

# Sickle Cell Disease Knowledge, Premarital Genotype Screening and Marital Decision Among Unmarried Students of Lagos State Polytechnic Ikorodu, Lagos, Nigeria

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## Abstract:

Marital decision following premarital genotype screening is a key to prevent the risk of having children with Sickle cell disease. Sickle cell disorder is one of the genetic diseases affecting Nigerians and its effective eradication and management constitute a challenge to both parents and health professionals due to the transmission of the genetic trait from parents to offspring, frequent hospitalization of the affected persons and associated mortality. This study assessed Sickle cell disease knowledge, premarital genotype screening and marital decision among Students of Lagos State Polytechnic, Ikorodu, Lagos, Nigeria. A descriptive research design was adopted for the study. The population of the study was 435 unmarried students of Lagos State polytechnic Ikorodu Lagos, Nigeria. Data were collected through structured and validated questionnaire with the help of four research assistants. The reliability of the instrument was determined, Cronbach's Alpha coefficient for the structure range from 0.71 to 0.78. Descriptive and inferential statistics were used to answer the three research questions and three hypotheses. Majority of the participants had a high knowledge on sickle cell disease 402 (98%), the means score of the participants knowledge was  $39.3 \pm 2.91$ . There is also high level of acceptance of premarital genotype screening 390 (95.6%), the means score of the participants level of acceptance was  $23.4 \pm 2.55$ . Many of the

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respondents 329 (80.6%) have positive marital decision in case of genotype incompatibility. In conclusion, this study revealed good knowledge, high acceptability of premarital genotype screening and positive marital decision among the respondents. Considering the associated health problem of sickle cell disease, it could be emphasized that imbining the culture of premarital genotype screening and positive premarital decision by intending couples is the most cost-effective intervention that could end the threat of the sickle cell genetic disorder.

**Keywords:** Sickle Cell Disease, Knowledge, Genotype screening, Marital Decision,



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## Introduction

Sickle cell disease (SCD) is a hereditary blood disorder, a main public health and social problem in Nigeria. It is also one of the most common monogenetic diseases in the world that happens to 2-3% of the Nigerian population and contributes to 5% of infant and under five children deaths (Robin, 2018). Also, it is an illness in which red blood cells are not shaped as they should be, abnormal sickle-shaped red blood cells disrupt flow of blood in small vessels, and this vaso-occlusion causes distal tissue ischaemia and inflammation, with symptoms defining the sudden painful sickle-cell crisis. A repeated sickling and on-going haemolytic anaemia, with chronic organ damage, causes substantial morbidity and early death (Snizzat, 2020).

As of 2015, people with sickle cell disease are about 4.4million, while an additional 43 million have sickle cell trait. About 80% of sickle cell disease cases are believed to occur in Sub-Saharan Africa. It also frequently occurs in parts of India, the Arabian Peninsula, and among people of Africa residing in other parts of the world. In 2015, it led to about 114,800 deaths (WHO, 2020). This is a preventable illness in which an intending couple can undergo a premarital genotype screening which will show whether they have a compatible genotype. It is observed that some people have little or no understanding of sickle cell disease before they get married and some end up giving birth to sickle cell disease children. Marital decision making when there is genetic incompatibility is a big challenge in this contemporary world; lovers just proceed with marriage decision regardless of their genetic status. Many do not undergo genotype screening before marriage, while those that do find it uneasy to make the right decision. This has led to the birth of children with genetic diseases such as sickle cell disease.

Nigeria tops the world in the number of cases of sickle cell disease (SCD). An estimated 150,000 babies are born yearly in Nigeria with SCD, a heredity disorder, and before the age of 5, 70-90% of them die. Only a tiny portion of affected infant and children in Sub Saharan Africa (SSA) reach adolescence. There were more than 550 children who die per day in sub-Saharan Africa from SCD. These dismal statistics are different from outcomes in high-income countries where more than 90% of SCD patients reach adulthood (Arwa, 2019). Furthermore, non-adherence to genotype screening before marriage and poor decision making can cause birth of a child with SCD disorder, repeated going in and out of the hospital, and infant death and illness causing many couples to lose their children in quick succession. On close enquiry, it was observed that some of these children die because of sickle cell disease (Micheal, 2020).

