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KNOWLEDGE AND ATTITUDE OF UNIVERSITY OF THE GAMBIA, MANAGEMENT DEVELOPMENT INSTITUTION, GAMBIA TECHICAL TRAINING INSTITUTION AND THE GAMBIA COLLEGE STUDENTS TOWARDS SICKLE CELLED DISEASE IN THE GAMBIA

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ABSTRACT

***Objective*: To investigate the association between Knowledge and attitude of students towards sickled celled disease.**
***Design*: A cross sectional descriptive**
***Setting*: Student attending face to face lectures in the various campus**
***Subject or participants*: Students attending The University of The Gambia (UTG), Management Development Institute (MDI), The Gambia College and The Gambia Technical Training Institute (GTTI).**
***Interventions*: one to one interview**
***Data analysis*: Data was analyze using Statistical Package for Social Science version 22 and p-value≤0.05**
***Main outcome measures*: knowledge on SCD, transmission and attitude to the disease**
***Result and conclusion*: This survey show that, students from UTG had the most understanding of SCD (78%) followed by students from MDI (75.5%) while students from GTTI (56%) had the least knowledge of SCD. The Chi square result also demonstrates that practically all of the variables on SCD knowledge had a high level of statistical significance. There was a strong correlation between students from the various institutions in this study and the variable questions on**

attitude but there was also no statistical significance with students' attitude towards SCD. The survey revealed that the majority of students enrolled in Tertiary Institutions in The Gambia have heard about SCD, they have good attitude and belief of SCD. However, a few of them have poor Knowledge and attitude towards SCD. Half of the students indicated that they had learned about SCD in schools.

INTRODUCTION

Sickle cell disease (SCD) is a monogenetic disease that affects people all over the world [1, 2, 3]. SCD primarily affects people of African heritage and persons (or their descendants) from tropical and subtropical regions of the world where malaria is or was prevalent, such as persons of Hispanic, Mediterranean, or Southeast Asian origin in the United States [1, 2, 4]. Patients with sickle cell trait have elevated chance of malaria infection at least in part due to compromised splenic function, which could explain why SCD is so common in Africa [5, 6, 7]. Sickle cell disease is caused by the inheritance of two mutated alleles, causing red blood cells to take on the appearance of a "sickle" when oxygen tension is low and it is characterized by varying degrees of chronic haemolytic anemia, recurrent debilitating pain, and a variety of clinical sequelae, such as an increased risk of infection, stroke, lung disease, splenic dysfunction, and bone infarction [6, 8, 9, 10, 11]. The polymerization of deoxygenated hemoglobin S (HbS) causes erythrocyte destruction, and these injured cells have aberrant structures and expression of adhesion molecules. This causes hemolytic anemia and occlusion of small blood arteries, resulting in vaso-occlusion and perhaps organ failure. Multicellular adhesion of red blood cells, white blood cells, platelets, and endothelial cells, for example, causes a severe vaso-occlusive crisis [12, 13]. Research has shown that omega-3 fatty acids are effective and safe treatment alternatives for patients with SCD. Notwithstanding, omega-3 fatty acids and their active metabolites have well demonstrated pleiotropic biological actions-anti-inflammatory, inflammation resolving, anti-adhesion, anti-aggregation, vasodilatory and antioxidant. In preparation for World Sickle Cell Day in 2020, the Honorable Minister of Health, Dr. Samateh, stated that there is already a Sickle Cell Association in The Gambia with over a hundred members, but lack of resources has hampered their progress for the previous seven years. He went on to say that in the Nuimis, there is a village called Tankular in Kiang Keneba where 90 percent of the people have SCD. The community is known as "sickle cell village" because of the high rate of intermarriage among people, which has resulted in an outbreak of the disease [14]. However, our research has shown that there is little or no work that has been done on this topic hence this work would be the first of its sort in The Gambia. As a result, the goal of this research is to analyze current knowledge and beliefs towards sickle cell anemia among students in tertiary institutions in The Gambia.

MATERIALS AND METHOD

Study location: This study was conducted in four public institutions in The Gambia namely: The University of The Gambia (UTG), The Gambia College, Management Development Institution (MDI) and The Gambia Technical Training Institution (GTTI).

