

Sickle Cell Disease Awareness, Prevention and Management Competence of Student Teachers: Panacea for Strengthening Childhood Education in Nigeria

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Abstract: *The study seeks to examine the level of awareness on the prevailing conditions and preventive trends on sickle cell disease among Primary Education Students in Usmanu Danfodiyo University Sokoto. The total population is 755 students, and purposeful sampling technique was used and all the 150 students (UG 3 level) were used as sample for the study. Researcher constructed instrument was used for the study. Samples were subjected to pre-test, awareness/ lecture sessions, and post test. Five research questions and one hypothesis were advanced for the study. Frequency, percentages and t-test were used as statistical instruments. The study found significant difference between pretest and post test scores of students on awareness, knowledge of conditions and preventive measures of sickle cell. The study found difference between pre-test and post test on students decision for spouse compatibility, and knowledge of managing SCD in the class. The study suggests the need for under graduate general studies course content to include lectures on sickle cell conditions, specifically all teacher training professional courses to facilitate wide spread awareness of sickle cell management and preventive measures. The study suggests the need to customize the practice of genotype screening and matching before marriage in various societies, specifically parents, religious leaders and clerics are to sensitize and make gene-type compatibility an important requirement for prospective couples. The study concludes that the best treatment for sickle cell disease is prevention, and this can be achieved with proper and valid laboratory blood screening test results, and matching of spouses before marriage to prevent the high rate of sickle cell birth and the eventual traumatic life they are likely to encounter can be addressed by team work of medical personnel and well trained teachers.*

Keywords— Sickle Cell, Awareness, Prevention, Students, Competence

1. INTRODUCTION

Children with Sickle Cell Disease (SCD) need not only adequate medical treatment, but also proper educational intervention and psycho-social management. This is because apart from being a fatal disease with high morbidity and mortality rate, it also renders its sufferers handicapped educationally, psychologically, socially and generally. Unlike other special need conditions such as seeing hearing, speech, which have special provisions in terms of personnel and facilities, SCD learners attend conventional educational provision for normal children without due regards to their special need conditions. The scenario faced by SCD learners in Nigerian schools is lopsided and need to be strengthened to enable SCD children attain their full educational and general capacity. Specifically, teachers generally are the lead role players in education of a sickle cell learner and should be well informed and equip to function well. To find out awareness knowledge and capacity of student teachers on SCD and its management is the major focus of this study.

Sickle cell disease is caused by transmission of genetic homozygous sickle cell genes (SS) from both parents (Adewoyin, 2005). Once transmitted the child acquires an abnormal hemoglobin called hemoglobin S or sickle hemoglobin (Ozenwosu, Chuku, and Ikefuna, 2015). Hemoglobin is described by (Adelekin & Ayinmode (2005) as a protein in red blood cells that carries oxygen throughout

the body. In a normal circumstance red blood cells are flexible and round in shape and move easily through the blood vessel, but in sickle cell patients the sickle hemoglobin causes inability for enough red blood cells to carry adequate oxygen throughout the body causing swelling of limbs, severe pains, infections, crises and a lot of other fatal complications leading to high morbidity and mortality of sufferers. This according to Cold, Mahrer, Treadwell, Weissman and Vichinly (2008), this accounts for low rate of survival, and negative implications in their physical, emotional, psycho-social wellbeing. It also affects their schooling, educational achievements, work life, marriage and family life. Schooling and education of children with sickle cell condition is of paramount importance and deserve professionally trained personnel who can handle them properly to enable them cope with the rigors of academic demands and educational pursuits in addition to ailments and complications posed on them by SCD. Teachers just like doctors and parents are indispensable personnel in management of children with SCD. The relevance of Primary Education students to be properly trained and groomed to enable them organize, plan, and implement primary education for all Nigerian children including children with special need conditions such as the SCD is considered paramount. Arie (2008) conducted a research on the scholastic performance of children with sickle cell disease. The sample comprises two groups of African American children with SCD of which 17 are sickle cell

anemia(SS) most severe form, and 15 with Sickle cell disease, a less severe form. They were compared with 34 healthy children with similar demographic characteristics. Their scholastic performance, standardized reading and mathematics achievement test score and school attendance were compared and the result revealed significant difference in favour of healthy children, which suggests that SCD children are at greater educational risk of school failure than their healthy counterparts. The inference derived from this finding showcases the need for teachers to be equipped with some intervention strategies to cater for the educational need of SCD learners.

