Original Article

Knowledge and Attitudes of Secondary School Students in Federal Capital Territory (FCT), Abuja ,Nigeria Towards Sickle Cell Disease

1. Rotimi S, Owolabi MBBS,MPH 1. Peter, Alabi MBBS,FWACP; 2. Olusoji, Daniel MBBS,MPH,FWACP; 1. Samuel, Ajayi MBBS,FWACP; 1. Theresa, Otu MBBS,FWACP; 3. Adeniyi, Ogundiran MBBS,MPH, DrPH

1. University of Abuja Teaching Hospital, Gwagwalada, Abuja, Nigeria.
2. Department of Community Medicine and Primary Health Care, Olabisi Onabanjo University, Sagamu, Nigeria
3. HIV Unit, World Health Organization Country Office, Abuja, Nigeria.

ABSTRACT

BACKGROUND: This study was conducted among Secondary School Students in Federal Capital Territory (FCT),Abuja Nigeria , between May and June 2010 to determine the knowledge and attitudes of the students towards Sickle Cell Disease (SCD).

METHODS: The study was a cross-sectional study carried out on 600 students from 8 secondary schools located within (FCT). A multistage sampling method was used for selection of the study population. Data was collected with the aid of a pretested self-administered questionnaire and analyzed with EPI-INFO 2008 .

RESULTS: The age of respondents ranged from 9 to 26 years with the mean age of 15.16 (SD=2.13). The modal age of the respondents was 10-19 years (97.8%). The male: female ratio was 1.01:1. A large number of respondents' fathers (80.7%) and mothers (70.2%) respectively, had at least secondary school education. Majority (81.8%) of the respondents claimed to have heard about sickle cell disease (SCD) but only 38.0% of them knew the cause of SCD. Slightly less than half, 292 (48.7%) of the respondents knew their genotype. Of the 292 respondents that knew their genotype, 206 (70.5%) were AA, 50 (17.1%) were AS,14 (4.8%), SS,11 (3.8%) AC, 5 (1.7%) SC, 4 (1.4%) CC, 2 (0.7%) other types of genotype. Only 46.2% and 36.8% of them respectively, correctly identified that pre-marital genotype testing and avoidance of marriage between two persons with haemoglobin S genotype as means of preventing further spread of SCD. Factors found to be significantly associated with the knowledge of respondents' genotype were; age =15 years, respondents' mothers' educational status, being taught about SCD in school, ever seeing somebody suffering from SCD complication, losing a relative to SCD, being in senior secondary school class and knowing the cause of SCD.

CONCLUSION: This study shows that majority of the respondents did not know their genotype ,and their knowledge about the cause and prevention of SCD was poor.

KEY WORDS: Knowledge, Attitudes, Sickle Cell Disease, Secondary School Students, FCT.

INTRODUCTION

Sickle cell disease (SCD) is the commonest single genetic disorder worldwide[1]. It is a major public health problem in Sub Saharan Africa, India and some Mediterranean populations because of its attendant significant morbidity and mortality[1].Though sickle cell disease is prevalent among Africans, black Americans, and Mediterraneans, it has recently become a global problem[2] The World Health Organization estimates that over 300,000 babies are born annually with severe forms of Sickle-cell disease and other haemoglobin disorders, making it the most prevalent hereditary disease of mankind [3].

In Nigeria the prevalence of Haemoglobin SS (HbSS) is 1-3%[4]. Sickle cell disease commonly manifests itself as chronic anaemia, painful crisis affecting joints and limbs usually triggered by factors such as infection, dehydration, exhaustion and a change in temperature. Sickle cell disease is associated with significant morbidity and mortality in affected individuals, particularly children. Most of the babies born with SCD die before they reach the age of 5 years [5]. Children with the disease are at risk of developing complications at a young age thereby reducing the quality of their life [6] SCD is the commonest cause of stroke in children and between 7 % and 10 % of children with SCD will have a stroke before the age of 14 years[7]. Thus, the Care of the children with SCD places an enormous burden on the parents,, guardians and other caregivers[8,9] .

