

Original Research Article

Knowledge And Attitude Towards Premarital Sickle Cell Disease Screening Among Students Attending Federal College of Education, Kano, Nigeria

ABSTRACT

Background: Sickle cell disease is a condition in which an individual inherits two abnormal haemoglobin genes from both parents $\beta s/\beta s$ (HbSS) resulting to pathological state which is attributed to the sickling phenomenon, vasoocclusion crises, infection and other complications. About 5% of the world's population carries genes responsible for haemoglobinopathies and each year about 300 000 infants are born with major haemoglobin disorders including more than 200 000 cases of sickle-cell disease in Africa. Sickle cell disease is a very common disorder in Nigeria with birth rate of about 1 in 50 and about 150,000 children are born annually with sickle cell anaemia in Nigeria alone. The study aimed to explore the knowledge and attitude of Federal College of Education, Kano students about premarital screening for sickle cell disease.

Methods: A descriptive, cross-sectional study was conducted using interviewer-administered structured questionnaire among 305 students. Descriptive statistics of frequency count and percentages were used to describe the demographic data, while the non-parametric statistics of chi-square set at $P=0.05$ level of significance were used to test the hypotheses.

Results: Majority of respondents have low knowledge sickle cell disease and also have negative attitude towards premarital sickle cell screening 45.9% and 40% respectively, although up to 9.1% selected blood group as their genotype. Predictors of knowledge from the study are programme of study, religion and age which was seen a significant relationship between knowledge of premarital sickle cell screening and the variables with p -value < 0.05 while those predictors for attitude towards premarital sickle cell screening include religion, knowledge of sickle cell disease and marital status p -value < 0.05 as indicated in the results.

Conclusion: The study shows that the respondents have poor knowledge and attitude towards sickle cell disease and premarital screening. The results of this study reflect the importance of health education as a keystone in improving knowledge and attitude towards premarital screening for sickle cell disease.

Keywords: Attitude, Knowledge, Premarital, Screening, Sickle Cell Disease

1. INTRODUCTION

Pre-marital genetic screening as services targeted at individuals and families which try to enable people with a genetic disadvantage, and their families to live and reproduce as normally as possible, assuring access to relevant medical services (diagnostic, therapeutic,

Comment [GR1]: This statement is not clear

21 counseling, rehabilitative and preventive) and social support systems, helping them to adapt
22 to their unique situation and providing information to enable educated and voluntary choices
23 in health and reproductive matters [1]. Pre-marital genetic screening can identify and modify
24 behavioural, medical and other health risk factors known to impact pregnancy outcomes
25 through prevention and management. It is capable of reducing the burden that birth defects
26 and genetic disorders impose on most couples and people [2].

27 One of the biggest health challenges to the human race is sickle cell disorder [1]. It is a
28 genetic disorder transmitted from parents to their offspring's. The disorder is associated with
29 many challenges resulting from frequent hospitalization of the affected individual due to
30 vasoocclusion crises or other forms of complications. Despite major advances in our
31 understanding of the molecular pathology, pathophysiology, and causes of the inheritable
32 disorders, thousands of infants and children are dying through lack of appropriate preventive
33 measures such as lack of premarital sickle cell screening by intending couples to know their
34 haemoglobin genotype before marriage [3].

35 Some of the objectives of pre-marital genetic screening includes: early recognition of
36 disorder for intervention that prevents or reverses the disease process; or to ensure optimal
37 management of the patient, that is, appropriate referrals to specialists when symptoms are
38 anticipated and, informed reproductive decisions or disease management [4]. It has been
39 recommended that it is time to start ascertaining the compatibility of intending couples to
40 make marriages work better, and on more realistic grounds by way of premarital screening
41 and testing [1]. There is need to encourage the practice of premarital sickle cell screening.
42 Prevention of sickle cell disorder and risk minimization through screening and carrier
43 identification remains the only realistic approach to reduce the impact of the disease
44 especially in an adult population. Tertiary institutions have large concentration of adult
45 population and they form important sub groups of the population since they are at a relatively
46 high level of education and in the manageable age group [5], thus the aim and target of the
47 study.

