so that people living in Mokola can be more informed on reasons why they need to voluntarily go for genotype screening.
3. Anti-stigma programmes should be put in place to reduce stigma towards people living with SCD in Mokola community.

REFERENCES

Abdel-Meguid N, Zaki MSA and Hammad SA 2000: Premarital genetic investigations: effect of genetic counselling. *Eastern Mediterranean Health Journal*. 6.4:652- 660.

Afolayan JA and Jolayemi FT 2011. Parental attitude to children with sickle cell disease in selected health care facility in Irepodun Local Government Kwara State, Nigeria. *Ethno Med*. 5.1:33-40.

Agbanusi O, Amaechi C, Onyejizu C, Osuroji C, Chukwuma A and Arua I 2007: Sickle cell anaemia. Awareness of sickle cell anaemia and its heterozygote state among undergraduate students of the University of Nigeria, Enugu. *Medikka Journal of the University of Nigeria Medical Students*. ISSN 03331-1643.

Akingbola TS, Bamidele TO, Salako B, Layden B, Hsu LL, Cooper RS, Gordeuk VR and Saraf SL 2014: Comparison of patients from Nigeria and the USA highlights modifiable risk factors for sickle cell anaemia complications. *Informa Health Care USA*. 10.31109/03630269.2014.927363.

Akinyanju OO 2010. The National burden of sickle cell anaemia and the way forward. Page 1-18.

Al-Gazali LI, Alwash R and Abdulrazzaq YM 2005: United Arab Emirate; communities and community genetics. *Community genetics*. 8:186-96

Ani C, Aranda AM, Kinanee J, Ola B and Kramer T 2012: Trainee-teachers' stigmatizing attitude towards sickle cell disorders in Nigeria. *European Journal of Educational Studies*. 4.3: 349-360.

Ani C, Ola BA, and Coker AO 2011: School children's stigmatizing attitude towards peers with epilepsy in Nigeria. *Vulnerable Children & Youth Studies*. 6 (4):330–338.

Anie KA, Egunjobi FE and Akinyanju OO 2010: Psychological impact of sickle cell disorder perspective from a Nigerian setting. *Globalization and Health*. 6:2.

Animasahun BA, Nwodo U and Njokanwa FO 2012: Prenatal screening for sickle cell anaemia: Awareness among health professionals and medical students at Lagos State

University Teaching Hospital and concept of prevention by termination. *Journal on Paediatry Hematology Oncology*. 34:252-256.

Ashley-Koch A, Yang Q and Olney RS 2000: Sickle haemoglobin allele and sickle cell disease: A human genome Epidemiology review (HUGE). *American Journal of Epidemiology*. 151.9:839-845.

Ballas SK, Bauserman RL, Mccarthy WF, Castro OL, Smith WR, Waclawiw MA 2010: Hydrourea and acute painful crises in sickle cell anaemia. Effects on hospital. *Journal for Pain Symptom Manage*. 40.6:870-882.

Bhatia M and Walters WC 2008: Haemopoietic cell transplantation for thalasaemia and sickle cell disease: Past, present and future. *Bone Marrow Transplant*. 41:109-117.

Bogardus ES 1933: A social distance scale. *Sociology and Social Research*. 17: 265– 271

Brousse V, Maakani J and Rees DC 2014: Clinical review: Management of sickle cell disease in the community. *BMJ* 348:1765 doi: 10.1136/bmj.g1765.

Brousseau DC, Owens PL, Mosso AL, Panepinto JA and Steiner CA 2010: Utilization and rehospitalisation for sickle cell disease. *JAMA*. 303.13:1288-1294.

Burnes DPR, Antle BJ, Williams CC and Cook L 2008: Mothers raising children with sickle cell disease at the intersection of race, gender, and illness stigma. *Health Social Work*. 33.3:211-220.

Butt G 2008: Stigma in the context of hepatitis C: Concept Analysis. *Journal of Advanced Nursing*. 62.6:712-714.

Corrigan PW, Edwards AB, Green A, Diwan SL and Penn DL 2001: Prejudice, social distance and familiarity with mental illness. *Schizophrenia Bulletin*. 27.2:219-225.

Davies SC, Cronin E, Gill M, Greengross P, Hickman N and Normand C 2000: Screening for sickle cell disease and thalasaemia. A systematic review with supplementary research. *Health Technology Assessment*. 4.3.

De Montalembert M 2008: Management of sickle cell disease. *BMJ* 8:337:a1397.doi:10.1136/bmj.a.1397.