Available prevention methods include premarital screening and genetic counseling, prenatal diagnosis, pre-conception diagnosis and implantation of normal embryos after in vitro fertilization, and in-utero therapy using stem cell transplantation. In many developing countries, identification of a SCD carrier and genetic counseling of individuals to take informed decision in their choice of life partners appears to be the only realistic approach to prevent further spread of the disease before other high tech interventions become readily available and accessible to the general populace. This approach can only be successful if the community has adequate knowledge of the disease and how to further reduce its spread within the population. The study was embarked upon to assess the knowledge and attitude of secondary school students on sickle cell disease.

METHODOLOGY

Correspondence: Dr Owolabi, R.S., HIV/AIDS Unit, Department of Medicine, University of Abuja Teaching Hospital, Gwagwalada, Abuja, Nigeria. **E-mail:** rsowolabi@yahoo.com **Phone :** 00234-8035610122

This study was a cross-sectional study carried out on 600 students from 8 secondary schools located within Federal Capital Territory (FCT), Abuja ,Nigeria ,between May and June 2010.

A multistage sampling method was used for the selection study population . The Federal Capital Territory (FCT) was first stratified into the 6 Area Councils. Two Area Councils (Bwari and Gwagwalada Area councils) were picked from the 6 area Councils in FCT by simple random sampling. Each of the two selected Area Councils was stratified into rural and urban areas. One Junior and one Senior secondary schools were selected by simple random sampling from the list of schools in each stratum of the selected Area Councils. The sample size for each school was allocated proportionately to the school population. In each school, there was a proportionate allocation of sample size to each class based on the student population of each class (i.e from Junior Secondary to Senior secondary Classes-JSS1-SS3). After this, an arm of each class was randomly selected for the study. In each of the selected arms of the class, systematic random sampling was employed to select the individuals for this study. The sample frame (i.e. the list of individual units in the class) was gotten from the class teacher. The total number of students in the class was divided by the sample size for that class to get the sampling interval. A simple random sampling was employed to get the starting number. The students were picked based on the sampling interval

Data was collected with the aid of a pretested self administered questionnaire. The questionnaire consists of personal bio-data and questions on some factors associated with knowledge of Hemoglobin status. . For students who did not understand the questions, the teachers were available to interpret the questions to the student in the language he or she understands better. Data was analyzed using standard statistical procedures including the use of Epi-Info 3.5.4 statistical soft ware. We used chi square ($X^{2)}$ test to evaluate differences in categorical variables. Fisher's exact test was used when cell size were less than 5. Differences between data were considered significant where $P < 0.05$ or Odds Ratio (O.R) did not embrace unity.

Ethical approval was obtained from the Ethical Committee of University of Abuja Teaching Hospital. A letter of introduction was obtained from the Zonal Education Board to the Principals of the selected schools. Permission was obtained from the Principals of the schools which enabled the students in their custody to participate in the study. The purpose of the study was clearly explained to the teachers and students after which a verbal consent was obtained from each of them to participate in the study. Confidentiality of participant's information was assured throughout the study.

RESULTS

A total number of 600 students from four Junior and four Senior secondary schools within FCT participated in the study. The age of respondents ranged from 9 to 26 years with the mean age of 15.16(SD=2.13). The modal age of the respondents is 10-19 years (97.8%). The male:female ratio was 1.01:1. The students were almost evenly spread in the various class categories; 16.8% in Junior Secondary School Class 1 (JSS1), 16.8% in JSS2,15.8% in JSS3,21.8% in Senior Secondary School Class1 (SSS1),20.2% in SSS2, and 8.5% were in SSS3. The dominant ethnic group was Igbo (33.0%) , followed by Yoruba (19.8%) and Hausa (15.8%) while 31.3% were of other minority tribes. Majority (77.5%) of the respondents were Christians, 22.0% Muslims,0.3% Traditional, and 0.2% belonged to other religions. A large number of respondents' fathers (80.7%) and mothers (70.2%) respectively, had at least secondary school education (Table 1).

