

Promoting Health Literacy on Pre-marital Genetic Counseling and Testing of Sickle Cell Disease among Child-Bearing age Women in Nigeria

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Abstract

Promoting health literacy on pre-marital genetic counseling and testing of sickle cell disease among child bearing age in Nigeria has been a topic of dialogue among academics and public administration.

This study showed that majority of the respondent were aware of genetic counseling and testing as well as genotype and marital genotype while some know their genotype.

It was concluded that the general level of awareness of sickle cell disease and pre-genetic counseling and testing is very good although a few misconception and challenges still exist; most especially lack of enough health facilities and personnel's to conduct the pre genetic counseling and testing activities. Therefore, it is highly recommended that the government and all authorities concerned should help curtail this problem. further awareness and success towards pre-genetic counseling and testing will occur if there is improvement in national health sector as well as entrusting dedicated centers to carry out an adequate services for pre-genetic counseling and testing all over Nigeria and beyond.

Keywords: literacy, pre-marital, testing, counseling, genotype, child-bearing.

Introduction

A genetic disorder is a disease that is caused by an abnormality in an individual's deoxyribonucleic acid (DNA). Abnormality can range from a small mutation in a single gene to the addition or subtraction of an entire chromosome or set of chromosomes. The issue of genetic disease is a topical issue of growing concern in Nigeria. Genetics has traditionally been viewed through the window of relatively rare single gene disease (Fauci, Touchett, and Folkers, 2005). These disorders account for approximately 10 percent of pediatric admission and childhood mortality according to the World Health Organization (WHO 2005). It is apparent that almost all medical condition with the exception of single trauma has a genetic component as it is often evident from a patient's family history. Disease such as hypertension, heart diseases, asthma, diabetes mellitus, hemophilia, sickle cell disease, cancer, albinism as well as mental illness are significantly influenced by the genetic background as stated by the National Human Genome Research (NHGRI2002).

The prevalence of genetic diseases combined with their severity and chronic nature imposes a great financial, social and emotional burden on the society (WHO 2002). Most of the genetic diseases affecting individuals or families are ascribed to the improper information and lack of literacy on premarital genetic and testing as many diseases can be diagnosed using cytogenetic and various biochemical analysis, National Centre for Biotechnology Information, (NCBI,2002). Recent advances in deoxyribonucleic acid (DNA) diagnostics have extended the field of genetics to include virtually all medical specialties. Genetics have historically focused on chromosomes and genetic reflecting the long standing availability of techniques to diagnose these conditioned for example, conditions such as Trisomy 21 (Down's syndrome) or monosomy X (Cruetzfeldt-Jakob syndrome) can be diagnosed using cytogenetic. Sickle cell disease can be diagnosed through genotyping premaritally. Recent advances in deoxyribonucleic acid (DNA) diagnostic have extended the field of genetics to include virtually all medical specialties (Emery and Remoin 2006).

Genetic disorder is a disease condition that occurs as a result of mutations which could be fatal and causing various changes in gene structure and causes degrees of harm (Taylor, Kemeny, Reed, Bower and Gruenewald, 2004). The genes that are lost are known as mutant genes, gene mutation can cause loss, addition duplication, insertion, deletion, inversion or substitution of bases (Olumitale 2005). Examples of diseases that occur as result of substitution include sickle cell anemia, cystic fibrosis, phenylketonuria and hemophilia. This study will limit itself to the Promoting health literacy on pre-marital genetic counseling and testing of sickle cell disease among child bearing age in Zaria metropolis Nigeria. Sickle cell disease is a common genetic disorder that affects hemoglobin, inheritance of mutant hemoglobin genes from both parents' results to Hemoglobin sickle cell. It occurs at a frequency of 1 out of 1600 among blacks (Olundale, 2005).

Another variant is Hemoglobin C disease which is a milder sickling disorder, it presents in 1 of 1100 African American, and symptoms are similar to sickle cell disease, but less frequent and severe. Sickle cell thalassemia is also less frequent and severe. Sickle cell trait is heterozygous carrier state hemoglobin AS, these individuals are generally healthy as non-carriers. The prevalence varies from one country to another. Sickle cell trait occurs in about 8 percent African Americans and 20-30 percent in Nigeria (Reid and Famodu 2003) and 20-40 percent in Africa (Flemin and Leshman 2009).

