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Awareness and acceptance of premarital genotype screening among youths in a Nigerian community

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Abstract
Genetic diseases like sickle cell disease is more prevalent in developing countries like Nigeria. Premarital genetic screening could help in its prevention. Awareness and acceptance of pre-marital genetic screening is not well documented in Plateau State. The aim of this study was to determine the level of awareness and acceptance of pre-marital genetic screening a Nigerian community.
A descriptive design was adopted for the study and 150 youths voluntarily completed a pilot-tested questionnaire.
Findings indicated that 50.7% are aware of premarital genotype screening and 52.7% of the respondents have been screened for their genotype. The majority of the respondents (77.3%) accepted to go for premarital genotype screening. The relationship between aware and acceptance of premarital genotype screening is statistically significant.
It was concluded that although awareness and acceptance of pre-marital screening was reasonable more need to be done to increases public awareness.

Keywords: Awareness, Acceptance, pre-marital genotype screening, Nigeria.

1. Introduction
Premarital genotype screening presents an opportunity for individuals to become informed about their genetic predisposition to diseases and for couples to be aware of the possible genetic characteristics of their unborn children. Hence, if one holds the view that one of the reasons for marriage is procreation, then worrying about genetic compatibility and avoiding genetic inheritance of grave consequence becomes something to strongly consider. The most common genetic diseases include sickle cell disease, cystic fibrosis and Tay-Sach's disease of which sickle cell disease is the commonest [1]
Premarital screening consists of a comprehensive group of test, especially for those who are planning to get married.
According to WHO[2] reported that 5% of the world population carries genes responsible for haemoglobinopathies and that Sickle cell anaemia is particularly common among people whose ancestors comes from sub-Saharan Africa, India, and Saudi Arabia and Mediterranean countries. Further, over 300,000 babies are born worldwide with sickle cell disease mostly in low and middle income countries, with the majority of these births in Africa[2]. Sickle cell disease is one of the commonest genetic disorder in Nigeria, about 24% of the population are carriers of the mutant gene and prevalence (at birth) is 2% i.e. 15,000 children are born with sickle cell disease genotype annually in Nigeria alone [2].
Sickle cell disease contributes to the equivalent of 5% of under five deaths on the African continent, more than 9% of such deaths in west Africa and up to 16% of under five deaths in individual West Africa countries [3] Haemoglobinopathies are mainly public health problems worldwide, according to WHO, approximately 240 million people are carriers of genetic disease and at least 200,000 affected individuals are born annually [4]
The prevalence of genetic disease is becoming higher, in the society, creating more stress despite the difficulties the people encounter in life.
Methods of preventing genetic disease include premarital screening and genetic counseling, prenatal diagnosis, preconception diagnosis and implantation of normal embryos after *in vitro* fertilization and *in vitro* therapy using stem cell transplantation [2]. Prevention of the disease

through carrier identification and genetic counseling remains the only realistic approach to reduce the impact of the disease and allow better use of available resources in the low income countries where the condition is most prevalent [2].

With the increasing prevalence of genetic diseases in developing countries e.g. Nigeria, there is the need to evaluate the level of awareness and acceptance of premarital genotype screening -a way of reducing and/or preventing the occurrence of genetic diseases especially sickle cell disease.

Nigeria has the highest number of sickle cell disease (a genetic disease) in the world with prevalence found to be 10 persons with sickle cell disease per 1000 population [5].

With the increasing prevalence of genetic diseases in developing countries e.g. Nigeria, there is the need to evaluate the level of awareness and acceptance of premarital genotype screening -a way of reducing and/or preventing the occurrence of genetic diseases especially sickle cell disease.

Most youths today are either unmarried or intending to get married and will procreate in the future. This group of persons are the target population who will benefit from appropriate interventions aimed at preventing and/or controlling genetic disease especially sickle cell disease. Thus, there is a need to assess their awareness and level of acceptability of premarital genotype screening so as to direct interventions in reducing the reproductive risk of genetic diseases, thereby contributing to a decrease in the prevalence of genetic diseases in Nigeria.

2. Materials and method

The current study was conducted in a Tina community of Plateau State, Nigeria.

A descriptive design was adopted and a questionnaire was used to elicit necessary information from the respondents. A total of one hundred and fifty youths participated voluntarily. The questionnaire was pilot-tested prior to data collection. Data obtained was analyzed and presented in the frequency table, percentages, and chi-squared analysis. Anonymity and confidentiality of information were maintained.