De Montalembert M, Ferster A, Colombath R, Ress DC and Gulbis B 2011: Clinical recommendation for disease management and prevention of complication of sickle cell disease in children. *American journal of hematology*. 88:72-75.

Delicat-Loembet LM, Elguero E, Arnathau C, Durand P, Ollomo B, Ossari S, Mezui-me-ndong J, Mboro TM, Becquart P, Nkoghe D, Leroy E, Sica L, Gonzalez J, Prugnolle F and Renaud F 2014: Prevalence of the sickle cell trait in Gabon: A Nationwide Study. *Infections, Genetics and Evolution*. 25:52-56.

Diallo D and Tchernia G 2002: Sickle cell disease in Africa. *Curr. Opin. Hematol*. 9.2:111–116.

Durotoye IA, Salaudeen AG, Babatunde AS, Bosah EC, Ajayi FD 2013: Knowledge and perception of sickle cell disease among secondary school students in Ilorin metropolis. *The tropical journal of Health Sciences*. 20.2.

Dyson S, Atkin K, Culley LA, Dyson SE and Evans H 2011: Sickle cell habitual Dys-positions and fragile dispositions: young people with sickle cell at school. *Sociology of Health and Illness*. 33:465-483

Ebrahim SH, Khoja TAM, Elachola H, Atrash HK, Memish Z and Johnson A 2010: Children who come and go: The state of sickle cell disease in resource-poor countries. *American Journal Preventive Medicine*. 38.45:S568-S570.

Fottrell E and Osrin D 2013: Sickle cell anaemia in a changing World. PLoS Med. 10.1:e1001483.doi:10.1371/*journal.pmed*.1001483.

Frenette C and Atweh A 2007: Sickle cell disease. *Journal of Clinical Investigation*. 117.4:850-858. Doi: 10.1172/JC130920.

Galadanci N, Wudil BJ, Balogun GO, Ogunrinde GO, Akinsule A, Hasan-Hanga F, Mohammed AS, Kehinde MO, Olaniyi JA, Diaku-Akinwunmi IN, Brown BJ, Adeleke S, Nnodu OE, Emodi I, Ahmed S, Osegbue AO, Akinola N, Opara HIO, Adegoke SA, Areke J and Akile AD 2013: Current sickle cell disease management practices in Nigeria. *International Health Royal Society of Tropical Medicine and Hygiene*. 6:23-28.

Grosse SD, Odame I, Atrash HK, Amendah DD, Piel FB and Williams TN 2011: Sickle cell disease in Africa; A neglected cause of early childhood mortality. *American Journal of Preventive Medicine*. 41.654:398-S405.

Hamideh D and Alvarez O 2013: Sickle cell disease related mortality in the United State of America (1999-2009). *Paediatry Blood Cancer*. 60: 1482-1486.

Hartree N and Gronow H 2012: Sickle cell disease and sickle cell anaemia. 2779.

Hassell KL 2010: Population estimate of sickle cell disease in the US. *American Journal Prev Med*. 38.4:512-521.

Haywood C, Beach MC and Lanzkron 2009: A systematic review of barriers and intervention for improve appropriate use of therapies for sickle cell disease. *Journal for National Medical Association*. 101.10:1022-1023.

Jacob E 2001: Pain management in sickle cell disease. *Pain Management Nursing*. 2.4:121–131.

Jenerette C, Marjorie F and Murdaugh C 2005: Sickle Cell Disease: A stigmatizing condition that may lead to depression. *Issues in Mental Nursing*. 26.10:1081-1101.

Jenerette CM and Brewer C 2010: Health-related stigma in young adults with sickle cell disease. *Journal for National Medical Association*. 102.11:1050-1055.

Jorm AF and Wright A 2008: Influences on young people's stigmatising attitudes towards peers with mental disorders: National survey of young Australians and their parents' attitudes. *The British Journal of Psychiatry*, 192:144–149. doi: 10.1192/bjp.bp.107.039404.

Juwah AI, Nlemadim EU and Kaine W 2004: Types of anaemic crises in paediatric patients with sickle cell anaemia seen in Enugu, Nigeria. *Arch Dis Child*. 89:572–576.

Kabiti IA 2008: Anthropometric profiles of homozygous sickle cell children in North-West Nigeria. *AJOL*. 11.2.