Sickle cell anemia contributes to an equivalent of 5 percent under 5 deaths on Africa continent and more than 90 percent of such deaths in West Africa and up to 16 percent of fewer than 5 deaths in individual were African countries (WHO 2005).

Sickle cell disease as well as other genetic diseases can be properly understood and tackled through integration and interpretation of family and medical history to assess the chance of disease occurrence and reoccurrence, education about inheritance of the disease, testing, management, prevention research and counseling promotes informed choices and adaptation to the risks or conditions (Resta, 2006).

Problem

It has been observed that genetic diseases are on the increase over the years and awareness on genetic practice of premarital counseling and testing is not a common practice in Nigeria. Diagnosis is usually made when an individual presents with a severe complication. It is also expected that the population of children with genetically inherited disease will continue to rise if premarital genetic counseling and testing is not effectively instituted, this will consequently lead to more demands from the government in terms of health facilities and expenditures as the genetically acquired diseases continue to rise more death will be expected, increase number of handicaps and problems on future prospective of the child, discrimination, as well as problems before marriage. Sickle cell disease in Nigeria with a frequency of 3 percent is a major health problem with no specific treatment and unfortunately, most Nigerians do not even know they have or carry the trait until they find themselves in situations where they either want to donate blood, when pregnant or when a woman give birth to sickle child, and to compound the problems most Nigerians are not curious about the disease, (Adeyemo, Oyenike, Omidiji, Olusesan, Shabi).

In view of the above problems, the researcher wants to find out how to promote health literacy on pre-marital genetic counseling and testing of sickle cell disease among child bearing age in Nigeria.

Research objectives

- To assess the literacy of childbearing age women on premarital genetic counseling and testing of sickle cell disease.
- To identify attitudes of childbearing age women towards premarital genetic counseling and testing of sickle cell disease.
- To assess the practice of premarital genetic counseling and testing of sickle cell disease in women of childbearing age.

Hypothesis

- Good knowledge on practical genetic counseling and testing among women of childbearing age in Zaria metropolis will lead to decrease in incidence of sickle cell disease.
- Good attitude towards practical genetic counseling and testing among women of childbearing age in Zaria metropolis will lead to decrease in incidence of sickle cell disease.
- Practice of genetic counseling and testing among women of childbearing age will lead to decrease in incidence of sickle cell disease.

Significance of the study

- This research will provide information on the knowledge attitude, practice as well as level of acceptance of women of childbearing age towards premarital genetic counseling and testing of sickle cell disease.
- This study will also serve as a tool to reinforce the importance and benefits of premarital genetic counseling and testing of sickle cell disease among women of childbearing age.
- It will help the government and other private organizations in planning strategies of mobilizing and enhancing the practice of premarital genetic counseling and testing.
- This research will also pave way for further research by other health professionals.
- The research will hopefully add to existing knowledge about genetic counseling and testing of sickle cell disease as well as other genetically acquired disease.

Limitations

- There was no means of verifying some of the data provided by the respondents.
- The researcher was limited to the scope of this study because some of the women approached expressed skepticism and thus reluctant to answer the questions.
- The level of awareness about genetic counseling and testing of sickle cell disease was carried out using a small sample size, hence cannot be generalized to the whole population.
- Time was also a limitation to the study as the researcher had a time frame to collate the data and analyze them.

Method

Description of the site

The site is Zaria metropolis which comprises of Sabo gari and Zaria local government area respectively. Zaria being one of the ancient cities in northern Nigeria, it is also regarded as one in the Hausa Kingdom. Zaria is one of the original seven Hausa states (Hausa Bakwai). It was established by Gunguma, the son of Bawo and the grandson of Bayajidda, the great legend warrior of दौरا sons who established the seven Hausa states.

Zaria took its name after one of the youngest daughter (Zariya) of the ruler in the city which was founded in 6th century. It has a population of about 408, 198 according to 2006 census. It is located between longitude 90 & 80 north east. The major occupations are farming, blacksmithing, hand crafting, sewing, embroideries. The city is surrounded by walls called (Ganuwa) which was built by the emirate leaders. It has gate known as kofa, these include Kofandoka, kibau, jatau, kuyanbana, kona and galadima.