Majority (81.8%) of the respondents claimed to have heard about sickle cell disease (SCD). Respondents' sources of information about SCD included; School (47.8%), Television (45.7%), Radio (16.7%), Self-reading (15.2%), Health Workers (7.0%), Friends (6.8%), Relatives (3.5%), Church/Mosque (2.5%), and Seminar/Workshop (1.5%) as shown in Table 2.

On the knowledge of respondents about the cause of SCD, only 38.0% of them knew that SCD is inherited from one's parents. Other causes of SCD mentioned by respondents were: A Virus (11.3%), Drinking of bad water (6.8%), Mosquitoes (3.8%), Witchcraft (1.7%), and 1.3% said it's caused by a Bacterium (Table 2). Slightly less than half, 292 (48.7%) of the respondents knew their genotype. Of the 292 respondents that knew their genotype, 206 (70.5%) were AA, 50 (17.1%) were AS,14 (4.8%), SS,11 (3.8%) AC, 5 (1.7%) SC, 4 (1.4%) CC, while the remaining 2 (0.7%) said they have other types of genotype (Table 3).

Over half (55.3%) of the respondents had seen somebody with SCD before, 37.5% of respondents knew someone close to them that has SCD, 15.3% had lost a relative to SCD(Table 5). The conditions in which some of the respondents saw someone suffering from SCD included; the person(s) lacked blood (39.3%), the eyes of the person(s) were yellowish (34.3%), and the person(s) was having bone pain (28.5%) (Table 5).

When the respondents were examined on their knowledge on how to prevent SCD, 46.2% and 36.8% of them respectively, correctly identified that pre-marital genotype testing and avoidance of marriage between two persons with haemoglobin S genotype as means of preventing further spread of the genetic disorder. Incorrect responses mentioned by the respondents as means of preventing SCD included; complete

abstinence from sex (24.5%). Some of the respondents mentioned negative attitudes to persons with SCD such as avoidance of bodily contact with a person with the disease (13.3%), not sitting on a seat with anybody with sickle cell disease (4.7%), while 3.0% would not buy goods from someone who has the disease (Table 5).

Some factors found to be statistically significant to the knowledge of respondents' genotype were; age =15 years (X^2=5.06, P value=0.002), senior secondary school class (X^2=11.81, P value=0.0005), Respondents mothers' educational status (X^2=21.43, P value=0.00009), being taught about SCD in school(X^2=10.51. P value=0.001), Ever seeing somebody suffering from SCD complication (X^2=24.02, P value=0.000001), losing a relative to SCD (X^2=11.14, P value=0.0008), and knowing the cause of SCD (X^2=15.69, P value=0.00007) (Table 6).

Table 1.Respondents' Socio demographic Characteristics (N=600)