Researchers like Ameh and Tarfa (2012), Afolayan and Jolayemi have attested to the high rate at which the population of SCD are increasing which need to be addressed through advocacy. Education for all and Sustainable Development goals that seek to strengthen educational and life attainments and success for all across the world may not be feasible were some segment of world populations (SCD) are at risk of failure. Available statistics (WHO2005,) shows the prevalence of sickle cell disease shows that 5% of the world's population are carriers of genes responsible for sickle cell disease. Those who inherit only one mutant gene(S hemoglobin) from one parent becomes a carrier, and the presence of single abnormal sickle genes does no harm to the carriers rather it protect them from malaria, but the inheritance of two abnormal genes from two parents(carriers) leads to the condition of sickle cell disease which is irresistible to malaria parasite and malaria is the major cause of ill health condition and death among patients with sickle cell especially children under five(Animasahun, Akitoye and Njokanma (2008). Also Adewoyin (2015) described the scenario of the prevalence of sickle cell disease (SCD) as one of the most common genetic disease globally with highest prevalence in Middle East, Mediterranean region, South Asia, and Sub Saharan Africa especially Nigeria. It is more prevalent in mosquito endemic areas, rural areas, where awareness, health services and educational attainments is low.

It is generally acknowledged that the SCD is caused by single mutant genes(S gene) donated by each parent (carriers of S genes) resulting in two mutant genes in the offspring (SS genes) leading to sickle cell disease. This means that situation can be averted if only one parent has the genes and the other does not have. The case advanced by this study is that is a worthy venture to work out modality of spreading the information and raising awareness that this dreadful disease can be averted through simple identification and matching of prospective parents to ensure that two people with S genes do not mate or marry to produce infected SCD child. Thus the study aims to find out the level of awareness and knowledge of sickle cell condition among Primary Education Students (as prospective parents and teachers). As prospective parents since they have not married then equipping them with prior knowledge on selection of compatible genotype spouse might play a great role in their

decision on choice of rightful spouse to avoid repeated cycle of generating carriers and SCD children. And as prospective teachers, educating them on the causes, symptoms and educational management of sickle cell disease condition might also help to address some difficulties faced by SCD learners and promote their well being, performance and achievements.

Some research studies conducted provide some useful revelations and need for more researches. A cross sectional research conducted by Animasa, Akitoye and Njokanma (2005) on sickle cell anemia awareness among health professional and medical students at the Lagos University Teaching Hospitals. The study revealed that 91.3% had heard about SCD prenatal screening, but only 75% knew that SCD could be prevented by pre-natal screening. 48% of them were not aware that prenatal screening is available in Nigeria and 42% would not allow preventive termination of pregnancy for positive screening results. The study shows that respondents do not succumb to the idea of terminating pregnancy which may be due to their belief. The study used health workers and focused on prenatal screening while the current study used student teachers and investigated on premarital screening and decisions. Another study by Abioye-Kuteyi, Oyegbade, Bello and Osakwe (2009), they conducted a survey of 320 Local Government Workers in Ile-Ife, Nigeria, on sickle cell knowledge, pre-marital screening and marital decisions. The findings show that 69% had poor knowledge about SCD, 95% had positive attitude toward premarital screening and 86.7% of the respondents and 74% of their partners had done sickle cell screening. 25% of the married and engaged respondent did not know their status. While 33-66% of the respondents indicated that they would continue with their partners if either or both had hemoglobinopathy. Actually, previous empirical studies conducted made some useful discoveries, but they are not very extensive, therefore, the need for wide spread researches in different communities become relevant, thus the current researcher envisages the need to conduct this study using different environment, approach, research design/instrument and samples.