48 Healthy manpower is vital to national development. Nigeria is a developing country yearning
49 for development. The health and wellbeing of students from tertiary institutions as potential
50 manpower of the nation should be of great concern. Therefore, this study was designed to
51 find out the Knowledge and attitude of students of Federal College Education, Kano, towards
52 pre-marital genetic screening.
53

54 2. MATERIAL AND METHODS

55 2.1 Sample collection

56 The instrument used for data collection was a self-administered structured questionnaire.
57 Questions were drawn based strictly on the stated objectives and literatures reviewed on
58 premarital sickle cell screening. Following reception of patients, consent and ethical
59 clearance from appropriate authorities, a total number of 305 venous blood samples were
60 aseptically collected in anticoagulated sodium heparin universal container from both sexes of
61 students of various age groups offering different programmes (Pre-NCE, NCE, B. Ed and
62 PGDE) at the institution. The corresponding blood samples were transported and analyzed
63 at Hematology laboratory, Aminu Kano Teaching Hospital (AKTH), Kano, Nigeria for
64 haemoglobin genes genotyping using the methods of Bello et al [6].

65 2.2 Method of data analysis

66 The quantitative raw data were collated and tallied. Descriptive statistics including
67 frequencies, percentages, were used to present the data. Chi-square was used to test the

Comment [GR2]: The methodology is grossly lacking key aspect of the study. Which tool was used to assess knowledge and attitude? And how was the tool interpreted? Is the tool validated in your setting?

Comment [GR3]: What do you mean by positive and negative attitude?

Comment [GR4]: How did you arrive at this sample size; how was the patients selected to reduce sources of selection bias

68 hypotheses at 95% confidence interval 0.05 levels of significant. All the statistical analyses
69 were performed using statistical package for social sciences (SPSS), version 18.

70

71 3. RESULTS

72

73 A total of 305 respondents data were collected for the study from students offering different
74 programmes (Pre-NCE, NCE, B. Ed and PGDE) at the institution. Out of the total
75 respondents, 59.0% are females, and 41.0 are males, Majority of the respondents' age
76 between 21 to 25years which make up 32.5% while the least are 46 years and above
77 (4.9%). Marital status Muslims (Islamic Religion) constitutes 68.9% of the respondents
78 which predominates and 31.1% are Christians (Table1).

79 Table 1 shows that less than half of the total about 124 respondents about 40.7% were
80 assessed with positive attitudes towards premarital sickle cell screening through graded
81 scale questionnaire and 181 respondents about 59.3 were having negative attitudes towards
82 premarital sickle cell screening.

83 **Table 1. Demographic Characteristics of the Respondents (n=305)**

	Demographic Variables	Frequency	Percentage (%)
Gender	Male	125	41.0
	Female	180	59.0
	Total	305	100.0
Age	16 – 20	70	23.0
	21 – 25	100	32.8
	26 – 34	50	16.4
	35 – 40	45	14.8
	41 – 45	25	8.2
	46 and Above	15	4.9
	Total	305	100.0
Marital Status	Unmarried	100	32.8
	Married	150	49.2
	Divorced	25	8.2
	Widowed	30	9.8
	Total	305	100.0
Religion	Islam	210	68.9
	Christianity	95	31.1
Programme of Studies	Total	305	100.0
	Pre-NCE	70	23.0
	NCE	95	31.1
	B. Ed	90	29.5
	PGDE	50	16.4
Knowledge Assessment	Total	305	100.0
	High Level Knowledge	140	45.9
	Low Level Knowledge	165	54.1
Attitude	Total	305	100.0
	Positive Attitude	124	40.7
	Negative Attitude	181	59.3
	Total	305	100.0

84

85 This study was conducted with the aim of assessing the knowledge and attitude of the
86 student of Federal College of Education Kano regarding premarital screening for sickle cell
87 disease. Total number of respondents are 305 for the study of which majority are females
88 and Muslims. The respondents cut across various socio-demographic characteristics with

89 their age ranging from 16-46 and above years. Majority of the respondents are between
 90 21years and 25years. The fact that a reasonable number of the respondents are single
 91 makes the study most appropriate for the study group because the respondents need to be
 92 aware of the importance of premarital sickle cell screening before they get married (Table 1).