Age Range(yr)	Frequency	Percent
5 – 9	1	0.2
10 – 14	231	38.5
15 – 19	356	59.3
20 – 24	11	1.8
25-29	1	0.2
Sex		
Male	301	50.2
Female	299	49.8
Class		
SSS1	131	21.8
SSS2	121	20.2
JSS1	101	16.8
JSS2	101	16.8
JSS3	95	15.8
SSS3	51	8.5
Tribe		
Igbo	198	33.0
Yoruba	119	19.8
Hausa	95	15.8
Igala	38	6.3
Edo	32	5.3
Ibira	18	3.0
Efik	14	2.3
Idoma	13	2.2
Tiv	13	2.2
Nupe	9	1.5
Urobo	7	1.2
Gwari	5	0.8
Bassa	4	0.7
Fulani	4	0.7
Ggagi	4	0.7
Ibiobio	4	0.7
Kataf	4	0.7
Igede	2	0.3
Marowa	2	0.3
Ogoja	2	0.3
Others	13	2.2
Religion		
Christianity	465	77.5
Islam	132	22.0
Traditional	2	0.3
Others	1	0.2
Father's educational status		
Tertiary	265	44.2
Secondary	219	36.5
Primary	75	12.5
No formal education	41	6.8
Mother's educational status		
Secondary	226	37.7
Tertiary	195	32.5
Primary	122	20.3
No formal education	57	9.5
Father's Occupation		
Civil Servant	246	41.0
Business/Trading	186	31.0
Student	55	9.2
Farming	48	8.0
Driving	36	6.0
Unemployed	16	2.7
Artisan	7	1.2
Others	6	1.0
Mother's Occupation		
Business/Trading	333	55.5
Civil Servant	133	22.2
Full House Wife	42	7.0
Student	39	6.5
Farming	25	4.2
Unemployed	19	3.2
Artisan	6	1.0
Others	3	0.5
Type of your family		
Monogamy	423	70.5
Polygamy	148	24.7
Separated	20	3.3
Divorced	9	1.5

Table 2. Respondents' sources of information about sickle cell disease and their knowledge about the cause of the disease N=600

Sources of information	Yes n(%)	No n(%)
School	287(47.8)	313(52.2)
Television	274(45.7)	326(54.3)
Radio	100(16.7)	500(83.3)
Self-reading	91(15.2)	509(84.8)
Health Workers	42(7.0)	558(93.0)
Friends	41(6.8)	559(93.2)
Relatives	21(3.5)	579(96.5)
Church/Mosque	15(2.5)	585(97.5)
Seminar/Workshop	9(1.5)	591(98.5)
Causes of sickle cell disease		
Inherited from one's parents	228(38.0)	372(62.0)
A Virus	68(11.3)	532(88.7)
Drinking bad water	41(6.8)	559(93.2)
Mosquito	23(3.8)	577(96.2)
Witchcraft	10(1.7)	590(98.3)
A Bacterium	8(1.3)	592(98.7)

Table 3. Respondents' knowledge of their Genotype

Do you know your genotype?	Frequency	Percent
Yes	292	48.7
No	308	51.3
Total	600	100.0
If yes , what is your genotype?		
AA	206	70.5
AS	50	17.1
SS	14	4.8
AC	11	3.8
SC	5	1.7
CC	4	1.4
Others	2	0.7
Total	292	100.0

Table 6. Factors Affecting Respondents' knowledge of their Haemoglobin Genotype

Factors	Aware of Hb genotype status N=292	Not aware of Hb genotype status N=308	Chi Square (X^2)	P value
Age				
<15	99	133		
e15	193	175	5.06	0.02
Sex				
Male	146	153		
Female	146	155	0.00	1.0
Level of Education				
Junior Sec. school	123	174		
Senior Sec. School	169	134	11.81	0.0005
Fathers Education				
No formal education	15	26		
Primary education	30	45		
Secondary education	107	112		
Post primary education	140	125	6.49	0.09
Mothers Education				
No formal education	20	37		
Primary education	47	75		
Secondary education	106	120		
Post primary education	119	76	21.43	0.00009
Respondents had been taught about Hb diseases in school				
Yes	160	127		
No	132	181	10.51	0.001
Respondents has personally witnessed someone with complications of sickle cell disease				
Yes	190	138		
No	102	170	24.02	0.000001
Respondents has heard of someone who died from sickle cell disease				
Yes	60	32		
No	232	276	11.14	0.0008
Respondents knew the cause of SCD				
Yes	135	93		
No	157	215	15.69	0.00007