2. PROBLEM STATEMENT

Sickle cell is one of the predominant genetically acquired killer diseases among human race. Despite the increasing number of educated people in the society and developments associated with it, it is sad to learn that the prevalence of sickle cell disease is also increasing instead of reducing. With a rising population of those affected with sickle cell as Akinyaju and Ann(1989) indicated that about 25% of adults have sickle cell trait and estimated 90,000 out of 5.4 million to be SCD and 1.1 million to be carriers. While WHO (2005) gave an estimate of 150,000 birth of sickle cell disorder in Nigeria annually. As at 2016, though no exact estimate but it is evidently becoming a popular disease in most households. This study assumes that lack of awareness, knowledge and sensitization about the SCD and improper matching of

marriage partners account for the rise in number of sickle cell birth. Traditionally, there seem to be lukewarm attitude toward blood screening before spouse selection. Traditional and customary arrangements in most society including Sokoto being the area of research does not give prominence ascertain and ensure valid and reliable laboratory genotype screening of prospective couples before entry into marriage union. Degree certificate is high educational attainment which is expected to bring about not only high level man power and resource persons but also people with high level capacity to make wise decision on matters relating to spouse selection and reproduction of healthy children . SCD is assumed to be non-curable but preventable disease. The objective of the study is to investigate the awareness attitude competence of students teachers who are being professionally trained to manage children with sickle cell conditions, on the preventive side it is assumed that since most of the student are not married ,then they form the best target group to help in addressing the prevention through their choice of spouse with compatible genotype.

3. METHODOLOGY

The study used three hundred level undergraduate students to find out their awareness and knowledge of the sickle cell condition and their attitude toward prevention and handling of learners with sickle cell disease. The study was quasi experimental with a pretest at the beginning then they were exposed to awareness and lectures and then post test. The population 750 Primary Education students, out of which 150 three hundred level students during the 2015/2016 session offering the courses child psychology and special education respectively were used for the study. The instrument was validated and found reliable with .73 reliability index.The sensitization given to the respondents was on myth , life stories and updates on sickle cell condition, while lectures were given on the causes, symptoms, prevention, educational implications and management of SCD five research questions and one hypothesis were raised and analysed using frequency count ,percentages and t-test.

4. DATA PRESENTATION

Table 1:Showing Frequency Distribution on Biodata of Respondents

Variable	Range	Male percentage	Female Percentage	Total
Sex		100 (66.67 %)	50 (33.33%)	150
Age:	18-30	92 (61.33%)	42 (28.00%)	150
	31-45	08 (5.33%)	08 (5.33%)	
Marital status	Married Unmarried	08 (5.33%)	10 (6.66%)	150

		92 (61.33%)	40 (26.66%)	
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Table 1 shows the that there are 100 male and 50 females respondent used for this study. The figures are actual number of primary education students in 300 level. The data shows that 92(61.33%) males and 42(28%) females are within the age range of 18 to 30 years and only 8 male and 8 female are above 30 years. And 92 out 100 male students representing (61.33%) ma and 40 out of 50 females students are not married. The number of unmarried students is quite high and could be sensitize on proper matching for compatible partner.

Research Questions 1: *To what extent are the primary education student teachers aware of some basic information on sickle cell disease.*

The level of awareness was measured by number of students that were able to answer questions on basic information considered essential for a potential personnel in education of children. This was ascertain pre-test and post test. Item analysis of their responses were presented in frequency and percentages.

Table 2: Showing Students Level Of Awareness On SCD .