3. Results

Table 1: Socio-demographic data of respondents

Variable	Frequency N=150	Percentage (%)
Age (years)		
14-19	33	22
20-25	67	44.7
26-30	38	25.3
31-35	12	8
36 and above	0	0
Gender		
Male	83	55.3
Female	67	44.7
Tribe		
Yoruba	64	42.7
Igbo	32	21.3
Hausa	15	10
Other	39	26
Religion		
Christianity	113	75.3
Islam	36	24
Others	1	0.7
Marital status		
Single	87	58
Married	52	34.7
Divorced	5	3.3
separated	6	4
Level of education		
Primary	7	4.7
Secondary	77	51.3
Tertiary	66	44
Occupation		
Civil servant	35	23.3
Farming	4	2.7
Business	74	49.3
Others	37	24.7

From the data in table1, 33 (22%) of the respondents were ages 14-19years, 67 (44.7%) were ages 20-25years, 38 (25.3%) were ages 26-30years, 12 (8%) were ages 31-35years while 0 (0%) were 36 years and above. 83 (55.3%) of the respondents were males while 67 (44.7%) were females according to gender. Based on their tribe, 64 (42.7%) of the respondents were Yoruba, 32 (21.3%) were Igbo, 15 (10%) were Hausa while 39 (26%) were from other tribes. Based on their religion, 113 (75.3%) practice Christianity, 36 (24%) practice Islam while 1 (0.7%) practice other religion. 87 (58%) of the respondents were single, 52 (34.7%) were married, 5 (3.3%) were divorced while 6 (4%) were separated.

In terms of level of education, 7 (4.7%) attended up to primary school level, 77 (51.3%) attended up to secondary school level while 66 (44%) reached a tertiary level of education. In terms of occupation, 35 (23.3%) are civil servants, 4 (2.7%) are farmers, 74 (49.3%) are involved in business while 37 (24.7%) had other occupations in which most was specified as students.

Table 2: Level of awareness of genetic diseases and their causes

Statement	Frequency	Percentage (%)
Are you aware of genetic disease?		
Yes	93	62
No	57	38
Total	150	100
If yes, where did you hear about it?		
School	41	44.1
Mass media(newspaper, radio television)	25	26.9
Health personnel	16	17.2
Friends	11	11.8
Total	93	100
What is genetic disease?		
Is any disease that is caused by inheriting two abnormal genes from the parent	95	63.3
A disease caused by infection	30	20
A disease caused by lack of diet	25	16.7
Total	150	100

Results in tables 2 indicates that 93 (62%) of the respondents are aware of genetic disease while 57 (38%) are not aware of genetic disease. 41 (44.1%) confirmed that they heard it in school, 25 (26.9%) heard it from the mass media (newspaper, television, radio), 16 (17.2%) heard about it from health personnel while 11 (11.8%) heard about it from friends. When asked what genetic disease is, 95 (63.3%) confirmed that it is a disease that is caused by inheriting two abnormal gene from the parents, 30 (20%) confirmed that it is a disease caused by infection, and 25 (16.7%) confirmed that it is a disease caused by lack of diet.

Table 3: Level of awareness of the cause of genetic disease.

Statement	Frequency N=150	Percentage (%)
What is the cause of genetic disease?		
Infection	20	13.3
Hereditary	92	61.4
Lack of diet	12	8
Don't know	26	17.3
Do you know anybody with a genetic like sickle cell anemia?		
Yes	80	53.3
No	70	46.7

Results in table 3 indicate that 20 (13.3%) of the respondents reported that genetic disease is caused by infection, 92 (61.4%) reported that genetic disease is transmitted hereditarily, 12 (8%) reported that genetic disease is caused from lack of diet while 26 (17.3%) do not know the cause of genetic disease. 80 (53.3%) of the respondents know someone with a genetic disease like sickle cell anemia while 70 (46.7%) of the respondents do not know anyone with a genetic disease like sickle cell anemia.