Komba AN, Makani J, Sadarangani M, Ajala-Agbo T, Berkley JA, Newton CR, Marsh K, Williams TN 2010: Malaria as a cause of morbidity and mortality in children with

homozygous sickle cell disease on the Coast of Kenya. *Clinical Infectious Dieases*. 49.2:216–222.

Kumar R, Panigrahi I, Dalal A and Agarwal S 2012: Sickle cell anaemia – molecular diagnosis and prenatal counselling: SGPGI experience. *Indian Journal of Paediatrics*. 79.1:68–74.

Lawson J.B. Sickle cell disease in pregnancy. In: Lawson JB, Stewart OB (Eds). Obstetrics and Gynaecology in the tropics and developing countries. London Edward Arnold (publishers) Limited.

Makani J, Cox SE, Soka D, Komba AN, Oruo J and Mwamtemi H 2011: Mortality in sickle cell anaemia in Africa: a prospective cohort study in Tanzania. *PLoS ONE* 6.2:14699.

Malat JR, van Ryn M and Purcell D 2006: Race, socioeconomic status and the perceived importance of positive self-presentation in health care. *Social Science and Medicine*. 62:2479-2488.

McAuley CF, Webb C and Makani J 2010: High mortality from Plasmodium falciparum malaria in children living with sickle cell anaemia on the coast of Kenya. *Blood*. 116:1663–1668.

Memish ZA and Saeedi MY 2011: Six-year outcome of the national premarital screening and genetic counselling program for sickle cell disease and β-thalassemia in Saudi Arabia. *Ann Saudi Med*. 31.3: 229-235.

NHS England. Sickle cell disease in childhood: Various standards and guidelines for clinical care, NHS sickle cell and thalasaemia screening program (various dates).

Nnodu OE 2014: Interventions for the prevention and control of sickle cell disease at primary health care centre in Gwagwalada area council of FCT, Nigeria. 6.8:e194.doi.10.7759/cureus.194.

Ohene-Frempong K, Oduro J, Tetteh H and Nkrumah F 2008: Newborn screening for sickle cell disease in Ghana. *Paediatrics*. 121:S120e1.

Ola B, Coker R and Ani C 2013: Stigmatising attitude towards peers with sickle cell disease among secondary school students in Nigeria. *International Journal of Child, Youth and Family Studies*. 4:391-402.

Olarenwaju S, Enwerem K, Adebimpe W and Olugbenga-Bello A 2013: Knowledge and attitude of secondary school students in Jos Nigeria on Sickle Cell Disease. *Pan African Medical Journal*. 2013.15.127.2712.

Oloyede OAO 2005: Influence of socio-demographic characteristics on the utilization of choronic villus sampling service in Nigeria. *Tropical Journal Obstetrics and Gynaecology*. 22.2:116-119.

Olubiyi SK, Umaru JN, Ajiboye O, Makinde OV and Abioye TAS 2013: Knowledge and attitude of undergraduates of Ekiti State University towards sickle cell disease and genetic counselling before marriage. *Sky Journal of Medicine and Medical Science*. 1.6.

Oludare GO and Ogili MC 2013: Knowledge, attitude and perception of premarital counselling for sickle cell disease among youth in Yaba, Nigeria. *African Journal of Reproductive Health*. 17.4:175-182.

Piel FB, Patil AP, Howes RE, Nyangiri OA, Gething PW and Dewi M 2013: Global epidemiology of sickle haemoglobin in neonates: a contemporary geostatistical model-based map and population estimates. *Lancet* 381:142-151.

Population Reference Bureau 2007: The state of the World's population. Available at www.prb.org/countries/Nigeria.aspx.

Rees DC, Williams TN, Gladwin MT 2010: Sickle Cell Disease. *Lancet*. 376.9757: 2018-2031.

Sani M 2014: The study of ABO blood groups and haemoglobin genotypes in Hassan Usman Katsina Polythenic, Katsina, Nigeria. *JORIND*. 12.1: 198-200.

Sankar P, Cho MK, Wolpe PR and Schairer C 2006: What is in a cause? Exploring the relationship genetic cause and felt stigma. *Genet Med*. 8.1:33-42.

Sartorius N 2006: Lessons from a 10-year global programme against stigma and discrimination because of an illness. *Psychol Health Med*. 11.3:383-388.

Serjeant GR 2001: The emerging understanding of sickle cell disease. *British Journal Haematology*. 11.2: 3-18.

Serjent GR 2004: The geography of sickle cell disease: opportunities for understanding its diversity. Available at: http://www.kfshrc.edu.sa/annals/143/rev9239. 89: 572–576.