Premarital genotype screening and right marital decision have high possibility to limit the incidence of SCD in an adult population and preventing marriages among high risk couples, but many people do not adhere to it. In a study conducted by Anunobi (2014), on knowledge and attitude as correlates of adherence to premarital sickle cell screening among adult students of Nnamdi Azikuwe University, Awka revealed that there is high level of knowledge and positive attitude towards premarital genotype screening but people failed to make right marital decision in the face of genetic incompatibility, some are carried away with love, some material things or money while some belief it is only God that chooses a life partner. All these lead to poor marital decisions which subsequently lead to increase in number of children born with sickle cell disease.

This study assessed sickle cell disease knowledge, premarital genotype screening and marital decision among unmarried students of Lagos State Polytechnic Ikorodu, Lagos. The result may serve as a tool to sensitize the public on the need for right marital decision which will reduce the number of children born with sickle cell disease. This study specifically:

1. assessed the level of sickle cell disease knowledge among unmarried students of Lagos State Polytechnic Ikorodu, Lagos State;
2. found out the acceptance level of premarital genotype screening among students of Lagos State Polytechnic Ikorodu, Lagos;
3. assessed the marital decision ability of respondents;
4. determined the relationship between the sickle cell disease knowledge and premarital decision among unmarried students;
5. assessed the relationship between the premarital genotype screening and premarital decision among unmarried students; and
6. determined the influence of sickle cell disease knowledge and premarital genotype screening on premarital decision among unmarried students.

### Research Questions

The following research questions were raised for this study:

1. What is the level of sickle cell disease knowledge among unmarried students of Lagos State Polytechnic Ikorodu, Lagos State?
2. What is the level of acceptance of premarital genotype screening among unmarried students of Lagos state polytechnic Ikorodu, Lagos?
3. What is the marital decision of respondents in case of genetic incompatibility?

### Research Hypotheses

These hypotheses were postulated for this study:

1. There is no significant relationship between the sickle cell disease knowledge and premarital decision among unmarried students.
2. There is no significant relationship between the premarital genotype screening and premarital decision among unmarried students.
3. There is no significant influence of sickle cell disease knowledge and premarital genotype screening on premarital decision among unmarried students.

### Methodology

A descriptive research design was adopted for the study on Sickle cell disease knowledge, premarital genotype screening and marital decision among students. The study was carried out in Lagos State Polytechnic, Ikorodu, Lagos, Nigeria. Study population was the unmarried Students of Lagos State Polytechnic, Ikorodu, Lagos, Nigeria. The total population of unmarried students was 32000 as at February 2021. The sample for this study was made up of 435 unmarried students of Lagos state polytechnic, Ikorodu, Lagos, Nigeria. The sample size was derived using the Slovin's formula. A multistage sampling procedure was adopted for the study.

A pretested semi-structured questionnaire was used to elicit information from the respondents. The questionnaire consists of a 36 test item and was sectioned into 4. The instrument was critically scrutinized for face and content validity by experts in Department of

Nursing Science and necessary corrections that were made were affected. In testing the reliability of the instrument, a pilot survey was conducted by administering 10 % of the questionnaires, which was 40 copies of the questionnaires to students of Yaba school of technology, Yaba, Lagos, Nigeria that are not part of the study sample but have similar characteristics with the study subjects. The reliability index of each section was calculated using Cronbachs Alpha and the reliability index gotten was represented in the table below.

S/N	Section	Reliability index
1	Section B	0.788
2	Section C	0.712
3	Section D	0.756

The researcher conducted the study with the help of four research assistant who were recruited and trained on the administration of the research instrument. The researcher educated the students about the content of the questions and methods of filling the questionnaire while 408 copies of questionnaire were retrieved back. Data generated was coded, analyzed using SPSS version 21. Descriptive statistics was used to answer the three research questions while inferential statistics of Pearson's Product Moment Correlation statistics was used to test hypotheses 1 and 2 while Analysis of Variance was used to test hypothesis 3 at 0.05 level of significance.

### Results

**Research Question 1:** What is the level of sickle cell disease knowledge among unmarried students of Lagos State Polytechnic Ikorodu, Lagos State?

