UDS International Journal of Development [UDSIJD]
Special Issue, Volume 10 No. 1, 2023
https://www.udsijd.org
ISSN: **2026-5336**

KNOWLEDGE, BELIEFS, AND ATTITUDE TOWARDS SICKLE CELL DISEASE AMONG SENIOR HIGH SCHOOL STUDENTS IN TAMALE METROPOLIS

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Abstract

Sickle cell disease (SCD) is a hereditary disease that comes with many complications, such as vaso-occlusive crises and anemia. The SCD is now a public health problem due to its global spread. As a result, the incidence of it in Ghana has increased drastically over time. The research was conducted among Senior High School students from Forms 1-3 to assess their knowledge, beliefs and attitude towards SCD. The data collection was carried out in four selected schools in the Tamale Metropolis. Participants engaged in the study were 386 and their ages ranged from 15 to 24 years, with a mean of 17.94 years (SD: 6.28). About 47% of the students were in the 18 - 20 age range, the 23-24 age range accounted for 3.11% of the entire sample, the 15-17 age range was 44.30%; and 21-22 age range was 5.44%. Eighty one per cent (81.0%) of the participants have heard of SCD with just a few of them (11.66%) knowing their sickle cell status. Some 31% perceived SCD as curable; while 30.05% perceived it as not curable. However, 18.13% and 20.47% reported that they were not sure or did not know whether SCD is curable or not, respectively. A large number of them (48.70%) indicated they would seek spiritual intervention when they have SCD. The beliefs of students on SCD included the belief that SCD is acquired at birth (72.28%), through sexual intercourse (20.21%, 78), spiritual means (13.47%) or it is airborne (3.37%), and through food (1.5%). Regarding their attitudes toward SCD, 88.34% had not been screened for SCD, and the reasons assigned included not falling sick easily (22.22%), and not considering it as necessary (14.53%), as well as the fear of testing positive (13.11%). It was concluded, even though most participants had heard about SCDs, only a few knew their SCD status. There was a statistically significant associations between the student's class and knowledge of SCD and the course of study. Participants believed that the SCD can be transmitted at birth or through sexual intercourse, airborne, food and spiritually. Generally, there was poor attitude towards SCD by students.

Keywords: Knowledge, Beliefs, Attitude, Sickle Cell, Disease

Introduction

Sickle cell disease (SCD) is a hereditary disease that occurs as a result of the presence of abnormal hemoglobin called hemoglobin S (HbS) (Moumni et al., 2016). During deoxygenation, the red blood cell (RBC) changes its shape from biconcave to sickle shape due to the abnormal hemoglobin (Aljabry et al., 2019). RBC changes its shape back to the biconcave shape after reoxygenation (Aljabry et al., 2019). Nonetheless, the recurrent sickling and unsickling lead to hemolysis and anemia (Moumni et al., 2016; NHLBI, 2002). The rigidity, glueyness, and sickled-shaped red blood cells make the cells gather together and block the blood vessels. This causes blockage in the movement of blood and oxygen in the body (Behrens & Cymet, 2000; Serjeant, 2013; Stuart & Nigel, 2004; Fowora, 2016). Normal red blood cells have a longer life span than sickled-shaped red blood cells. The sickled nature of the red blood cells causes its collapse and easy breakdown (NHLBI, 2002; Stuart & Nigel, 2004; Fowora, 2016). Complications were seen among people with sickle cell disease resulting from the sickled red blood cells (John Hopkins University, n.d; NHLBI, 2002; Stuart & Nigel, 2004; Fowora, 2016). People with sickle cell trait often have a normal life expectancy as persons with normal hemoglobin genes (Behrens & Cymet, 2000; Serjeant, 2013). Sickle cell disease is most common among people with lineages from African countries (Oguntoye et al., 2019). About 300,000 children are born yearly with hemoglobin illnesses, comprising about 200,000 newborns with sickle-cell disease cases in Africa (WHO, 2006; Anie et al., 2010). Worldwide, more people are sickle cell carriers (i.e., people who inherited one mutant gene from one parent) than those who have sickle-cell disease (WHO, 2006). Sickle cell disease originated in humid regions because of its benefits against malaria (Anie et al., 2010). The sickle cell gene is very common in Africa. The sickle cell trait has some resistance against falciparum malaria during the dangerous early childhood periods, favouring their existence and future spread of the abnormal gene (WHO, 2006). When two abnormal