Zaria local government is also divided into seven districts namely, Zaria, wajetudunwada), Tukur-Tukur, Dutsen Abba and Gyallesu, their major ethnic group is Hausa & Fulani and other smaller groups. Sabongari local government area of Kaduna state is a unique home of business men and women, center of academic excellence and one of the food baskets of the state. It has its headquarters at Dogarawa, a growing village located at the center of the local government area.

Sabongari local government area came into being through several transformation of sabongari town which literally means 'New town' and its surrounding villages. Sabongari from which the local

government derived its name was established as a result of the establishment development of communication, commerce and military into Sabongari town to give a unique cosmopolitan nature.

The local government area has a population of about 286,871 people according to 2006 census, with a land area of approximately 600sq km. It has boundaries with KudanSamaru and Basawa districts which were all created in April 2001. The major occupation of the people being an urban are mostly civil mostly servants, traders with a larger population in the areas involved in large scale farming producing a large yield of cash and food crops.

Sabongari local government area is also a center of industrial trade and commercial activities, it has established factories and industries situated around Cikaji industrial estate. The majority of the people are Muslims while there is a considerable number of Christians in the area. The culture is a mixed values and norms. It has traditional values by the complexity of the ethnic groups that form the society and population of the local government area.

There are many educational institutions such as Ahmadu Bello University Zaria, Nigerian institute of transport technology, Nigerian college of Aviation, college of leather research, Nigerian institute of chemical research etc.

Instruments for data collection

Data was collected by questionnaire, it was collected using closed ended questionnaire that were structured and focused on the perception, attitude and knowledge of childbearing age women towards premarital genetic counseling and testing of sickle cell disease. It was interpreted for the women who could neither read nor write at the level and language they understand. A total of 389 questionnaires were distributed and 351 returned. The response rate was 91percent.

The study was analyzed using description statistic (frequency distribution tables and percentages).

The sampling technique employed in this study is multistage sampling which was divided into various stages as follows:

Stage 1 Stratified sampling of Zaria metropolis into local government areas.

Stage 2 SabonGari districts and Zaria local government areas.

Stage 3 Simple random sampling of the district.

Stage 4 stratified sampling of each local government area to districts.

Stage 5 Simple random sampling of households.

Diagnosis

Sickle cell syndromes are suspected on the basis of hemolytic anemia, red blood morphology and intermittent episodes of ischemic pain. Diagnosis is confirmed by hemoglobin electrophoresis and sickling test as well as the issued below, genotyping of family members and potential partners is critical for genetic counseling. The diagnostic procedures include the following.

Electrophoresis: it is used for routine clinical purposes. Electrophoresis at potential hydrogen of 8.6 on cellulose acetate membranes is especially simple inexpensive and reliable for initial screening. Agar gel electrophoresis at potential hydrogen 6.6 in citrate buffer is often used as a complementary method. Comparison of the results obtained in each system usually allows for unambiguous diagnosis but some important variant are eletrophoretically silent. This mutant hemoglobin can usually be characterized by more specialized technique such as electric focusing and high pressure liquid chromatography.

Hemoglobin Assays: quantization of hemoglobin and functional assays, solubility or oxygen affinity is also performed. The best sickling assay involve measurement of the degree to which the hemoglobin samples becomes insoluble, or gelled as it is deoxygenated (that is sickle solubility tests). Unstable hemoglobin is detected, or by its precipitation in insoporpanol or after heating to 50⁰ C. high oxygen at which the hemoglobin sample becomes 50 percent saturated with oxygen. Direct tests for the percent carboxyhaemoglobin and methemoglohemoglobin, employing spectrophotometric technique can readily be obtained from most clinical laboratories on urgent basis.

Polymerase Chain Reaction: allele specific oligonucleotide hybridization and autosomal deoxyribonucleic acid sequencing allow identification of globin gene mutation in few days.

Complete characterization including amino acid sequencing or gene cloning and sequencing is available from several investigational laboratories around the world.

Laboratory evaluation remains an adjunct rather than the primary diagnostic acid. Diagnosis is best established by the recognition of a characterization history, physical finding peripheral blood smear morphology and abnormalities of the complete blood count (Embury et al 2002).