Strickland O, Jackson G, Gilead M, Mc Guire DB and Quarles S 2001: Use of focus group for pain and quality of life assessment in adults with sickle cell disease. *Journal of the National Black Nurses Association (JNBMA)*. 12.2:36-43.

Stuart MJ and Nagel RL 2004: Sickle cell disease. *Lancet* 9-15; 364(9442):1343-1360.

Taiwo IA, Oloyede OA and Dosumu AO 2011: Frequency of sickle cell genotype among Yorubas in Lagos: Implication for the level of awareness and genetic counselling for sickle cell disease in Nigeria. *Journal for Community Genetics*. 2:13–18.

Tsaras G, Owusu-Ansah A, Boateny FO 2009: Complication association with sickle cell trait: A brief narrative Review. *American Journal Med*.122.6: 507-512.

Tunde-Ayinmode MF 2011: Children with sickle cell disease who are experiencing psychosocial problems concurrently with their mothers: A Nigerian study. *African Journal for Psychiatry*. 14:392-401.

Weatherall D, Akinyanju O, Fucharoen S, Olivieri N and Musgrove P 2006: Inherited disorder of haemoglobin. *Disease Control Priorities in Developing Countries*. 34:663-680.

Weatherall DJ and Clegg JB 2001: Inherited haemoglobin disorder. An increasing Global health problem. *Bull World Health Organization*. 79:704-712.

Weiss MG, Ramakrishna J and Somma D 2006: Health-related Stigma. Rethinking Concepts and Interventions. *Psychology Health Med*. 11.3:227-287.

Wethers D 2000: Sickle cell disease in childhood: Part II Diagnosis and treatment of major complications and recent advances in treatment. *American Family Physician*. 62.6:1309-1310.

Williams TN and Obaro SK 2011: Sickle cell disease and malaria morbidity: a tale with two tails. *Trends Parasitology*. 27:315–120.

World Health Organisation 2006: Sickle-Cell Anaemia Report by the Secretariat. Fifty Ninth World Health Assemblies. Report of a joint WHO-march of dimes meetings

management of birth defects and haemoglobin disorders. http://apps.who.int/gb/ebwha/pdf_files/WHA59/A59_9-en.pdf.

World Health Organization 2010. Sickle cell disease: A strategy for the World health organization for African region. AFR/RC/60/8.

APPENDIX I

TELEGRAMS.....

TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to the Honorable Commissioner quoting

Our Ref. No. AD 13/ 479/____

February, 2015

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

Attention: Olawuyi Adeola

Ethical Approval for the Implementation of your Research Proposal in Oyo State

This acknowledges the receipt of the corrected version of your Research Proposal titled: "Stigma and Discrimination Towards people Living with Sickle Cell Disease in Ibadan North Local Government Area, Oyo State."

2. The committee has noted your compliance with all the ethical concerns raised in the initial review of the proposal. In the light of this, I am pleased to convey to you the approval of committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of the findings as this will help in policy making in the health sector.

4. Wishing you all the best.

Sola Akande (Dr).
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethical Review Committee

APPENDIX II

STIGMA TOWARDS PEOPLE LIVING WITH SICKLE CELL DISEASE IN MOKOLA COMMUNITY, IBADAN NORTH LOCAL GOVERNMENT AREA, OYO STATE.

INFORMED CONSENT FORM

Dear Respondent,

My name is Olawuyi Adeola A., am a postgraduate student from the Department of Epidemiology and Medical Statistics, University of Ibadan. I'm conducting a research on stigma towards people living with sickle cell disease in Ibadan North Local Government Area, Oyo State. This questionnaire will be used to obtain information about your socio-demographic characteristics, knowledge and beliefs about sickle cell disease, stigma and discriminating attitude towards people with sickle cell disease.

You have the right to decide whether or not to participate in the study. All information collected from you will be used for research purpose only and be treated with strict confidentiality.