DOI: https://doi.org/10.47740/784.UDSIJD6i

genes are inherited, one gets sickle-cell anemia, but the inheritance of a single abnormal gene can protect against malaria (WHO, 2006). Children with sickle-cell anemia easily get sick or die from malaria, and there is growing evidence that malaria in Africa is influencing SCD
(WHO, 2006). SCD leads to infant death if not treated, and it has been recognized as a global burden that affects health (Anie et al., 2010). About 2% of all children born in sub-Saharan Africa have SCD (WHO, 2006). The prevalence of the sickle-cell trait (persons who inherited a mutant gene from one parent) is between 10% and 40% in Africa. It reduced significantly in North Africa, thus between 1% and 2%. When measuring under-five mortality, sickle-cell disease contributes to about 5% in Africa, and more than 9% transpire in West Africa (WHO, 2006). More than 2% of the population are born with SCD in Ghana every year, and about 25% to 30% are sickle cell carriers (Ohene-Frempong et al., 2008).

Pain is very common among sickle cell patients (Edwards et al., 2005). Clinical conditions of the disease comprise anemia, vaso-occlusive crises (bone and muscle pain caused by blockages in the blood vessels), increased susceptibility to infection, tissue destruction, and organ damage (Anie & Green, 2015). The pain associated with SCD reflects in the type of names given to the disease in certain parts of West Africa (Anie et al., 2010). For instance, in Ghana, SCD is called 'Ahotutuo' by the people who speak Twi, which means 'body biting,' 'body chewing,' or 'beaten up' in English (Anie et al., 2010). It is called 'chwechweechwee' among the Ga people and 'nuidudui' among the Ewe people (Konotey-Ahulu, 2005). The nature of pain associated with SCD seems to depict the resonance of the letters captured in those names. Pain associated with SCD may not always be present, but patients may experience other crises related to SCD throughout their lifetime (Anie et al., 2010).

The average survival age of sickle-cell patients in Africa is less than five years (Olatona et al., 2012). SCD contributes to about 50% to 90% of infant deaths in Africa (Grosse et al., 2011). In Ghana, SCD is one of the significant causes of childhood morbidity and mortality. The 41st Annual Convention of the Sickle Cell Disease Association of America (SCDAA) in September 2013 showed that globally about 5,476,407 people have Sickle Cell Trait (AS) and 312,302 people have Sickle Cell Anaemia (SS). Sub-Saharan Africa takes about 75.5% of the total number, representing 3,580,207 for Sickle Cell Trait (AS), and 235,681 have Sickle Cell Anaemia.

Proper public health awareness is essential for the management of SCD. In Ghana, about 5,815 people had Sickle Cell Disease in 2010, with an estimated 32.3% growth globally, 46.0% increase in the Sub-Saharan regions, and a 17.9% increase by 2050 (Piel et al., 2013). The lifespan of SCD patients has been enhanced, so they can now live to the fullest. This was achieved by using general prophylactic and other corrective measures. A study among university students at the University of Ghana found limited understanding and inadequate knowledge of SCD, especially about heritage patterns (Boadu & Addoah, 2018). A survey conducted in Ilorin, Nigeria, among new university graduates showed that the participants had poor knowledge of SCD (Adewuyi, 2000). Similar research conducted in Benin City, Nigeria, revealed that most students (55.1%) did not know their genotype, and only 18% had some right ideas about the disease (Bazuaye & Olayemi, 2009). A study from Ghana also showed a knowledge gap regardless of the prevalence of sickle cell carrier status and the current newborn screening programme in Ghana (Paula et al., 2011). It is essential to educate people on the misconceptions about SCD and make them understand the risks of having a child with SCD.

METHODOLOGY

Study Area

The study was conducted in the Tamale Metropolis in the Northern Region of Ghana. The Tamale Metropolis comprises the Tamale Central, the Tamale South, and the Tamale North constituencies and is one of the 26 districts in the Northern Region. It is located in the central part of the Region and shares boundaries with the Sagnarigu District to the west and north, Mion District to the east, East Gonja to the south, and Central Gonja to the southwest. Geographically, the Metropolis lies between latitude 9º16 and 9º34 North and longitudes 0º 36 and 0º 57 West. The Metropolis has a total estimated land size of 646.90180sqkm (GSS, 2010).