Theoretical framework

The theory of planned behavior was prearranged by IcekAjzen in 1985 in his article from intentions to actions the theory was established from the theory of reasoned action, which was prearranged by Martin Fishbein composed with IcekAjzen in 1975. The theory of reasoned action was in turn grounded in many theories of attitude such as learning theories, expectancy- value theories, consistency theories, and attribute theory. According to the theory of reasoned action, if people assess the recommended behavior as optimistic and if they think the important of others want them to achieve the behavior (subjective norm), this consequences in a higher aim (motivation) and they are more probable to do so. A high correlation attitudes and subjective norms to behavior purpose, and then to behavior, have been established in several studies. A counter-argument against the high relationship among behavioral intention and actual behavior has also been planned, as the results of certain studies demonstrated that, because of incidental limitations, behavioral intention does not continuously lead to actual behavior, since behavior intention cannot be the exclusive cause of behavior where person's control over the behavior is imperfect, Ajzen presented the theory of planned behavior by adding a new constituent, "apparent behavioral power." By this, he lengthens the theory of reasoned action, to protection-volitional behaviors, for forecasting behavioral intention and actual behavior. According to the theory, human behavior is directed by three kinds of thoughts: beliefs, about the likely consequences of the behavior and the assessment of these consequences (behavior beliefs), beliefs about the normative anticipations of others and incentives to comply with these prospects (normative beliefs), and beliefs concerning the presence of factor that may ease or obstruct presentation of the behavior and the apparent power of these factors (control beliefs). In their own aggregates, behavioral beliefs create a promising or disapproving attitude toward the behavior, normative beliefs result in perceived social burden or personal standard; and control beliefs increased to apparent behavioral control. In combination, attitude toward the behavior, subjective norm, and insight of behavioral control result to the creation of a behavioral intention. As a overall rule, the more promising the attitude and subjective norm, and the better the apparent control, the stronger should be the person's intention to achieve the behavior in question. Finally, given a adequate degree of actual control over the behavior, people are predictable to carry out their intentions when opportunity arises. Intention is thus expected to be the instant precursor of behavior. However, because many behaviors pose problems of implementation that may bind volitional control, it is valuable to reflect perceived behavior control in addition to intention. To the range that perceived behavioral power is veridical, it can serve as a substitution for real control and give to the forecast of the behavior in question, (Ajzen, 2006).

Ethical consideration

Permission was obtained from the authorities of the districts studied they include Mai Angua and the family heads to carrying out the project.

Data analysis interpretation, presentation and discussion

The data were analyzed using various statistical procedures such as descriptive statistics for frequency and percentage. The results of this analysis are presented according in the preceding tables and subtopics. The results of the research questions and research hypothesis are also presented.

Demography	Frequency	Percent
Age		
15-24 years	183	52.1
25-44 years	164	46.7
45 and above	4	1.1
Total	351	100.0
marital status of the respondents		
Married	64	18.2
Single	283	80.6
Divorced	4	1.1
Total	351	100.0
Ethnic Group of Respondent		
Hausa/Fulani	193	55.0
Igbo	44	12.5
Yoruba	51	14.5
Others	63	17.9
Total	351	100.0
Educational level		
Informal education	12	3.4
Primary	8	2.3
Secondary	20	5.7
Tertiary	311	88.6
Total	351	100.0

This shows the analysis of respondents with respect to their socio-demographic characteristics. It reveals that most of the respondents are within the age of 15 - 24 years with the highest percentage of 52.1%. It was followed by those in the 25 - 44 years category (46.7%) while the least was those in the 45 and above category. It also shows that most of the respondents were single (80.6%) followed by those that are married (18.2%) while the divorced are 1.1% respectively. More than half of the respondents were Hausa/ Fulani which accounted for the highest percentage of the respondents with 55.0%, which was followed by those from other ethnic groups with 17.9% while the Yoruba were 14.5% and the least was Igbo with 12.5%. The educational level of over half of the respondents fell within the tertiary institution category 88.6%, followed by secondary school education with 5.1% while informal and primary categories with 3.4% and 2.3% respectively. This reveals that most of the respondents have knowledge of Premarital Genetic Counseling and Testing with (80.9%) and most of them got their information from hospital (39.6%) closely followed by those who got their information from textbooks (30.8%). Followed by mass media (18.5%) and the least were able to get information through other sources.