Sample size calculation: A cross-sectional study was conducted in May 2021. Participants were

carefully chosen using a random sampling approach of students who were found on campuses and who also consented to participate in this study. Sample size for this study was determined using the formula described by Thrusfield [15], based on 95% confidence interval.

$$N=\frac{Z^2pq}{d^2}$$

Where N= sample size
Z= appropriate value for the standard normal deviation for the desired confidence interval (1.96) Since there was no data on similar study, a prevalence of 50% was assumed for this study. However, using the above formula, 384 was obtained and this was further multiplied by 10% for sampling error. As a result, a total of 431 students were chosen for this study, which was then computed based on the total number of students enrolled in each institution.

Method of data collection: This study is a descriptive cross-sectional survey involving students attending higher education institute in The Gambia. Four institutions were randomly selected for the survey. A written ethical approval was obtained from all the institutions before embarking on this study. A total of 431 students participated in this study. The purpose of the study was to explain to the participants and those who volunteered to participate in the study were interviewed. The questionnaires were first pretested on 10 UTG and College students. A total of 4 questions were asked to determine respondent's knowledge of SCD, 5 questions were asked with respect to their beliefs and 8 questions to determine their attitudes toward SCD. To prevent using any external sources of information, such as the internet, questionnaires were filled out in the presence of the researchers.

Data Analysis: The data were first entered into excel software and then exported to SPSS version 22 (SPSS Inc., Chicago, Ill., USA). All statistical analyses were performed using SPSS. The relationship between demographic characteristics, sickle cell information and participant's knowledge were performed using chi-squared test. Significance level was determined at $p<0.05$. Pearson's chi-square was used to compare variables. The level of statistical significance was established at $p<0.05$. The students' perception was scored when average correct answers for knowledge, belief and attitude towards SCD were >40 % = poor perception, 41-55 % average, 56 -75 % = good knowledge and 76-100 % very good perception.

RESULT

Demographic Data: A total of 431 students participated in this survey. Most of the respondents (table 1) were females 227 (53%). Of the respondents, 40.4% were between the age range of 30-39. A total of 185 (43%) of the respondents were recruited from The Gambia College School of Agriculture and School of Education. Moreover, of the respondents, 78.7% was single during the course of this study.

Table 1

Demographic characteristics participants

Characteristics	Frequency	Percentage
Sex		
Male	204	47
Female	227	53
Age		
18-29	166	38.5
30-39	174	40.4
40-49	59	13.7
50-59	25	5.8
60-69	4	0.9
>70	3	0.7
Marital status		
Married	87	20.2
Single	339	78.7
Divorce	3	0.7
Separated	2	0.5
Religion		
Muslim	379	88
Christianly	52	12
Ethnic Group		
Mandinka	147	34
Wolof	86	20
Jola	61	14
Fula	59	14
Others	78	18
Program		
Certificate	78	18
Diploma	120	28
Advance Diploma	90	21
Bachelor's degree	143	33
Institution		
UTG	143	33
MDI	41	10
GTTI	62	14
Gambia College	185	43

Knowledge and belief of Sickled Celled Disease: In this survey, 314 respondents (73%) had heard of SCD (table 2), and 164 respondents (38%) claimed they had formally learned about SCD in schools and that this was their source of information (figure 1). Table 2 further shows that the majority of respondents (93.7%) had never had a sickle cell test and that 331 (76.8%) of those surveyed are unaware of their SCD status.