Thanks for your cooperation

_____ _____

Signature/Thumbprint of participant *Date of Interview*

APPENDIX III

QUESTIONNAIRE

SECTION A: SOCIO DEMOGRAPHIC CHARACTERISTICS

1. Age in years _____
2. Sex (1) Male (2) Female
3. Marital status (1) Single (2) Married (3) Widowed (4) Separated (5) Divorced (6) Co-habiting (7) Others please specify_____
4. Religion (1) Christianity (2) Islam (3) Traditional (4) Others please specify_____
5. Ethnicity (1) Yoruba (2) Hausa (3) Igbo (4) Others please specify
6. Family Setting (1) Monogamy (2) Polygamy
7. Level of Education completed (1) No formal education (2) Primary school (3) Secondary school (4) Tertiary institution
8. Occupation (1) Unemployed (2) Self-employed (3) Employed (4) Others please specify_____
9. Parity (Number of children)_____

SECTION B: KNOWLEDGE AND BELIEFS ABOUT SICKLE CELL DISEASE

10. Have you heard about sickle cell disease? (1) Yes (2) No
11. Where were your sources of information about SCD? Please tick more than one option (1) Radio/TV (2) Friends/Relative (3) Magazine/ Newspaper (4) Internet/ social network (5) Health workers / Health facilities (6)Others (please specify) _____
13. Sickle cell disease is a disorder affecting (1) Red blood cell (2) Lungs (3) Don't know
14. Sickle cell disease can be caused by? _____
15. How do people get sickle cell disease? (1) SCD can be acquired (2) SCD can be inherited (3) others please specify_____
16. What are the signs and symptoms of SCD?
    (1) Frequent illness Yes ☐ No ☐
    (2) Painful swelling of hand and feet Yes ☐ No ☐
    (3) Looking pale Yes ☐ No ☐
    (4) Painful crises (bone, back, joint and body pain) Yes ☐ No ☐
    (5) Stunted growth Yes ☐ No ☐
    (6) Low blood level Yes ☐ No ☐
    (7) Jaundice (yellow eyes and skin) Yes ☐ No ☐
    (8) Abdominal swelling Yes ☐ No ☐
    (9) Others please specify_____
17. How can Sickle cell disease be diagnosed? (1) Through blood test (2) Through urine test (3) Don't know

18. Do you consider haemoglobin genotype screening important? (1) Yes (2) No

19. Have you ever gone for genotype screening? (1) Yes (2) No

20. Do you know your genotype? (1)Yes (2) No

21. If No, state reason _____

22. What is your genotype? (1) AA (2) AS (3) AC (4) Don't know

(5) Others please specify_____

23. Where did you do your genotype screening? (1) Government Hospital (2) Private Hospital (3) Laboratory (4) Others please specify_____

24. How many times have you had haemoglobin genotype screening? (1) Never (2) Once (3) twice (4) Thrice (5) Others please specify_____

25. What genotype is responsible for SCD? (1) AA (2) AS (3) SS (4) Don't know

26. In cases where one parent is a carrier of sickle cell trait, what are the chances that their children will have sickle cell trait?

(1) All the children will have SCT (2) None of the children will have SCT (3) 1 out of 4 will have SCT (4) Half of the children will have SCT (5) 3 out of 4 will have SCT (6) Don't know

27. In cases where both parents are carriers of sickle cell trait, what are the chances that their children will have sickle cell disease?

(1) All the children will have SCD (2) None of the children will have SCD (3) 1 out of will have SCD (4) Half of the children will have SCD (5) 3 out of 4 will have SCD

(6) Don't know

28. A child can have SCD if (1) Both parent are carriers of the disease

(2) Father/mother is a carrier of the disease (3) Don't know

29. What should spouse/partner do when they discover that their genotype predispose them to having children with SCD? (1) Discontinue the relationship (2) Continue with the relationship and damn the consequences (3) Don't know

30. How can SCD be treated? (1) No treatment is available (2) Can be treated spiritually (3)Can be treated medically (4) Can be treated traditionally (5) Don't know (6) Others please specify_____

31. How can SCD be prevented? (1) Through genetic counselling (2) Through genotype screening (3) Through prayer (4) Don't know (5) Others please specify_____

SN	BELIEF ABOUT SICKLE CELL DISEASE	YES	NO
32	SCD is life threatening		
33	SCD is infectious		
34	SCD can be caused by witches, wizards & evil spirits		
35	SCD can be inherited from parents with sickle cell trait		
36	SCD can be acquired through contaminated blood		
37	SCD can be caused by bad food		
38	Cause of SCD is unknown		
39	You can be a carrier of abnormal sickle cell without being sick		
40	Black people are the ones at risk of having SCD		
41	Only men are at risk of SCD		
42	Women who are unfaithful are at risk of having SCD		
43	SCD can be transmitted through mosquito bite		
44	SCD can be transmitted by utilizing personal object belonging to infected person with the disease		
45	Genotype status concerning SCD should be known before marriage or conception		
46	Screening test that reveals presence of SCD is available		
47	SCD can be cured with herbs		
48	SCD can be cured if treated early		
49	Vaccine has been developed to prevent SCD		
50	SCD can induce lungs problem		
51	SCD can induce stroke		
52	SCD can induce cardiac problem		
53	SCD can induce kidney disorder		
54	SCD can kill		