Concerning the respondents knowledge on genetic diseases, most of the women are aware of genetic diseases (86.6%) while those that have no knowledge on genetics disease constitute about 13.4%. Furthermore, 93.7% of the respondents have knowledge of Sickle Cell Disease while 6.3% have no knowledge of Sickle Cell Disease. Also, those that know the causes of Sickle Cell Disease constitute 92.6% of the respondents while those that don't know are 7.4%. Additionally, 80.6% of the respondents have knowledge on the prevention of Sickle Cell Disease while 19.4% do not have such knowledge. Finally, 84.0 % of the respondents said they do not have sickle cell patients in their family while 16.0% said they have sickle cell patients in their family.

The table 1 below shows Women Attitude towards Premarital Genetic Counseling and Testing of Sickle Cell Disease.

1. Women are not aware of premarital genetic counseling and testing service	Frequency	Percentage
Strongly agree	137	39.0
Disagree	145	41.3
Strongly disagree	43	12.3
No response	26	7.4
Total	351	100.0
2. Premarital genetic counseling and testing of sickle cell disease is not necessary prior to marriage		
Strongly agree	46	13.1
Disagree	91	25.9
Strongly disagree	211	60.1
No response	3	0.9
Total	351	100.0
3. Genetic counseling and testing should be made compulsory to all women prior marriage		
Strongly agree	310	88.3
Disagree	26	7.4
Strongly disagree	12	3.4
No response	3	0.9
Total	351	100.0
4. Premarital genetic counseling and testing can reduce the incidence of Sickle Cell Disease and other genetically acquired diseases		
Strongly agree	337	96.0
Disagree	10	2.8
Strongly disagree	4	1.1
Total	351	100.0
5. There are no enough health facilities to conduct premarital genetic counseling and testing		
strongly agree	139	39.6
Disagree	127	36.2
strongly disagree	53	15.1
no response	32	9.1
Total	351	100.0

Above table indicates that the level of awareness of women towards Premarital Genetic Counseling and Testing shows that most women are aware prenatal genetic counseling and testing (41.3%) while those that disagree are about 39.0% and 7.4% of the respondents did not respond. 60.1% of the respondents strongly disagree to the fact that it is not necessary of Premarital Genetic Counseling and Testing before marriage while 25.9% stated that it was not necessary. Furthermore, 88.3% of the respondents state Premarital Genetic Counseling and Testing should be made compulsory while 10.8% stated that Premarital Genetic Counseling and Testing should not be made compulsory.

Practice of Premarital Genetic Counseling and Testing of Sickle Cell Disease among Women of Child Bearing Age

1. Do you patronize any genetic counseling and testing center for services prior marriage?	Frequency	Percent age
No	156	44.4
Yes	195	55.6
Total	351	100.0
2. Does your culture of religion present or forbid seeking genetic counseling and testing prior marriage?		
No	318	90.6
Yes	33	9.4
Total	351	100.0
3. Is there any obstacle that hinders you from seeking genetic counseling and testing of Sickle Cell Disease?		
No	323	92.0
Yes	28	8.0
Total	351	100.0
4. List the obstacle that hinders you from seeking genetic counseling and testing of Sickle Cell Disease?		
Culture	10	35.7
Religion	7	25
Funds	11	39.3
Total	28	100.0
5. Have you had any health education on the importance of genetic counseling and testing of Sickle Cell Disease by health personnel?		
No	57	16.2
Yes	294	83.8
Total	351	100.0

The above table indicates that 55.6% of the respondent patronizes health facilities that conduct Genetic Counseling and Testing while 44.4% do not patronize these facilities. Furthermore, 90.6% of the respondents stated that culture do not influences Premarital Genetic Counseling Testing while 9.4% of are of the opinion that culture influences Premarital Genetic Counseling Testing. Additionally, 92.0% of the respondents there are no obstacles to Premarital Genetic Counseling and Testing on Sickle Cell Disease while 8.0% said there are obstacles to premarital Genetic Counseling and Testing on Sickle Cell Disease. Finally, 83.8% of the respondents claim to have had health education on Premarital Genetic Counseling Testing while 16.2% said they have not had health education on Premarital Genetic Counseling and Testing.