**Table 1: Level of knowledge of students on sickle cell disease**

Levels of knowledge	Category of Scores	Frequency	percentage	Mean $\pm$ SD
Above average	11-16	402	98.5%	39.3 $\pm$ 2.91
Average	6-10	6	1.5%	
Below average	1-5	-	-	
<b>Total</b>		408	100	
<b>Minimum score= 7; Maximum score= 16</b>				

**Source: Field study, 2021**

Table 1 reveals the level of knowledge of students of Lagos State polytechnic. The result shows that majority of the participants had a high knowledge on sickle cell disease 402(98.5%) while very few of the participants had average knowledge 6(1.5%). The means score of the participants knowledge was  $39.3 \pm 2.91$  which can be categorized as high knowledge. This implies that majority of the students were not ignorance of sickle cell diseases.

**Research Question 2:** What is the level of acceptance of premarital genotype screening among unmarried students of Lagos state polytechnic Ikorodu, Lagos?

**Table 2: Level of acceptance of premarital genotype screening among students of Lagos State polytechnic**

Levels of acceptance	Category of Scores	Frequency	percentage	Mean $\pm$ SD
High	19-27	390	95.6%	23.4 $\pm$ 2.55
Average	10-18	16	3.9%	
Low	0-9	2	0.5%	
<b>Total</b>		408	100	
<b>Minimum score= 9; Maximum score= 27</b>				

**Source: Field study, 2021**

Table 2 reveal the level of acceptance of premarital genotype screening among students of Lagos State polytechnic. The result shows that most of the participants highly accept premarital genotype screening 390(95.6%) compare to very few participants who had low level of acceptance 2(0.5%). The means score of the participants level of acceptance was 23.4 $\pm$ 2.55 which can be categorized as high level of acceptance. This infers that most students of Lagos State polytechnic believed and support premarital genotype screening.

**Research Question 3:** What is the marital decision of respondents in case of genetic incompatibility?

**Table 3: the level of marital decision of respondents in case of genetic incompatibility**

Levels of marital decision	Category of Scores	Frequency	percentage	Mean $\pm$ SD
Positive	13-18	329	80.6	14.94 $\pm$ 3.61
Negative	7-12	38	9.3	
Indifference	1-6	41	10.0	
<b>Total</b>		408	100	
<b>Minimum score= 5; Maximum score= 17</b>				

**Source: Field study, 2021**

Table 3 reveals the level of marital decision of respondents in case of genetic incompatibility. The result shows that 329 (80.6%) of the participants have positive marital decision in case of genetic incompatibility, 38 (9.3%) have negative decision and 41 (10%) were indifference in their premarital decision in case of genetic incompatibility. The mean score of the participants' premarital decision in case of genetic incompatibility was 14.94 $\pm$ 3.61 which can be categorized as positive level of marital decision. This infers that most students of Lagos State polytechnic believed and support the fact that people with sickle cell genetic traits must not marry each other.

### Test of Hypotheses

**Hypothesis 1:** There is no significant relationship between the sickle cell disease knowledge and premarital decision among unmarried students.

**Table 4: Correlation between respondent sickle cell disease knowledge and premarital decision among unmarried students**

		Knowledge	Marital decision
<b>Knowledge of SCD</b>	Pearson Correlation	1	.374**
	Sig. (2-tailed)		.000
	N	408	408
<b>Marital decision</b>	Pearson Correlation	.374**	1
	Sig. (2-tailed)	.000	
	N	408	408

\*\* . Correlation is significant at the 0.01 level (2-tailed).

The results in Table 4 revealed positive and significant relationship between respondents' sickle cell disease knowledge and premarital decision ( $r = .374$ ;  $p = 0.000 = .000$ ). The hypothesis which stated that "There is no significant relationship between the sickle cell disease knowledge and premarital decision among unmarried students of Lagos State Polytechnic Ikorodu, Lagos State" was hereby rejected by this finding. This implies that respondents sickle cell disease knowledge had significant relationship with premarital decision.

**Hypothesis 2:** There is no significant relationship between the premarital genotype screening and premarital decision among unmarried students.