93 **Table 2. Relationship between Attitude and Knowledge Level of Premarital Sickle Cell**
 94 **Screening and Gender of Respondents**

Gender	Knowledge Assessment		Total
	High Level Knowledge	Low Level Knowledge	
Male	53	72	125
Female	87	93	180
Total	140	165	305

Marital Status	Attitude		Total
	Positive Attitude	Negative Attitude	
Male	49	76	125
Female	75	105	180
Total	124	181	305

96
 97 Table 2 shows the Relationship between attitude and knowledge level of premarital sickle
 98 cell screening and gender of respondents. Higher percentage of female students having
 99 more knowledge and attitude greater than that of the male students was recorded.

100 **Table 3. Relationship between Attitude and Knowledge Level of Premarital Sickle Cell**
 101 **Screening and Marital Status of Respondents**

Marital Status	Knowledge Assessment		Total
	High Level Knowledge	Low Level Knowledge	
Unmarried	41	59	100
Married	80	70	150
Divorced	9	16	25
Widowed	10	20	30
Total	140	165	305

Marital Status	Attitude		Total
	Positive Attitude	Negative Attitude	
Unmarried	27	73	100
Married	74	76	150
Divorced	13	12	25
Widowed	10	20	30
Total	124	181	305

102
 103 Married and Unmarried respondents shows high level of knowledge 53.3% and 41.0%
 104 respectively as regard to Divorced and Widowed Marital status group with prevalence of
 105 36.0% and 33.3%. Attitude of the respondents is in disparity with knowledge assessment as
 106 Divorced marital status group showed highest positive attitude 52.0% followed by the
 107 married and widowed individuals 49.3% and 33.3% respectively, the least being Unmarried
 108 marital status group 27.0% (Table 3).

109 A prevalence of 45.9% was observed for high knowledge about premarital sickle cell
 110 screening, respondents in the study based on age, showed that age group 35 – 40 were
 111 observed to have the highest prevalence of 66.7% followed by 41 – 45 and 21 – 25 age
 112 groups having 60.0% and 49.0% prevalence respectively. The lowest prevalence 31.4%
 113 was observed in the age group 16 – 20, age groups of 26 – 34 and 46 and above had a

114 prevalence of 38.0% and 33.3% respectively (Table 4). Table 4 shows the attitude of the
 115 respondents towards premarital sickle cell screening with reference to age. Age groups 46
 116 and Above and 35 – 40 shows high attitude of the respondents 66.7% and 53.3%
 117 respectively compared to age groups 16 – 20 and 21 – 25 with lowest attitudes 31.4% and
 118 39.0% respectively.

119 **Table 4. Relationship between Attitude and Knowledge Level of Premarital Sickle Cell**
 120 **Screening and Age of Respondents**

Age	Knowledge Assessment		Total
	High Level Knowledge	Low Level Knowledge	
16 – 20	22	48	70
21 – 25	49	51	100
26 – 34	19	31	50
35 – 40	30	15	45
41 – 45	15	10	25
46 and Above	5	10	15
Total	140	165	305

Age	Attitude		Total
	Positive Attitude	Negative Attitude	
16 – 20	22	48	70
21 – 25	39	61	100
26 – 34	19	31	50
35 – 40	24	21	45
41 – 45	10	15	25
46 and Above	10	5	15
Total	124	181	305

121

122 The results of table 5 shows that Pre-NCE students has the least knowledge about the topic
 123 followed by NCE students 35.8% while PGDE and B. Ed students shows higher prevalence
 124 about knowledge of premarital sickle cell screening 70.0% and 50.0% respectively. The
 125 attitude of the respondents shows that PGDE students are the only group with positive
 126 attitude 50.0% towards premarital sickle cell screening while all the other group of students
 127 in other programme of studies have negative attitude toward premarital sickle cell screening
 128 as follows NCE (45.3%), Pre-NCE (30.0%), and B. Ed (38.9%) with statistical significance (p
 129 = 0.109), Therefore, there is no significant difference in positive attitude towards premarital
 130 sickle cell screening between students of different programmes at FCE, Kano (Table 5).