Table 4. Respondents' awareness about Sickle Cell Disease

Have you heard about sickle cell disease? N=600	Frequency	Percent
Yes	491	81.8
No	109	18.2
Have you ever seen anyone with sickle cell disease?		
Yes	332	55.3
No	268	44.7
Has anybody known to you suffered from sickle cell disease?		
Yes	214	35.7
No	386	64.3
Has anybody related to you died of sickle cell disease?		
Yes	92	15.3
No	508	84.7
Have you seen anybody suffering from Sickle Cell Disease complication(s)?		
Yes	328	54.7
No	272	45.3

Table 5.Respondents' knowledge on how to prevent sickle cell disease, Attitude towards Persons with SCD and the conditions in which they met sufferer(s) of sickle cell disease N=600

How to prevent sickle cell disease	**Yes n(%)**	**No n(%)**
Premarital genotype testing	277(46.2)	323(53.8)
Two persons with "S" haemoglobin not marrying each other	221(36.8)	379(63.2)
Attitudes towards someone with SCD	147(24.5)	453(75.5)
Avoid body contact with anybody suffering from sickle cell disease	80(13.3)	520(86.7)
Not sitting on a seat with anybody with sickle cell disease	28(4.7)	572(95.3)
Not buying things from anybody with sickle cell disease	18(3.0)	588(97.0)
Conditions in which they met sufferers of SCD		
The person(s) lacked blood	236(39.3)	364(60.7)
The eyes of the person(s) were yellowish	206(34.3)	394(65.7)
She/he was having bone pain	171(28.5)	429(71.5)

DISCUSSION

This study revealed that majority of the respondents has heard about sickle cell disease (SCD). This finding is supported by findings from similar studies conducted in Nigeria which reported that majority of the respondents have heard about sickle cell disease[4,10-13,]. The high level of awareness may not be unconnected with the fact that the study was carried out in a cosmopolitan city among students who are still learning and exposed to the mass media which was identified in the study as one of the major sources of information about the disease. The mass media is a veritable tool for the dissemination of health information to the general populace and the potential of the mass media in reaching a very large segment of the country should be utilized in disseminating health information. Other sources of health information mentioned such as the use of religious bodies and health care workers in disseminating health information needs to be strengthened. These sources have been successfully utilized in the dissemination of health information in some disease situations such as HIV/AIDS. There is therefore an urgent need to integrate health care workers and religious organizations in the SCD prevention programs.

In spite of the high level of awareness of the disease, only 38.0% of the respondents knew the actual cause of sickle cell disease. This finding is corroborated by findings from similar studies carried out in Nigeria among higher institution students which similarly showed poor knowledge of the respondents on sickle cell disease[11,14-17]. It was observed in another study among high school students in West Indies [18] that factual knowledge about the disease was more from articles in news paper and magazine rather than the mass media. Therefore it may become imperative for teachers to encourage students to read health columns in newspaper and other health magazines. Teachers can go the extra mile to provide students with cut-outs from magazines and newspaper on SCD for the students to improve their knowledge-depth of the disease. The implication of this finding is that poor knowledge of the disease among the respondents may make it impossible for them to take the appropriate preventive actions and seeking appropriate medical intervention.

The study also revealed that majority of the respondents did not know their haemoglobin genotype. This finding agrees with the findings from similar studies conducted among higher institution students in Nigeria, which also showed that majority of the respondents did not know their genotype[11,15,19]

Knowledge of one's genotype is one of the first steps needed to be taken in the prevention of sickle cell disease . This finding implies that those who have sickle cell disease, but do not know their genotype, may not be able to access the available care for the disease, thereby increasing sickle cell related morbidity and mortality especially in a country where so many people still patronize alternative/spiritual health practitioners. On the other hand, those who are carriers of the disease, but do not know their genotype, may not avail themselves with the necessary genetic counseling to make informed marital choices when they need to as it relates to the prevention of the continuous spread of the disease. There is therefore the need for the school authorities to provide haemoglobin genotype testing available, accessible and affordable to all students. .