SECTION C: STIGMA AND DISCRIMINATING ATTITUDE TOWARDS PEOPLE LIVING WITH SICKLE CELL DISEASE

S/N	LEVEL OF PERSONAL CONTACT WITH PEOPLE LIVING WITH SCD	YES	NO
55	I have a son/daughter who has sickle cell disease		
56	I have a brother/sister who has sickle cell disease		
57	I have a relative who has sickle cell disease		
58	I have a friend/neighbour living with sickle cell disease		
59	I have seen someone who has sickle cell disease		
60	I have heard of someone who has sickle cell disease		

S/N	SOCIAL DISTANCE QUESTIONS	YES	MAY BE	NO
61	Would you gossip about anyone with SCD?			
62	Would you say bad things about anyone with SCD?			
63	Would you avoid sharing food or eat with anyone who has SCD?			
64	Would you avoid being friends with anyone who has SCD?			
65	Would you avoid having personal contact with anyone who has SCD?			

SN	ATTITUDE QUESTIONS	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
66	People with SCD cannot live normal life					
67	People who have SCD should be ashamed of their disease					
68	Affected people with SCD need love and care					
69	People who have SCD should be blamed for bringing the disease into the community					
70	People who have SCD should keep secret about their illness					
71	Having less contact with people living with SCD will not make you have the disease					

72	People who have SCD need more health care than others					
73	People with SCD frequently visit the hospital because of their illness					
74	Cost of medical care for people living SCD is expensive					
75	Families who have people living with SCD usually become poor due to the care and management of their illness					
76	Affected people with sickle cell disease who seek proper medical care can live a normal and prolonged life					
77	People with SCD do not usually die from the disease					
78	People with SCD may have other diseases caused by SCD					
79	People living with SCD can live up to 60yrs if medical care is of high quality					
80	People living with SCD can die at anytime					

APPENDIX IV

AWON IWA TO TA ABUKU BA AWON ENIYAN TO N GBE PELU ARUN AROMOLEGUN NI AGBEGBE MOKOLA, IWO ORUN TI ILU IBADAN, NI IPINLE OYO.

IWE MOGBO MOGBA

Oludahun mi owon,

Oruko mi ni Olawuyi Adeola A. omo ile-iwe giga ti Unifasti ti ilu Ibadan ti eka eto ilera. Mo n se iwadi lori awon iwa to n ta abuku ba awon eniyan to n gbe pelu arun aromoleegun ni agbegbe Mokola iwo orun ti ilu ibadan, ni ipinle Oyo. Ninu iwadi yii, a o maa beere awon ibeere to je mo ara yin, imo ati ohun ti e gbagbo nipa arunaromoleegun, iwa yin si awon ti o ni arun aromoleegun ati awon iwa to ta abuku baa awon to gbe pelu arun aromoleegun.

Eni anfani lati pinu boya efe kopa tabi a ko fe kopa ninu iwadi wa yii lai ni wahala ninu. Gbogbo iwadi ti a ba gba lenu yin, a o lo fun idi ti a se gba iwadi yi nikan ni ati wipe eti keta kosini gbo tabi mo nipa iwadi ti aba gba lenu yin.

Ese fun ifowosowopo yin

_____ _____

Ifowosiwe/ Titeka ti enti yio kopa ninu iwadi *Ojo iforowero*

APPENDIX V

IWE IFOROWERO

APA KINNI: IBEERE NIPA ARA YIN

1. Omo odun melo ni yin? _____

2. Eya (1) Okunrin (2) Obinrin

3. Se e ni iyawo tabi oko? (1) Emi ko ti fe oko tabi iyawo (2) Mo ti se igbeyawo (3)Opo nimi (4) Atipinya (5) Atijawe fun ara wa (6)Anjogbe papo mo (7) Omiran_____