Do you have knowledge on genetic counseling and testing * premarital genetic counseling and testing cannot reduce the incidence of Sickle Cell Disease and other genetically acquired diseases					
		premarital genetic counseling and testing can reduce the incidence of Sickle Cell Disease and other genetically acquired diseases			Total
		strongly agree	Disagree	strongly disagree	
do you have knowledge on genetic counseling and testing	No	57	6	4	67
	Yes	278	4	2	284
Total		335	10	6	351

$$X^2 = 28.824, df = 2, P\text{-value} = 0.0001$$

Since the P-value (0.0001) is less than 0.05 we reject the Null hypothesis (Ho) at 5% level of significance and conclude that good knowledge on practical genetic counseling and testing among women of child bearing age in Zaria Metropolis will lead to decrease in incidence of sickle cell disease.

Do you have knowledge on genetic counseling and testing, genetic counseling and testing should be made compulsory to all women prior marriage						
		genetic counseling and testing should be made compulsory to all women prior marriage				Total
		strongly agree	Disagree	strongly disagree	no response	
do you have knowledge on genetic counseling and testing	No	53	11	2	1	67
	Yes	257	12	12	3	284
Total		310	23	14	4	351

$$X^2 = 24.672 df = 3 P\text{-value} = 0.0001$$

Since the P-value (0.0001) is less than 0.05, we reject the Null hypothesis (Ho) at 5% level of significance and then conclude that Good attitude towards practical genetic counseling and testing among women of child bearing age in Zaria metropolis will lead to decrease in incidence of sickle cell disease

Do you have knowledge on genetic counseling and testing premarital genetic counseling and testing of sickle cell disease is not necessary prior to marriage						
		premarital genetic counseling and testing of sickle cell disease is not necessary prior to marriage				Total
		strongly agree	Disagree	strongly disagree	no response	
do you have knowledge on genetic counseling and testing	No	12	23	29	3	67
	Yes	33	68	182	1	284
Total		45	91	211	4	351

$$X^2 = 20.332, df = 3, P\text{-value} = 0.0001$$

Since the P-value (0.0001) is less than 0.05, we reject the Null hypothesis (Ho) at 5% level of significance and conclude that Practice of genetic counseling and testing among women of child bearing age will lead to a decrease in incidence of sickle cell disease.

Discussion of findings

The findings of the study revealed that the socio-demographic data of the respondents across the various age, marital status ethnic and educational level, most of the respondents are within the age of 15 -24 years with the highest percentage of 52.1%. This is in line with the fact that Zaria is a city with several tertiary institutions, while the least was those in the 45 and above category. Majority of the respondents were single (80.6%) followed by those that are married (18.2%) while the divorced is 1.2%. The analysis along ethnic lines indicates that Hausa/ Fulani account for the highest percentage of the respondents with 55.0%, which was followed by other ethnic group with 17.6% and those from Yoruba was 14.5% while the least was Igbo with 14%. This is in cognizance with the fact that the town is situated in the Northern part of Nigeria. The educational level of over half of the respondents fell within the tertiary institution category with 88.6%, while the least was those under the primary category with 2.3%

The result of the study also shows that most of the respondents have good knowledge on Premarital Genetic Counseling Testing with (80.6%), this answered the research question one which tried to know the level of knowledge of the respondents and most of them got their information from hospital (39.6%) while the least were able to get information through other sources. Additional finding reveal that the genotype distribution of the respondents is as follows, AA 71.8%, AS 23.6% and others 2.8%. Also, 86.6% of the respondents know what genetic disease is and also 93.7% know what sickle cell disease is 92.6% of the respondents stated yes that they are aware of the cause of sickle cell diseases.80.6% of the respondents stated yes that sickle cell disease can be prevented while 7.4% stated no, that sickle cell disease cannot be prevented, similarly with the previous statement, where 78.3% 41.3% of the respondents disagreed that women are not aware of the Premarital Genetic Counseling and Testing, 39.0% strongly agreed that women are aware of Premarital Genetic Counseling and Testing

Counseling and Testing. 60.1% of the respondents strongly disagreed Premarital Genetic Counseling and Testing of Sickle Cell Disease is not necessary prior to marriage and 25.9% disagreed that Premarital Genetic Counseling and Testing of Sickle Cell Disease is not necessary prior to marriage while 13.1% strongly agreed that Premarital Genetic Counseling and Testing of Sickle Cell Disease is not necessary prior to marriage. This indicates that majority of the respondents strongly disagree that Premarital Genetic Counseling and Testing of Sickle Cell Disease is not necessary prior to marriage and also 88.3% of the respondents strongly agreed that Premarital Genetic Counseling and Testing should be made compulsory to all women before marriage and 7.4% disagreed while 3.4 strongly disagreed. This indicates that majority of the women strongly agreed that Premarital Genetic Counseling Testing should be made compulsory to all women before marriage.96.0% strongly agreed that Premarital Genetic Counseling Testing can reduce the incidence of Sickle Cell Disease and other genetically acquired diseases and 2.1% disagreed while 1.1% strongly disagreed. This indicates that majority of the women strongly agreed that Premarital Genetic Counseling and Testing can reduce the incidence of Sickle Cell Disease and other genetically acquired diseases.