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Table 5. Relationship between Attitude and Knowledge Level of Premarital Sickle Cell
Screening and Programme of Studies of Respondents

Programme of studies	Knowledge Assessment		Total
	High Level Knowledge	Low Level Knowledge	
NCE	26	44	70
B. Ed	34	61	95
PGDE	45	45	90
PGDE	35	15	50
Total	140	165	305

Programme of studies	Attitude		Total
	Positive Attitude	Negative Attitude	

Pre-NCE	21	49	70
NCE	43	52	95
B. Ed	35	55	90
PGDE	25	25	50
Total	124	181	305

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136 Knowledge assessment of premarital sickle cell screening shows that most of the
 137 respondents that are Muslims (Islamic Religion) have low knowledge (31.4%) while majority
 138 (77.9%) of the Christians (Christianity Religion) have high knowledge (Table 6).
 139 Respondents with Christianity religion shows majority 68.4% of them with positive attitude
 140 towards Premarital Sickle Cell screening and the respondents with Islamic religion have
 141 negative attitude 28.1% towards premarital sickle cell screening having statistical
 142 significance of $p= 0.00$, which indicates the rejection of the null hypothesis (H2) and
 143 accepting the alternate, therefore there is significant difference in the attitude towards
 144 premarital sickle cell screening due to religion among students of FCE Kano (Table 6).

145

146 **Table 6. Relationship between Attitude and Knowledge Level of Premarital Sickle Cell**
 147 **Screening and Religion of Respondents**

Religion	Knowledge Assessment		Total
	High Level Knowledge	Low Level Knowledge	
Islam	66	144	210
Christianity	74	21	95
Total	140	165	305

Religion	Attitude		Total
	Positive Attitude	Negative Attitude	
Islam	59	151	210
Christianity	65	30	95
Total	124	181	305

148

149 The relationship between knowledge of premarital sickle cell screening and attitude shows
 150 that majority 60.0% of the students who have high knowledge on premarital sickle cell
 151 screening also shows positive attitude towards it, likewise majority 75.8% of the students
 152 with negative attitude are seen to have low knowledge on the subject matter, giving a
 153 statistical significance of $p= 0.00$, indicating the rejection of the null hypothesis (H4, therefore
 154 is significant difference between knowledge of premarital sickle cell screening and attitude
 155 towards premarital screening (Table 7).
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 157

158 **Table 7. Relationship between knowledge of premarital sickle cell screening and**
 159 **Attitude towards premarital sickle cell screening**

Knowledge Assessment	Attitude		Total
	Positive Attitude	Negative Attitude	
High Level Knowledge	84	56	140
Low Level Knowledge	40	125	165
Total	124	181	305

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163 **4. DISCUSSION**

164 Majority of the respondents have low knowledge about sickle cell anaemia and is consistent
165 with the position of Isah [7] where about 65.7% of the population have poor knowledge
166 about premarital sickle cell screening in Sokoto among school of nursing students and
167 inconsistent with that of Arulogun [8]. Most of the respondents who have heard of genetic
168 disease knew the cause. However, a reasonable proportion demonstrated a poor knowledge
169 about the cause of genetic diseases. This indicates the need for enlightenment about the
170 causes of genetic diseases. Most of the respondents demonstrated poor knowledge on
171 premarital sickle cell screening. However, reasonable proportions of the respondents have
172 higher levels of knowledge on premarital sickle cell screening. Similar lower level of
173 awareness of genotype have been reported from studies among youths in selected areas in
174 Lagos [3], while in contrast with findings that have been reported from studies among
175 undergraduate students in Yobe State, Nigeria by Animasahun [9].