Table 4: Level of Awareness about genotype

Statement	Frequency	Percentage (%)
Have you heard about genotype?		
Yes	100	66.7
No	50	33.3
Total	150	100
If Yes, what is your source of information?		
School	47	47
Mass media (Newspaper, radio, television)	27	27
Health personnel	26	26
Total	100	100
Do you know your genotype?		
Yes	79	52.7
No	71	47.3
Total	150	100
If Yes, what is your genotype?		
AA	44	55.7
AS	27	34.2
SS	8	10.1
Total	79	100
If No, would you want to know?		
Yes	65	91.5
No	6	8.5
Total	71	100

Findings in table 4 shows that 100 (66.7%) have heard about the genotype while 50 (33.3%) had never heard about genotype. Among those who have heard about genotype, 47 (47%) of the respondents heard about it in school, 27 (27%) heard about it from the mass media (newspaper, television, radio) and 26 (26%) heard it from health personnel. 79 (52.7%) of the respondents know their genotype while 71 (47.3%) do not know their genotype. Among respondents that know their genotype, 44 (55.7%) are AA, 27 (34.2%) are AS and 8 (10.1%) are SS. Among respondents that do not know their genotype, 65 (91.5%) are willing to know their genotype while 6(8.5%) are not interested in knowing their genotype.

Table 5: Level of Awareness of premarital genotype counseling.

Statement	Frequency	Percentage (%)
Have you ever heard of premarital genotype screening?		
Yes	76	50.7
No	74	49.3
Total	150	100
If Yes, what is your source of information?		
School	22	28.7
Mass media	16	21.1
Health personnel	36	47.4
Friend	2	2.6
Total	76	100
What is premarital genotype screening?		
A screening done by intending couples or youths to discover any abnormality in their blood sample.	72	48
Screening done to prepare couples for marriage in order to make them have children	21	14
Do not know	57	38
Total	150	100
Do you know any Centre where premarital genotype screening is carried out?		
Yes	52	34.7
No	98	65.1
Total	150	100

Table 5 shows that 76 (50.7%) of the respondents have heard of the premarital genotype screening while 74 (49.3%) have never heard of the premarital genotype screening. Among those who have heard of premarital genotype screening, 22 (28%) heard about it in school, 16 (21.1%) heard it through the media, 36 (2.6%) heard it from friends.72 (48%) of the respondents confirmed that premarital genotype screening is a screening done by intending couples or youths to discover any abnormality in their blood sample, 21 (14%) reported that premarital genotype screening is a screening done to prepare couples for marriage in order to make them have children, and 57 (38%) of the respondents do not know what premarital genotype screening is all about.52 (34.7) of the respondents know centres where premarital genotype screening is carried out while 98 (65.1%) do not know where premarital genotype screening is carried out.

Table 6: Level of awareness on the importance of premarital genotype screening in the prevention of genetic disease.

Statement	Frequency	Percentage %
Do you think premarital genotype screening is necessary?		
Yes	82	54.7
No	68	45.3
Total	150	100
Why is premarital genotype screening Important?		
To prevent genetic disease	72	48
To prevent abnormalities in blood sample	27	18
To select a partner		
It is not important	20	13.3
Total	31	20.7
	150	100
Do you believe that premarital genotype screening can help in the prevention of genetic disease?		
Yes	82	54.7
No	68	45.3
Total	150	100
Would you like to go for genotype screening?		
Yes	116	77.3
No	34	22.7
Total	150	100

The results in table 6 shows that 82 (54.7%) do think that premarital genotype screening is necessary while 68 (45.3%) do not think that premarital genotype screening is necessary. 72 (48%) of the respondents affirmed that premarital genotype screening is important because it prevents genetic disease, 27 (18%) reported that it is important because it prevents abnormalities in the blood sample, 20 (13.3%) reported that it is important because it is used to select a partner, while 31 (20.7%) of the respondents reported that it is not important at all. 82 (54.7%) of the respondents believe that premarital genotype screening can help in the prevention of genetic disease while 68 (45.3%) do not believe that premarital genotype screening can help in the prevention of genetic disease. 116 (77.3%) of the respondents would like to go for genotype screening while 34 (22.7%) would not like to go for genotype screening.

4. Hypothesis

There is no significant difference between the awareness of premarital genotype screening and the acceptance of premarital genotype screening.

Table 7: Awareness of pre-genotype screening against its acceptance.