Responses	Pretest		Post-test	
	Aware	Not aware	Aware	Not aware
Awareness of how SCD is transmitted	58(38.7%)	92(62.3%)	134(89.3%)	16(10.7%)
Awareness that it has no known cure	77(51.3%)	73(48.7%)	121(80.7%)	29(19.3%)
Awareness that it can be prevented	36(24%)	114(76%)	132(88%)	18(12%)
Awareness of pre-marital genotype screening	35(23.3%)	115(76.7%)	140(93.33%)	10(6.7%)
Awareness of prenatal genotype screening	17(11.3%)	133(88.7%)	110(73.33%)	40(26.7%)
Awareness of bone marrow transplant	17(11.3%)	133(88.7%)	112(74.7%)	38(25.3%)
Awareness of spouse genotype before marriage	00(0%)	16(100%)	00(00%)	00(100%)
Awareness of need to cross match with Genotype of prospective spouse	14(9.3%)	86(90.7)	138(92%)	12(8%)

Table 2 contain data on the pretest and post test scores on student level of awareness on some basic information about transmission and prevention of SCD. Before the interaction only 58 out 150 shows evidence of awareness of how SCD is transmitted. Similarly, the pretest scores shows that very few students had prior knowledge about how it can be prevented and that it is incurable. The post test result shows increase on number of student that show awareness of basic information on SCD. Out of the 150 respondents only eight of them were married and all of them claimed they don't know the genotype of their spouse.

Research Question 2: To what extent do the students teachers in Primary education possess necessary knowledge about sickle cell condition as prospective functional teachers?

Table2: Showing students frequency count on their knowledge of sickle cell Disease

Response s	Number	Pretest		Post test	
		know	Don't know	Know	Don't know
Knowledge of genotype	150	32(21.3%)	118(78.7%)	125(76.7%)	25(23.3%)
Knowledge of sickle cell disease condition	150	54(36.%)	96(64%)	145(96.7%)	5(3.3%)
Knowledge of how it is acquired	150	46(30.7%)	104(69.3%)	130(86.7%)	20(30%)
Knowledge of causes of sickle cell condition	150	34(22.7%)	116(77.3%)	132(88%)	18(12%)
Knowledge about symptoms	150	36(24%)	114(76%)	140(93.3%)	10(6.7%)
Knowledge about its cure	150	50(33.3%)	100(66.7%)	137(91.3%)	13(8.6%)

The data in table 2, shows item analysis of number of students that possess some knowledge on sickle cell disease before and after the treatment. Before the advocacy sessions, the pretest shows that very few students have ideas and knowledge about sickle cell conditions and the post test shows that more students were educated and show evidence of knowledge about sickle cell disease.

Question 3: What factors do the primary education student teachers consider in choice of spouse

Table 4: Factors to consider in selection of spouse

Responses	Pretest (%)	Post test (%)
Love	46 (30.66%)	15 10%
Economic status	24 (16%)	11 7.33%
Educational status	15 (10%)	12 8%
Health status	20 13.33%	13 8.66%

Compatible genotype	10	6.66%	80	53.33%
Physical appearance	17	(11.33%)	10	6.66%
Behaviour and character	18	(12%)	09	%
Total	150	(100%)	150	100

The table 4 reveals what the participants consider most in spouse selection, the initial response before that interaction shows the highest response of 46 students representing 30.66% of the respondents choose love as what they consider most in decision about spouse, this was followed by economic status and health status. While on the post test the factor with the highest response was genotype compatibility with 80(53.3%) of the respondents, followed by love with only 15 equivalent to 10% and health status with only 13(8.66%) respondents.

Research Question 4: What is the genotype distribution of respondent and their decision to marry SCD.

Table 5. Student genotype distribution and decision to marry a person with sickle cell disease.