176 The result of this study showed that there is significant difference in the knowledge of
177 premarital sickle cell screening due to gender among students of Federal College of
178 Education, Kano. This is reflected in Table 2 of the study showing higher percentage of
179 female students having more knowledge and attitude greater than that of the male students.
180 This result is in contrast with the findings of Schmidt [10] which showed that males scored
181 higher on knowledge and were more susceptible to fear of diseases than their female
182 counterparts. Conversely in line with, Al-Aama et al [11] reported in a study on knowledge
183 regarding the national premarital screening program among university students in Western
184 Saudi Arabia, they found out that females have more knowledge than males. Sobhy et al [4]
185 submit that there is a positive correlation between knowledge and attitude, hence, this study
186 and similar studies like that of Abd-Al-Azeem et al [5] they demonstrated that females were
187 more oriented and more knowledgeable with important health issues related to pre-marital
188 genetic screening than males which they said later reflected on their better attitude. Al-Aama
189 [11] in a study on attitudes towards mandatory national premarital screening for hereditary
190 hemolytic disorders discovers that women also had better knowledge and stronger attitudes
191 toward the implementation of screening with a significantly higher number of female
192 respondents believing that the pre-marital screening should be mandatory and that marriage
193 should not be allowed between two carriers of the same disorder.

194 More than 50% of the PGDE and B. Ed respondents had good knowledge of sickle cell
195 disease, and the premarital screening for the disease with a significance p-value <0.05 due
196 to programme of study (Table 5). This is comparable to the 78.9% recorded among
197 undergraduate students in Benin, south-south Nigeria as stated by Omuemu et al. [12] and
198 the 80% recorded among youths in Yaba, a suburb of Lagos, Nigeria by Oludare [13]. It is
199 however higher than the levels recorded in various communities in the Middle East, El-
200 Hamzi [14]. The high level of knowledge of these groups of the respondents in our study can
201 be attributed to their high educational status. It can also be attributed to the higher
202 prevalence of sickle cell disease in Nigeria, and the fact that these respondents in our study
203 are older, married and were already exposed to premarital screening, in course of their
204 getting married.

205 According to Al-Aama et al [11] and Abioye et al [3] the effectiveness of carrier screening
206 programmes depends largely on the awareness of the target population. This is consistent
207 with the current study because the analysis of the relationship between knowledge and
208 attitude of pre-marital genotype screening shows that knowledge is a strong determinant of
209 attitude of premarital genotype screening p-value <0.05 (At 5% significant level). This
210 implies that the respondents ought to be aware of the importance of genotype screening for
211 them to be screened (Table 7).

212 **5. CONCLUSION**

213 This study shows that the respondents have poor knowledge of sickle cell disease and
214 premarital screening though a reasonable number of the respondent have good attitude
215 towards premarital screening. Reasons for non-adherence as identified by some students
216 include; lack of knowledge of premarital sickle cell screening before getting married, and lack
217 of knowledge of the consequences of not doing premarital sickle cell screening. The results
218 of this study reflect the need for health education as a keystone in improving knowledge and
219 attitude toward premarital screening for sickle cell disease.

220 **5.1 Recommendation**

221 Based on the findings in this study, these recommendations were recommended:

- 222 1. Health education about sickle cell disease shall be intensified in the schools and
223 also shall be made available for the community.
- 224 2. Premarital screening services should be made available for student and people in
225 the community and shall be made affordable
- 226 3. Media shall be used as a way creating community awareness since only very few of
227 the respondents knew sickle cell disease.
- 228 4. Government should institute strict policies on premarital sickle cell screening to
229 ensure that individuals going into marriage knew their status before marriage.
- 230 5. Religious leaders should educate their youths on the importance of premarital
231 genotype screening and should be made a criterion before marriages are conducted.

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233 **COMPETING INTERESTS**

234
235 Authors have declared that no competing interests exist.
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238 **ETHICAL APPROVAL**

239 All authors hereby declare that all experiments have been examined and approved by the
240 appropriate ethics committee and have therefore been performed in accordance with the
241 ethical standards laid down in the 1964 Declaration of Helsinki.
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