Among the 48.7% of the respondents that knew their genotype, only 4.8% were actually suffering from the disease. This is higher than the 2.5% reported among university students in Nigeria[15]. The higher rate may not be unconnected with the fact that result from our study was self-reported, while in the other study haemoglobin electrophoresis was actually carried out. There is the need for these students to be re-tested and diagnosis confirmed in them. SCD has been found to affect the educational performance of sufferers of the disease and they need to be given care and support in and out of school for them to fully achieve their potentials in life.

The study also revealed that some students had poor

attitude towards persons affected by SCD. Some of the responses include avoiding bodily contact with someone affected and not buying from someone known to be affected by SCD. This finding is as a result of the respondents' belief that the disease was contagious. However, there is need for further studies to explore the possibility of stigma on the attitude of the students. Although, the number of respondents was few, the finding is significant and should be addressed by correct information on how the disease can be transmitted.. The school authorities should ensure that all teachers are oriented on the minimum basics of SCD information that should be transmitted to the students.

Some factors were found to be significantly associated with respondents' knowledge of their genotype. The study observed that respondents in senior secondary were significantly more likely to know their haemoglobin genotype than those in junior secondary school. This finding concurred with a study among high school students in West Indies where there was a steady increase in knowledge and awareness of SCD with increasing school grade level[18]. The respondents in senior secondary school have more education and have had more time and interactions with other students in the school environment and may have come in contact with a student that has the disease.

The study also revealed that respondents whose mother had a higher level of education were likely to know their genotype. It has been shown in many health interventions especially in child survival strategies, that the mother's education is an important factor in favourable outcomes [20-22] Education of the girl child cannot be overemphasized in health related issues. Educated mothers are more likely to understand health messages during health talk in hospital and from the mass media and thus transmit such health information to their siblings since they spend a lot more time with the child. Also in their role as care givers, they are more likely to be with the child during ill health of their child and other children close to them. Targeting mothers for health education campaign may likely improve uptake of genotype screening among the students.

This study also shows that the respondents that have either been taught about SCD or heard about the disease were more likely to know their genotype. This implies that if every school includes SCD-related topics in its curriculum and there is regular enlightenment campaign on the disease, many students will know their genotype. We also found out from this study that the respondents that have seen somebody suffering from SCD complication were more likely to know their genotype. This finding is supported by the findings from a similar study in the West Indies which revealed that respondents who had personal knowledge of someone with the disease have a higher level of knowledge of the disease. By this finding, one can suggest that visual experience about SCD in form of documentary made available to the students either through television programs or video clips shown during SCD-related health talks among the students is likely to encourage students to know their genotype and take appropriate preventive action.

CONCLUSION AND RECOMMENDATIONS

This study shows that majority of the respondents did not know their genotype. Factors found to be significantly associated with the knowledge of respondents' genotype were respondents' mothers' educational status, knowing the cause of SCD, being taught of SCD in school, ever heard about SCD, loosing relative to SCD, seeing someone suffering from SCD, respondents' age of 15 years and above, and being in senior secondary school class. Respondents' knowledge about the cause and prevention of sickle disease was poor.

We hereby recommend that policy makers in education sector should ensure that topics on SCD are included in both primary and secondary schools' curriculum, so that students can be well informed about SCD as early as possible. There should be collaboration between health and education sectors on SCD prevention, diagnosis and management, in order to ensure regular health education/enlightenment campaign on SCD and free haemoglobin electrophoresis to students. Policy makers in education sector should also target the Parents Teachers Association (PTA) forum in schools to enlighten parents on the advantages of early diagnosis of SCD by having an haemoglobin genotype test performed on their wards. Haemoglobin genotype testing should be made routine for all students as part of the pre-entry medical screening that should be performed by all schools before admission into school. Counselors should be employed and trained on genetic counselling for them to provide support to the students before carrying out the test. Finally, Government at all levels should establish effective referral system between school health service and the health facilities , and equip the health facilities so that they can effectively manage crisis and or complication arising from the disease.

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