Responses	Genotype	Pre-test		Post-test		
		Decision to marry SS	Genotype (%)	Decision to marry		
		Yes	No	Yes	No	
AA genotype	68 (45.3%)	24 (16%)	44(29.3%)	96 (64%)	47(31.3%)	38(25.3%)
AS genotype	08 (5.3%)	02 (1.3%)	06 (4%)	35(23.3%)	10 (6.7%)	05(3.3%)
SC genotype	00 (0%)	00 (0%)	00(0%)	01(0.7%)	00 (00%)	01(.7%)
No idea	74 (49.3%)	38(25.3%)	36 (24%)	18(12.7%)	9(6%)	7(4.7%)
Total	150(100%)	150(100%)		150(100)		

The table 5 shows genotype indicated by students in pretest and the genotype results obtained laboratory genotype screening for post test. 68(45.33%) of the students claim they are AA, while 74(49.33%) indicate that they don't know their genotype. The post test (laboratory results) shows that 96(64%) respondents have AA, 15(10%) are AS and only one respondent has SC genotype, while 16 (10.66%) students did not present their genotype results. On the decision to choose a person with sickle cell as spouse, a total of 64 respondents (pretest) and 66(post test) declare their willingness to choose person with SCD as marriage partner.

Hypothesis 1: There is no significant difference between student scores before and after exposure to some treatment on classroom management for SCD Learners.

This hypotheses was analyzed using t-test statistics and presented in table 4

Table 6: showing t-test scores of students on Classroom management strategies for SCD

Variabl e	N	Df	Mean s	Std deviatio n	T – cal	p- value	Remark
Pretest	150	298	29.43	12.201	6.347	P=000	Significa nt
Post test	150		76.30	9.492			

P<.05

The table 6 reveals significant difference between students score in pretest and post test on class room management skill possessed by students. Because the t-caulated value of 6.347 is greater than the p-value at significant level of p<.05. This means that providing students with privilege information on how to handle and manage SCD in classroom increase the capacity as prospective primary school teachers, thus might enhance their teachers to manage SCD learners more effectively.

Major findings

1. There was significant increase in level of awareness on SCD pre-test and post test scores of students teachers in primary education.
2. There was significant improvement in level of knowledge of SCD possessed by students teachers in primary education after exposure to sensitization and treatment.
3. There was significant change on the need to consider genotype compatibility in choice of spouse .
4. The study found fluctuation on student decision on choosing spouse with sickle cell disease .
5. The study found significant difference on pre-test and post test scores of students teachers on their capacity to manage and handle children with sickle cell condition in classroom.

5. DISCUSSION OF FINDINGS

Research question one: The study was able to establish (in table 2) that most students teachers are not aware of how SCD is acquired and also lack awareness about different preventive measures. This poses serious risk reproduction of more children with SCD. This may explain the reason for the high increase in the prevalence of the diseases indicated by WHO(2005) and Adewoyin (2015). The inference made by this study is that the students who are being trained to serve in addressing the problem of SCD, are themselves not aware of the basic hints on the transmission and preventions of the disease. Then they are likely to marry blindly without taking precaution on the genetic transmission linkage ,so as to avoid incompatible partner. The implications is that of general lack of awareness among people including prospective graduates of primary education who are suppose to serve as personnels in handling childhood education including children with S. The study further revealed that sensitization and advocacy can help to promote awareness and consciousness on SCD so as to address it systematically .

Research question two assess the level of knowledge possessed by respondent and was captured in table 3. The

table provides evidences on lack of necessary knowledge by student teachers in pretest, which was improved upon through subjecting them to advocacy and lessons on sickle cell in post-test result. Actually children with SCD are faced with various problems, teachers who are to handle them need to be conversant with signs, symptoms, complications and the limitations the sickness posed to their educational pursuit which may invariably influence psycho-social, emotional, physical, general wellbeing and life of SCD learners. The issue is though, special education is part of course taught in teacher training programmes in universities, but it was observed that sickle cell disease is not covered in the course content. As such many student are likely to graduate without awareness or knowledge of the disease, its complications and their roles as teachers in helping learners with SCD.