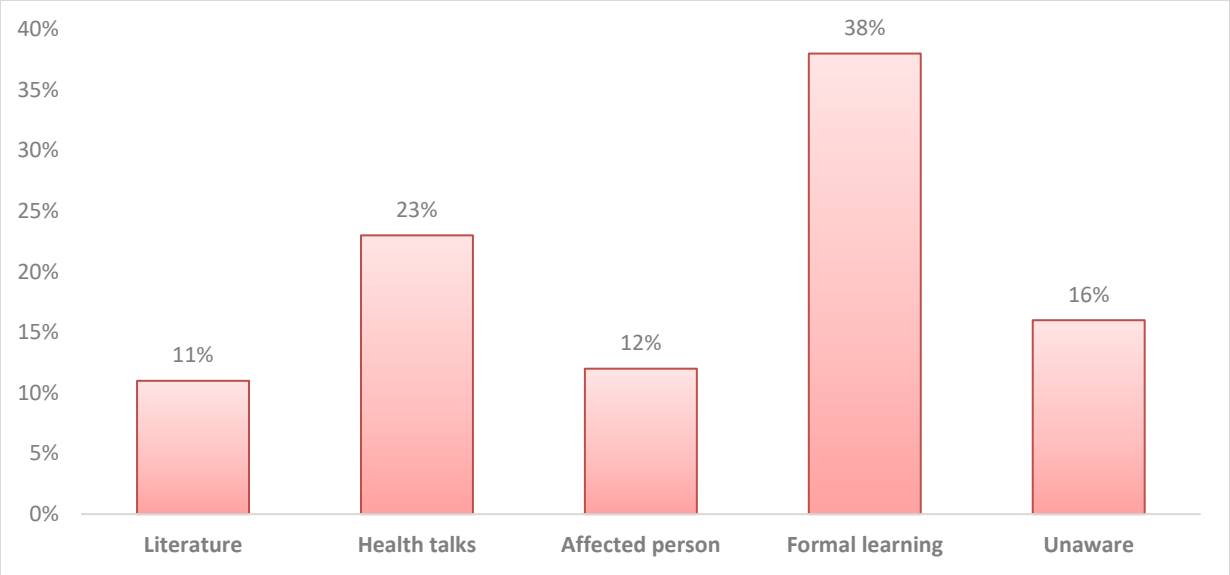

Figure 1: *Source of SCD awareness among the students*

Table 2

Knowledge of sickle cell among participants

Knowledge	n (%)	UTG	MDI	GTTI	College	P value
Are you aware of SCD	Yes	112(26)	31(7.2)	35(8.1)	136(31.6)	0.01*
	No	31(7.2)	10(2.3)	27(6.3)	49(11.4)	
Have you done the test for SCD?	Yes	10(2.3)	2(0.5)	4(0.9)	11(2.6)	0.887NS
	No	133(30.8)	39(9.1)	58(13.5)	174(40.4)	
Do you know your genotype?	Yes	38(8.8)	5(1.2)	22(5.1)	35(8.1)	0.029*
	No	105(24.4)	36(8.4)	40(9.3)	150(34.8)	

Attitude of students towards Sickled Celled Disease patients: Majority of the participants 71.9% showed positive attitude in terms of care and 81.4% having sympathy for people with SCD. Almost half (45%) of the participants disagree to end their relationships if they discover that their genotypes predispose them to having children with SCD, approximately 12.1% of the students could not decide whether they would choose not to have a child than to give birth to a child with SCD (Table 4).

Table 4

Number and percentage of participants' answers for questions related to attitude towards SCD