**Table 5: Relationship between premarital genotype screening and premarital decision among unmarried students**

		Marital decision	Premarital genotype screening
<b>Marital decision</b>	Pearson Correlation	1	.521**
	Sig. (2-tailed)		.000
	N	408	408
<b>Premarital genotype screening</b>	Pearson Correlation	.521**	1
	Sig. (2-tailed)	.000	
	N	408	408

\*\* . Correlation is significant at the 0.01 level (2-tailed).

The results in Table 5 revealed positive and significant relationship between respondents' premarital genotype screening and premarital decision ( $r = .374$ ;  $p = 0.000 = .000$ ). The hypothesis which stated that "There is no significant relationship between the premarital genotype screening and premarital decision among unmarried students of Lagos State Polytechnic Ikorodu, Lagos State" was hereby rejected by this finding. This implies that respondents premarital genotype screening had significant relationship with premarital decision.



**Hypothesis 3:** There is no significant influence of sickle cell disease knowledge and premarital genotype screening on premarital decision among unmarried students.

**Table 6: Summary of Multiple Regression Analysis of the influence of sickle cell disease knowledge and premarital genotype screening on premarital decision among unmarried students**

Model	Unstandardized Coefficients		Standardized Coefficients	T	p-value
	B	Std. Error			
(Constant)	1.644	1.423		1.156	.248
Knowledge	.202	.035	.247	5.810	.000
Premarital gen.scr	.422	.040	.451	10.614	.000
Source of variation	Sum of Squares	Df	Mean Square	F-Ratio	P
Regression	757.319	2	378.660	98.451	.000 <sub>b</sub>
Residual	1557.700	405	3.846		
Total	2315.020	407			

**R = 0.572; Multiple R = 0.327 Multiple R<sup>2</sup> (Adjusted) = 0.324; Stand error estimate = 1.961**

The relative contribution of each predictor variables (sickle cell disease knowledge and premarital genotype screening) to the variance in the premarital decision among unmarried students revealed that the respondents' sickle cell disease knowledge has a beta value of .247 and t-value of 5.810 significant at .000 alpha level and premarital genotype screening has a beta value of .451 and t-value of 10.614 significant at .000 alpha level. Therefore, sickle cell disease knowledge and premarital genotype screening were found to be potent factors influencing the premarital decision among unmarried students.

Furthermore, premarital decision among unmarried students yielded a coefficient of multiple regression (R) of 0.572 and a multiple correlation square of 0.324. This shows that 32.4% of the total variance in the premarital decision among unmarried students is accounted for by sickle cell disease knowledge and premarital genotype screening. The Table 7 also indicates that the analysis of variance of the multiple regression data produced an F-ratio value significant at 0.00 level ( $R = .572$ ,  $R^2 = .324$ ,  $f_{(2,407)} = 98.451$ ;  $P = .000$ ). Sickle cell disease knowledge and premarital genotype screening combined to influence the premarital decision among unmarried students. Therefore, the hypothesis that stated no significant influence of sickle cell disease knowledge and premarital genotype screening on the premarital decision among unmarried students was rejected.

### Discussion

The outcome of the study shows that majority of the participants had a high knowledge on sickle cell disease 402 (98%). This implies that majority of the students were not ignorance of sickle cell diseases. As knowledge is a prerequisite for a positive attitude towards sickle cell disease and consequently positive genetic premarital decisions geared

towards genotype compatibility, the study agrees with the submission that good knowledge regarding SCD is required for individuals especially carriers to take informed decision about their reproductive life and other health related choices (Adewoyin, et al., 2015). This result is line with a study on premarital Sick Cell Genetic Screening Knowledge carried out by Tajudeen, et al (2018) and revealed that the level of knowledge of the participants' was good (70.06%). However, this result contradicts the findings of Ugwu (2016) who concluded that majority of the study participants lack adequate knowledge of sickle cell disease.

The result shows that most of the participants highly accept premarital genotype screening compare to very few participants who had low level of acceptance. This infers that most students of Lagos State polytechnic believed and support premarital genotype screening based on their good knowledge of sickle cell and the health implications. This is supported by the study conducted by Anunobi (2014) who found high level of knowledge and positive attitude towards premarital genotype screening. Omuemu, Obarisiagbon and Ogboghodo (2013) found high level of awareness and acceptability of genetic screening for sickle cell disease among undergraduate students of the University of Benin. Health education is still needed to help them make well informed decisions concerning genetic screening for Sickle Cell Disease.