4. Omo esin wo ni o nse? (1) Kristeni (2) Musulmi (3) Ibile (4)Omiran_____

5. Kini eya ibile yin? (1) Yoruba (2) Hawusa (3) Ibo (4) Omiran_____

6. Kini eto ebi yin? (1) oko kan aya kan (2) oko kan iyawo pupo

7. Ile wo lo ka tan? (1) Mi o kawe rara (2) Ile-iwe mefa (3) Ile-iwe girama (4) Ile-iwe giga

8. Iru ise wo ni e nse? (1) Mi o nise lowo (2) Mo n kose, sise owo tabi ta oja (3) Mo nise lowo (4) Omiran_____

9. Omo melo leti bi? _____

APA KEJI: IBEERE NIPA IMO ATI IGBAGBO YIN NIPA ARUN AROMOLEEGUN

10. Se eti gbo nipa arun aromoleegun? (1) Beeni (2) Beko

11. Awon bo ni eti gbo nipa arun aromoleegun? E jowo elemu ju idahun kan lo

(1) Ero asoroma gba esi/ amohunmaworan (2) lati odo ore/ebi (3) iwe mogazini/ iwe iroyin (4) Lori ero ajelujara (5) Lati odo awon onimo nipa ilera / eka eto ilera (6) Omiran _____

12. Se arun aromoleegun le je akoba (1) Eya inu eje (2) Fukufuku (3) Emi komo

13. Kini olefa arun aromoleegun? _____

14. Bawo ni eniyan se le ni arun aromoleegun ? (1) A le ko lati ara eniyan (2) A le jogun re lati ara obi (3) Omiran _____

15. Kini awon ami ati ifihan fun arun aromoleegun?

(1) Aisan ni gbogboigba Beeni ☐ Beko ☐

(2) Owo wuwu ati ese pelu irora Beeni ☐ Beko ☐

(3) Wiwo suesue Beeni ☐ Beko ☐

(4) Egungun ati ara riro Beeni ☐ Beko ☐

(5) Idagba ti ko gunrege Beeni ☐ Beko ☐

(6) Ki eje ma to lara Beeni ☐ Beko ☐

(7) Oju ati ara pipon Beeni ☐ Beko ☐

(8) Ikun wuwu Beeni ☐ Beko ☐

(9) Omiran _____

17. Bawo lase lese ayewo fun arun aromoleegun? (1)Nipa ayewo eje (2) Nipa ayewo ito (3) Emi komo

18. Se ero pe ayewo geni se pataki? Beeni ☐ Beko ☐

19. Se e ti lo se ayewo geni ri? Beeni ☐ Beko ☐

20. Se e mo geni bi? Beeni ☐ Beko ☐

21. Bi be ko kini idi ?_____

22. Ki ni geni yin (1) AA (2) AS (3) AC (4) SS (5) SC (6) Emi komo (7) Omiran

23. Ni bo le ti lo se ayewo geni yin (1) Ile iwosan ijoba (2) Ile iwosan aladani (3) Labu (4) Omiran

24. E me lo le ti lo se ayewo geni yin (1) Rara (2) Ekan (3) Emeji (4) Emeta

25. Geni ni wo lo fa arun aromoleegun (1) AA (2) AS (3) SS (4) Emi komo

26. To ba je wi pe ikan ninu obi loni aleebu arun aromoleegun melo ninu a won omo won lo la ni aleebu arun yi (1) Gbogbo omo won ma ni (2) Okan ninu merin (3) Meji ninu merin (4) Meta ninu merin (5) Emi komo

27. Ni igba ti obi mejeeji ba ni aleebu arun aromoleegun yi,se aye wa pe a won omo kan kan le ni arun yii?(1) Gbogbo omo won ma ni (2) Okan ninu merin (3) Meji ninu merin (4) Meta ninu merin (5) Emi komo.

28. Omo le ni arun aromoleegun ti? (1) Obi mejeeji ba ni arun yii (2) Baba tabi iya bani arunyii (3) Emi komo

29 Kini ki awon afe sona se ni igba ti won ba se ayewo arun fun arun yii ti won wa ri pe awon lebi omo to ni arun aromoleegun? (1) Ki won ma fe ara won mo (2) Ki won ma fe ara won lo layi ro ohun ti yio sele leyin wa ola (3) Emi komo

30. Bawo la se le toju arun aromoleegun? (1) Ko si itoju fun (2) Itoju nipa temi (3) Itoju nipa ibile (4) Itoju nipa ile iwosan (5) Omiran_____