Attitude	n (%)	UTG	MDI	GTTI	College	P value
We should worry less about people with SCD since they may die soon.	Strongly agree	5(1.2)	1(0.2)	7(1.6)	12(2.8)	0.308^{NS}
	Agree	15(3.5)	4(0.9)	11(2.6)	23(5.3)	
	Neither agree nor disagree	13(3)	5(1.2)	8(1.9)	17(3.9)	
	Disagree strongly	61(14.2)	14(3.3)	14(3.3)	69(16)	
	Disagree	49(11.4)	17(3.9)	22(5.1)	64(14.9)	
I feel sympathetic for people with SCD.	Strongly agree	58(13.5)	16(3.7)	24(5.6)	81(18.8)	0.264^{NS}
	Agree	62(14.4)	19(4.4)	20(4.7)	71(16.5)	
	Neither agree nor disagree	13(3)	2(0.5)	8(1.9)	16(3.7)	
	Disagree strongly	6(1.4)	3(0.7)	6(1.4)	4(0.9)	
	Disagree	4(0.9)	1(0.2)	4(0.9)	13(3)	
Irrespective of my genotype I will not marry someone with SCT/SCD.	Strongly agree	22(5.1)	8(1.9)	6(1.4)	37(8.5)	0.635^{NS}
	Agree	44(10.2)	12(2.8)	22(5.1)	50(11.6)	
	Neither agree nor disagree	35(8.1)	8(1.9)	12(2.9)	29(6.7)	
	Disagree strongly	14(3.3)	3(0.7)	7(1.6)	22(5.1)	
	Disagree	28(6.5)	10(2.3)	15(3.5)	47(10.9)	
I will end my relationship if I discover that our genotypes predispose us to having children with SCD.	Strongly agree	18(4.2)	5(1.2)	5(1.2)	36(8.4)	0.144^{NS}
	Agree	34(7.9)	5(1.2)	15(3.5)	41(9.5)	
	Neither agree nor disagree	35(8.1)	9(2.1)	9(2.1)	25(5.8)	
	Disagree strongly	17(3.9)	6(1.4)	11(2.6)	30(7)	
	Disagree	39(9.1)	16(3.7)	22(5.1)	53(12.3)	
I will choose not to have a child than to give birth to a child with SCD.	Strongly agree	15(3.5)	1(0.2)	0(0)	18(4.2)	0.127^{NS}
	Agree	19(4.4)	9(2.1)	13(3)	39(9.1)	
	Neither agree nor disagree	19(4.4)	8(1.9)	9(2.1)	20(4.6)	
	Disagree strongly	32(7.4)	7(1.6)	12(2.8)	47(10.9)	
	Disagree	58(14)	16(3.7)	28(6.5)	61(14.2)	
Willingness to marry another carrier partner despite knowing risk of SCD Births.	Strongly agree	7(1.6)	2(0.47)	3(0.7)	21(4.9)	0.129^{NS}
	Agree	32(7.4)	6(1.6)	14(3.4)	41(9.5)	
	Neither agree nor disagree	23(5.4)	14(3.3)	11(2.6)	28(6.5)	
	Disagree strongly	24(5.6)	8(1.9)	7(1.6)	32(7.4)	
	Disagree	57(13.3)	11(2.6)	26(6.1)	63(14.7)	
I will abort unborn baby following prenatal diagnosis of SCD.	Strongly agree	8(1.9)	3(0.7)	2(0.5)	9(2.1)	0.704^{NS}
	Agree	15(3.5)	6(1.4)	8(1.9)	21(4.9)	
	Neither agree nor disagree	19(4.4)	7(1.6)	8(1.9)	18(4.2)	
	Disagree strongly	49(11.4)	6(1.4)	20(4.6)	56(13)	
	Disagree	52(12.1)	19(4.4)	24(5.6)	81((18.8)	
Legislation against marriage union between two SCD trait carriers.	Strongly agree	8(1.9)	3(0.7)	2(0.45)	9(2.1)	0.704^{NS}
	Agree	15(3.5)	6(1.4)	8((1.9)	21(4.9)	
	Neither agree nor disagree	19(4.4)	7(1.6)	8(1.9)	18(4.2)	
	Disagree strongly	49(11.4)	6(1.4)	20(4.6)	56(13)	
	Disagree	52(12.1)	19(4.4	24(5.6)	81(18.8)	

DISCUSSION

SCD is a burdensome chronic hereditary blood illness that has a psychosocial, emotional, and frequent painful impact on affected persons as well as a financial impact on their family. Prospective partners must be aware about SCD in order to make informed decisions about their reproductive possibilities. A good proportion of the students in this research (73%) were aware of SCD. The majority of student's knowledge came from what they have learnt in school (38%). This finding was comparable to that of Boadu & Addoah [6], who found that the majority of students at the University of Ghana campus had had formal education in SCD. This finding on the other hand, differed from that of Ameade et al., (2015). Who demonstrated that the majority of respondents in Tamale, Ghana, were aware of SCD through mass media. It was quite amazing that, even though most of the students were aware of SCD, majority of the students 93.7% of them had never done SCD test to determine their status and 76.8% of the respondents do not also know their genotypes for sickle celled gene. This result on lack of knowledge on SCD genotype was similar to the findings of others authors [16, 17]. Similarly, this result was quite different from the findings of [6]. Boadu & Addoah [6], reported that 98.6% of the students in the University of Ghana have knowledge of SCD. In this study, it is observed that students' lack of knowledge on SCD status could be attributed to the fact that SCD testing is not a requirement for entering into high education institutions in The Gambia and a matter of fact, most student do not see the need to get tested for SCD. Generally, students from The University of The Gambia had the most understanding of SCD (78%) followed by students from Management Development Institution (75.5%) while students from The Gambia Technical Training Institution (56%) had the least knowledge of SCD. High educational levels and social awareness among students have been linked to extensive and good knowledge about SCD, which could explain the above observation. The Chi square result in this study in table 2, demonstrates that practically all of the variables on SCD knowledge had a high level of statistical significance. This is true testimony that, students are well informed about SCD.