Research question three was on factors that students consider in choice of marital spouse. The study discovered as shown in (Table 4) that respondents do not give prominence to genotype matching of prospective partner in pretest (6.6%) but in the post test 53% of the respondent indicated genotype compatibility as a vital factor to be considered. How the clue deduced from this study is that when students are well informed, they became conscious that they can avoid giving birth to offspring with sickle cell condition even when one is a carrier (AS) or even sufferer (SS). They were also capable of weighing the problem and consequences of wrong matching. This means that adequate sensitization can help to intimate people on the need to be cautious in selection and proper match of marriage partner as a vital factor for reproduction of healthy children, their wellbeing and happiness of the family. The complications and constrain cause by sickle cell disease condition is not limited to the children or sufferer but to a large extent the parents as primary care givers are as well very much affected in so many ways. It may tell very much on job efficiency of teachers who become parents of SCD children. For this reason raising awareness of student teachers early before they become parents is considered necessary.

Research question four tries to find out whether the respondents know and did genotype test. The study was able to establish (Table 5) that most of the respondents do not know or test for their genotype in pretest. But in the post test it was found that 132 out 150 respondent were able to produce their laboratory test results indicating high percentage(64%) of AA genotype and 24% of AS genotype. The students were intimated to go recognized and reliable test and the need to do repeat confirmatory test to ascertain the reliability of the first one. However most of the candidates (pretest) declare that they will not marry an SCD, but in post test more 31% as against the initial 24% show their readiness to marry a spouse with sickle cell disease. The study found that respondent with AA genotype decline to marry SCD, which the only right match for SCD, while ironically those with AS are willing to take SS as spouse. The reason often given by those with AA is that they want to avoid problem of ailments, complication and the demand

that goes with it. While the case of AS respondents declaring to marry another AS pose great danger as it will lead to recycling of more SS genotype, which is detrimental to generation of healthy and viable human race.

One hypothesis was generated and tested using t-test (table 6). It was established by this study that it is not awareness and knowledge of sickle cell disease condition but teachers need to comprehend the peculiarities of SCD learners and the management and intervention strategies to help them overcome the difficulties in educational their pursuits.

6 IMPLICATIONS FOR STRENGTHENING CHILDHOOD EDUCATION.

The findings of this study could serve as a panacea for strengthening childhood education.

Nigeria is among of the countries in the world that declared education as birth right as such is decreed to be Education For All, through the UBE 2004 ACT. However, in reality sickle cell children are not getting adequate and desired service from stake holders. Many researches WHO (2014); Aneke and Okocha(2015); Ezenwosu, Chukwu and Ikefuna, (2015), Alege(2015), had provide a lot of insight in to the increasing trends of carriers and sufferers of SCD with various disposition on the nature of recurrent pain, complication they have to live with, which dully interfere with many aspect of their life including education. The findings of this study suggest that our student teachers are not very much aware of the SCD condition and the predicaments associated with it. And that many of them are not married that is when to get them know that simple blood screening can avert the birth, suffering and demand for special need education for SCD learners. Thus the need to strengthen education of children cannot be fully attained when teachers are inadequately equipped with knowledge and skill to prevent, manage and salvage the suffering of increasing population of SCD learners. Due to the nature of their ailment, they miss school attendance, lessons, assignments, tests and exams very often which are not always compensated for by teachers, putting them at high risk of school failure. They also encounter psycho social and emotional problems in schools which are neglected, thus making them the marginalized or disadvantaged school learners.

1. General awareness and sensitization is very necessary using media, schools, hospitals, community meeting points, in public gathering to enable every citizen be part of the venture to reduce and address the need of SCD,

2. Colloborative teamwork involving all relevant stakeholders such as medical, educational, social welfare, parents, community leaders and civic organization to work as team to address the needs of the SCD patients.

3. There is dire need to customize premarital screening in all communities to certified and match prospective couples before marriage to reduce birth of AS and SS traits. Those

with AA genotype should be encouraged and assisted to marry SS Genotype.

4. The Federal and State governments should set up special school for people with SCD and equip the schools with personnel that have stake in their management. It is virtually not easy for classroom teachers to handle both SCD and normal learners in the same class. The demand may be too much for them to cope with.

5. All teacher training courses and programme should offer in depth study of sickle cell condition to enable them attend to their needs as teachers. While all students in higher institution should be expose to information about SCD, and be sensitized to screen their blood and make proper choice of reproductive partner.

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