Results revealed that majority of the respondents agreed that AS should not get married to AS and SS should not get married to AS. This might be as a result of the knowledge gained. Also, majority of the students did not support that love is more important in selecting a partner than genotype of the intending couples and most of the respondents said they will not move ahead with marriage if there is genotype incompatibility. This implies that more of the respondents were cognizance of genotype compatibility during marital decision. This is in contrast to the study conducted by Alao (2013) who revealed that student of Benue state university (47%) were ready to proceed with marriage even in the face of genotype incompatibility. This will contributes to the high incidence of sickle cell disease in Nigeria.

The results revealed positive and significant relationship between respondents' sickle cell disease knowledge and premarital decision. This implies that respondents sickle cell disease knowledge had significant relationship with premarital decision. This study lend credence from Olarewaju (2013) who conducted a study in Jos on knowledge and altitude of sickle cell disease among secondary school students, result reveals that (66.9%) will not regard genotype incompatibility in decision on partners to get married with. This will subsequently lead to enormous number of children burn with sickle cell disease. Olakunle et al (2013) found that comprehensive knowledge about sickle cell anemia was found to be low despite good awareness among respondents, but only few knew their hemoglobin genotype. Also, Anunobi (2014), conducted a study on knowledge and attitude as correlate of adherence to premarital sickle cell screening among adult students of Nnamdi Azikwe University, Awka revealed that there is high level of knowledge and positive attitude towards premarital genotype screening but people failed to make right marital decision in the face of genetic incompatibility, this leads to increase in cases of sickle cell disease

The results revealed positive and significant relationship between respondents' premarital genotype screening and premarital decision. This implies that respondents' premarital genotype screening had significant relationship with premarital decision.

Furthermore, the findings on the relationship between premarital genotype screening and premarital decision among unmarried students indicated that knowledge was related to practice, premarital genotype screening and premarital decision among unmarried students since previous knowledge from the school could influence practice of sickle cell genetic screening before marriage. The implication of this finding is that as the number of people with positive attitude towards premarital genotype screening increases, there is a probability it could increase the practice of premarital decision. This is against the study conducted by Abubakar et al (2010) that revealed a deficiency in the perceptions about sickle cell disease and its prevention among undergraduates of tertiary institutions in Kano. There is a need to provide health education about sickle cell disease prevention to youths in schools and through other media as well as strengthen prenatal screening and premarital counselling.

Sickle cell disease knowledge and premarital genotype screening combined to influence the premarital decision among unmarried students. In line with the finding in this study where the sickle cell disease knowledge and premarital genotype screening positively influenced the premarital decision of study participants toward sickle cell disease. This is corroborated by a study carried out in Uganda that acknowledged the potency of knowledge of sickle cell disease in forming the right attitude towards the disease. Also this study align with findings of Abioye-Kuteyi, et al. (2009) found that good knowledge and premarital genotype screening of sickle cell disease may guaranty positive genetic premarital decisions in terms of genetic premarital screening, counselling and choice of inter-gender partner to ensure genetic compatibility.

### Conclusion

This study revealed good knowledge, high acceptability of premarital genotype screening and positive marital decision among the respondents. Sickle cell disorder is a known genetic disease characterized by inheritance of abnormal gene, which interferes with the normal body functions and leads to frequent hospitalization for treatment and death of the affected person's especially in a resource limited developing countries like Nigeria. Conclusively, considering the associated health problem of sickle cell disease, it could be emphasized that imbibing the culture of premarital genotype screening by intending couples is the most cost-effective intervention that could end the threat of the sickle cell genetic disorder.

### Recommendations

Based on the findings of the study the following recommendations were made:

1. Public and private secondary and tertiary institutions should from time to time organize health enlightenment programs to educate students on sickle cell disease
2. Religious institutions should as a matter of importance, organize health programs to educate the youths on sickle cell disease from time to time
3. Genotype compatibility test result should be made a requirement for obtaining marriage certificate at marriage registries in Nigeria.

4. Sickle cell disease education should be added to the health education curriculum of senior secondary schools. This will help to educate the youths on sickle cell disease at early age.
5. Parents and guardians should take time to educate their children on sickle cell disease with a view to enable them take informed decision when the need arises.

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