Almost half (43.3%) of the participants belief that, SCD is evil disease. Thirty-eight percent of the students from UTG, 35% from College, 5% from MDI and 22% from GTTI strongly agreed that SCD is an evil disease. The majority of the participants were well-versed in SCD or trait inheritance patterns (67%). This is in agreement with the finding a study that was carried out in Nigeria [18], as they were able to show that, the majority of their community survey respondents had corrected general knowledge about the genetic basis and severity of SCD. This study contradicts previously published data indicating a lack of understanding of SCD transmission among respondents [6,19]. Furthermore, 81% of respondents believed that SCD is a bad disease, and 79.8% of students disagreed when asked if SCD can't run in a family that believe in GOD. Furthermore, the majority (75.6 percent) felt that genetic testing before marriage demonstrates a lack of confidence in GOD. This demonstrates the great necessity and benefits of genetic testing as a preventive tool for SCD control. This result is consistent with a previous study in Ghana [6], who found that the vast majority of students interviewed favored genetic testing for SCD prevention. Students from UTG (64%), MDI (60%), and College (63%) had a positive perspective, whilst students from GTTI (53 percent) had an average attitude about sickle cell illness. In

general, students' total survey scores (62%) indicated that they had a positive attitude toward SCD, which was commendable. Chi-square result in table 3 shows that, there is a strong correlation between students from the various institutions in this study and the variable questions on attitude. This further demonstrated that, students have a good attitude towards SCD. The majority of students (71.9%) indicated they will worry and care about persons who have SCD, and 81.4% also said they had sympathy for people who have this genetic illness. This attitude matched the findings of Boadu & Addoah [6].

In contrast to the majority of students' positive attitudes, 16.9% strongly agreed and 29.9% agreed that they would not marry someone with SCD regardless of their genotype, and 33.9% said they would end their relationship if they discovered their genotypes predispose them to having children with SCD. About One fourth of the students strongly agreed and 37.8% of them responded that they will choose not to have a child than have a child with SCD. A similar study was conducted in Ghana, where 56% of students in the University of Ghana agreed to put off their marriages if they discovered genetic incompatibility [6]. This could be because respondents are fully aware of the emotional and psychosocial trauma that that SCD patients go through and will not want to be found in such a situation. The study found that 13.5% of students highly support legislation prohibiting the marriage of two SCD carriers, and 23.7% of students strongly support legislation prohibiting the marriage of two SCD carriers. This outcome was in line with a study that was conducted in Oman [20]. They also revealed that 19% of those polled agreed that regulations requiring premarital carrier screening should be enacted. In this study, the Chi square result in table 4 shows that virtually all of the variables affecting SCD attitude had no statistical significance. This shows that students have a generally low attitude regarding SCD. In general, a little more than half of the students in this study had a good attitude (56%) about SCD, with students from the college having the most positive attitude (59%), students from UTG (56%), GTTI (52%), and MDI having the least (51%).

CONCLUSION

In conclusion, the survey revealed that the majority of students enrolled in tertiary institutions in The Gambia had a very good knowledge and attitude towards SCD. In this study, it shows that half of the students indicated that, they had learnt about SCD in school. To improve this result and to reduce SCD in The Gambia, it is recommended that health education should be made compulsory in all secondary and tertiary institutions teaching and learning curricula in The Gambia. SCD education among other genetic diseases should be included in this curriculum. Tertiary institutions in The Gambia, especially the University of The Gambia should take the lead in raising awareness through seminars and conferences for reducing morbidity and mortality related to SCD in The Gambia.

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