31. Ki la se lati dekun arun aromoleegun? (1) Nipa ayewo geni wa (2) Nipa imoran (3) Nipa adura gbigba (4) omiran

SN	OHUN TI E GBAGBO NIPA ARUN AROMOLEEGUN	BEENI	BEKO
32.	Se ero wipe arun aromoleegun le payan?		
33.	Se e gbagbo wipe arun aromoleegun le ran eniyan ?		
34.	Aje ati oso le fa arun aromoleegun?		
35.	Se e gbagbo wipe omo le jogun arun yi lati ara obi?		
36.	Se e gbagbo wipe arun aromolegun maa n dakun tinu eje ara?		
37.	Se e gba wipe ounje ti ko dara le fa arun aromoleegun?		
38.	Se ero wipe won ko ti mo nikan to fa arun aromoleegun?		
39.	Se eyan le ni aleebu yii lara la se aisan?		
40.	Se awon eyan alawo dudu nikan lo le ni arun aromoleegun?		
41.	Se awon okunrin nikan lo le ni arun aromoleegun?		
42	Se awon obinrin tiko loto le ni arun aromoleegun		
43	Se e gbagbo wipe eyan le ko arun aromoleegun la ti ara efon		
44	Se eyan le ko arun aromoleegun ni pa lilo nikan pelu eniti o ni arun aromoleegun		
45	Se eyan gbodo se ayewo fun arun aromoleegun ko to di pe eyan se igbeyawo ta bi ko to bi omo		
46	Se ayewo ti wa fun arun aromoleegun		
47	Se tewe tegbo le wo arun aromoleegun san		
48	Se arun aromonleegun le kuro ti itoju ba fun la si ko		
49	Se abere aje sa ara ti wa fun arun aromoleegun		
50	Se arun aromoleegun le se a ko ba fun edoforo		
51	Se arun aromonleegun le fa arun ro ni la pa ro ni lese		
52	Se arun aromonleegun le fa arun okan		
53	Se arun aromonleegun le fa arun kidirin		
54	Se arun aromonleegun le pa eyan		

APA KETA: IBEERE NIPA AWON IWA TO ABUKU BA AWON TO GBE PELU ARUN INU EJE ARUN AROMOLEEGUN

SN	Ibesepo ti e ni pelu awon eniyan to n gbe pelu arun aromoleegun	Beeni	Beko
55	Se eni omo okunrin tabi omobinrin to ni pelu arun aromoleegun?		
56	Se eni egbon tabi aburo to ni pelu arun aromoleegun?		
57	Se enikan kan ninu ebi yin ni arun aromoleegun?		
58	Se eni ore/alabajo gbe to ni arun aromoleegun?		
59	Se eti ri eni kan kan pelu arun aromoleegun?		
60	Se eti gbo nipa eniti o ni arun aromoleegun ri?		

S/N	Ibeere lori awon iwa to n tabuku	Beeni	Boya	Beko
61	Se e ma sefofo nipa eni to ni arun aromoleegun			
62	Se e ma soro buburu ni pa eni to ni arun aromoleegun			
63	Se e le ba eni to ni arun aromoneegun jeun papo			
64	Se e ma sa fun awon to ni arun aromoleegun			
65	Se e ma sa fun ifi ara kan awon to ni arun aromoleegun			

SN	Ibeere lori iwa	Mo gba Gan	Mo gba	Mo leso	Mi o gba	Rara mi o gba
66	Se awon to ni arun aromoleegun le gbe igbe siaye to irorun					
67	Se oye ki oju ma ti awon to ni arun aromoleegun					
68	Se awon to ni arun aromonleegun nilo ife					
69	Se oye ki ada awon to ni arun aromoleegun lebi wipe awon le arun yi wa si agbegbe wa					

70	Se awon to ni arun aromoleegun ko gbo do ma so ni gbangba					
71	Se ti eba fi ara kan eni to ni arun aromoleegun se eniyen ma ni arun yii					
72	Se awon to ni arun aromonleegun nilo itoju to pe ye					
73	Se awon to ni arun aromoleegun nilo la ti ma lo si ilewosan ni tori aisan won					
74	Se owo topo ni ole se toju eni to ni arun aromoleegun					
75	Se idile to ni eyan to ni arun aromoleegun ma di edunarinle nipa itoju fun won					
76	Se awon to ni arun aromoleegun le gbe igbesi aye to rorun ti won ba ri itoju tope ye					
77	Se awon to ni arun aromoleegun ki ku nipa se arun yii					
78	Se awon to ni arun aromoleegun le ni aisan mi ni pa se arun yii					
79	Se awon to ni arun aromoleegun le pe ogota odun ti won ba ri itoju toto ati toye					
80	Se awon to ni arun aromoleegun le ku ni igbakigba.					