The study's findings also indicated that 195(55.6%) of the respondents stated that they practice Premarital Genetic Counseling and Testing, while 156(44.4%) of the respondents said they do not practice Premarital Genetic Counseling and Testing. This indicates that more than halve of the respondents practice Premarital Genetic Counseling and Testing. 232(92%) of the respondents said they do not have any thing that hinder them from the practice of Premarital Genetic Counseling and Testing, while 28(8%) of the respondents said some things hinder them from the practice of Premarital Genetic Counseling and Testing.10(35.7%)of those that stated that some things hinder

them from the practice of Premarital Genetic Counseling and Testing stated culture as the factor that causes the hindrance and 7(25%) said religion while 11(39.3%) stated lack of funds is the hindering factor.

Conclusion

The study revealed that the level of literacy and awareness of Premarital Genetic Counseling and Testing is also high. This is evident as 92.9% of the respondents know their genotype. Furthermore, with the results of the study, there is an increase in information on the role of Premarital Genetic Counseling and Testing in addressing the issue of Sickle Cell Disease among women of child bearing age. Some of the sources of information include, media, hospital, textbooks and other sources with the respondents having the highest form of information form hospital with about 39,6%.

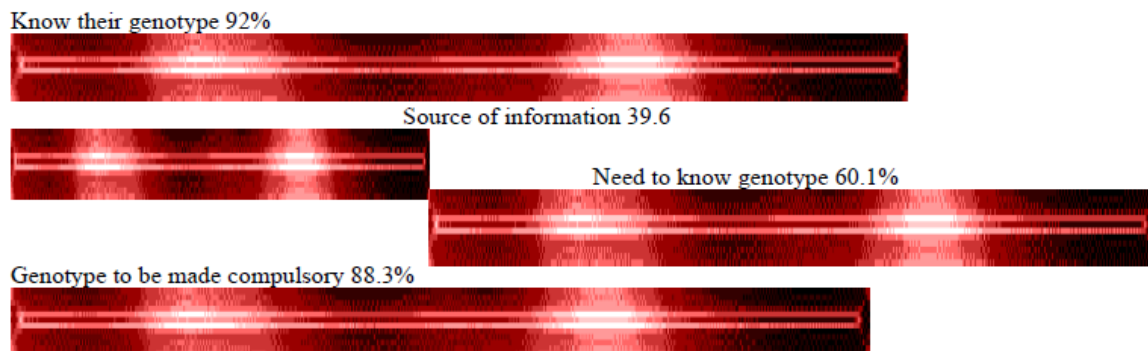
Additionally, it was observed that the attitude of the respondents towards Premarital Genetic Counseling and Testing of Sickle Cell Disease is also excellent and encouraging because about 60.1% strongly agree to the need for Premarital Genetic Counseling and Testing to couple before marriage. Additionally, 88.3% opined that Premarital Genetic Counseling and Testing should be made compulsory. It should be noted that genetic counseling and testing is one of the fundamental means of eliminating Sickle Cell Disease in Nigeria and Africa at large. There is therefore the need for Government to organize a coordinated national program to eradicate Sickle Cell Disease or reduce it to the barest minimum by increasing the awareness across the Nation. The campaign amongst students of tertiary institution should be intensified to attain improve the data. Finally, there is need for the government to increase the number of health care facilities as well as trained competent health care workers to enhance patronize by women of child bearing age in Nigeria.

If sickle cell disease control strategies must yield any significant results, more education about Sickle Cell Disease, especially among students in tertiary institutions in Nigeria is recommended. The use of persons with Sickle Cell Disease as peer educators/counselors should be explored.

Tables

Know their genotype	92.00%
Source of information (media, hospital, others)	39.60%
Need to genotype before marriage	60.10%
Genotype to be made compulsory	88.30%

Figures



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