Awareness of P.G.S	Acceptance of P.G.S		
	Yes	No	Total
Yes	71	5	76
No	45	29	74
Total	116	34	150

Calculated chi-square = 22.7, critical value at 5% significant level and a degree of freedom of one is 3.841. Since the calculated chi-square is greater than the critical value, the null hypothesis is rejected. It means that there is a statistically significant relationship between awareness of premarital genotype screening and the acceptance of premarital genotype screening among youths.

5. Discussion of findings

The respondents cut across various socio-demographic characteristics with their age ranging from 14-35years. Majority of the respondents are between 20years and 30years. The fact that most of the respondents are single makes the study most appropriate for the study group because the respondents need to be aware of the importance of premarital genotype screening before they get married.

Majority of the respondents have heard about genetic diseases, especially sickle cell anemia and is consistent with the position of Arulogun [6]. Most of the respondents who have heard of genetic disease knew the cause. However, a reasonable proportion demonstrated a poor knowledge about the cause of genetic diseases. This indicates the need for enlightenment about the causes of genetic diseases. Although, most respondents knew of genotype, a significant proportion of the respondents demonstrated poor knowledge of genotype. Similar findings have been reported from studies among undergraduate students in Yobe State, Nigeria [7], while in contrast lower level of awareness of genotype have been reported from studies among youths in selected areas in Lagos [8].

Majority of the respondents (52.7%) have been screened for their genotype while some (47.3%) have not been screened and this may be because they are not aware. Some respondents listed blood group as their genotype. This finding is much better than what was reported in the Federal Capital Territory and Benin City, where only about 40.3% and 32% of youths that knew their genotype respectively [9]

From the survey, among those who have been screened for their genotype, the majority are AA, some are AS while very few are SS. Most of the respondents who are not aware of their genotype would like to be screened while very few still, would not want to be screened to know their genotype. A qualitative study to understand the attitude of youths towards genetic screening in Nigeria is warranted.

According to Al-Aama [10] the effectiveness of carrier screening programmes depends largely on the awareness of the target population. This is consistent with the current study because the analysis of the relationship between awareness and acceptance of pre-marital genotype screening shows that awareness is a strong determinant of acceptance of pre-marital

genotype screening (At 5% significant level). This implies that the respondents ought to be aware of the importance of genotype screening for them to be screened.

Some of the respondents reported that premarital genotype screening is a screening done by intending couples or youths to discover any abnormality in their blood sample while the majority reported that they do not know what premarital genotype screening is all about. Among those who are aware of premarital genotype screening, only a few are aware of premarital genotype screening centres while others do not know any centre where the screening is done.

Slightly over an average number of respondents recognizes the relevance of premarital genotype screening while some do not think premarital genotype screening is important. Among the respondents who reported that premarital genotype screening is important, the majority said it is an important preventive strategy for genetic diseases especially sickle cell disease. This finding is in contrast to what was reported in Ife, Nigeria, where about 95% of the respondents favour premarital genotype screening [11], few reported that it is important because it is used to select a partner while some reported that it is not important at all. This may be because they are not even aware of what premarital genotype screening is.

The majority of the respondents believes that premarital genotype screening can prevent the occurrence of genetic diseases, while some do not believe it can prevent genetic diseases. This may have been due to their level of education. In a similar study, it was found that youths who had tertiary education were aware that premarital genotype screening can prevent sickle cell disease while those who had primary education were least aware [6].

6. Conclusion

The level of awareness and acceptance of pre-marital genotype screening in Jos Nigeria is reasonable. However, there is a need for enlightenment about the causes and prevention of genetic diseases in Jos, Nigeria.

7. Recommendation

1. Iintensive enlightenment campaign on premarital genotype testing before marriage should also be done by government and institutions through the media, alongside health education on genetic disease and its prevention right from primary school level.
2. Rreligious leaders should educate their youths on the importance of premarital genotype screening and should be made a criterion before marriages are conducted.
3. Ggovernment and Non-government organizations should provide free genotype testing and counseling centres in all areas of the country including the rural areas.
4. The Ggovernment and Non-government organizations should ensure that facilities for premarital genotype screening are available and easily accessible nationwide.

8. Suggestions for further studies

1. A qualitative study to understand the attitude of youths towards genetic
2. Screening in Nigeria is warranted.
3. There is need for an assessment of availability and affordability of genotype screening in Jos, Nigeria.
4. Further study to explore the barriers to acceptance of premarital genotype could enhance its uptake.
5. Future study should consider larger sample size.

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