Research Design

A quantitative research approach was used in the study. A cross-sectional study design examined senior high school students' knowledge, beliefs, and attitudes towards sickle cell disease in the Tamale Metropolis.

Study Population

This study consisted of students from SHS (year 1 to year 3) in the Tamale Metropolis. SHS 1 to SHS 3 was selected; this was used to help determine whether years in training would impact the topic under study.

Table 1: Distribution of Sex, Age, Form, Religion,

Variable		Frequency	Percent
Sex	Male	168	43.5
	Female	218	56.5
Age	15 - 17	171	44.3
	18 - 20	182	47.2
	21 - 22	21	5.4
	23 - 24	12	3.1
Form	One	165	42.8
	Two	141	36.5
	Three	80	20.7
Religion	Christian	118	30.7
	Islam	265	68.8
	African Traditional Religion	2	0.5
Course	General Science	129	33.4
	Home Economics	121	31.4
	General Arts	73	18.9
	Business	63	16.3

DOI: https://doi.org/10.47740/784.UDSIJD6i

Distribution of Age, Sex, and Course of Study

Table 2 presents the distribution of age, sex, and course of study results across the four sampled schools. About 47% of the students interviewed were in the 18 - 20 age range, representing the highest proportion. This breaks down to 13.99% in Ghanasco (B), 13.73% in Bisco (A), 13.21% in Ambariya (C), and 6.22% in the Vittin SHS (D). Students between ages 23 and 24, representing the lowest proportion of the sample, accounted for about 3% of the entire sample. Regarding the sex distribution, the majority (56.48%) of the students interviewed were females, with the remaining about 44% reported as males. The highest number (33.42%) of students interviewed pursued General Science, 31.35% were Home Economics students, 18.91% were General Arts students, and the remaining 16.32% offered Business.

Table 2: Distribution of Age, Sex and Course Across Selected Schools

Variables		A		B		C		D		Overall Mean	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Age	15 - 17	54	14.0	57	14.8	38	9.8	22	5.7	171	44.3
	18 - 20	53	13.7	54	14.0	51	13.2	24	6.2	182	47.2
	21 - 22	5	1.3	7	1.8	8	2.1	1	0.3	21	5.4
	23 - 24	7	1.8	4	1.0	1	0.3	0	0.0	12	3.1
Sex	Male	60	15.5	42	10.9	45	11.7	21	5.4	168	43.5
	Female	59	15.3	80	20.7	53	13.7	26	6.7	218	56.5
Course	Home Economics	41	10.6	40	10.4	25	6.5	15	3.9	121	31.4
	General Science	40	10.4	9	2.3	30	7.8	20	5.2	129	33.4
	General Arts	18	4.7	22	5.7	23	6.0	10	2.6	73	18.9
	Business	20	5.2	21	5.4	20	5.2	2	0.5	63	16.3

Distribution of Sex, Form, and Course Across Age Groups of Students

From Table 3, 47.15%, constituting the highest number of students, were aged 18 and 20. Also, 24.87% of the 15 - 17 age category were females, with the remaining 19.43% males. Additionally, most of these students were in Form 1, pursuing General Science. About 5% of the students (3.89% male and 1.55% female) were aged 21

Table 3: Distribution of Sex, Form, and Course Across Age Groups of Students

		15-17		18-20		21&22		23&24		Pool	
Variables		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Sex	Male	75	19.4	73	18.9	15	3.8	5	1.3	168	43.5
	Female	96	24.9	109	28.2	6	1.6	7	1.8	218	56.5
Form	One	89	23.1	70	18.1	3	0.8	3	0.8	165	42.8
	Two	65	16.8	64	16.6	10	2.6	2	0.5	141	36.5
	Three	17	4.4	48	12.4	8	2.1	7	1.8	80	20.7
Course	Home Economics	55	14.3	56	14.5	5	1.3	5	1.3	121	31.4
	General Science	65	16.8	55	14.3	5	1.3	4	1.0	129	33.4
	General Arts	28	7.3	38	9.8	4	1.0	3	0.8	73	18.9
	Business	23	6.0	33	8.6	7	1.8	0	0.0	63	16.3

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and 22. The distribution of this age group in terms of their forms includes 2.59%, 2.07, and 0.78% for Form 2, Form 3, and Form 1, respectively. Again, 1.81% of the students in this category were Business students, 1.3% were General Science and Home Economics Students, and the remaining 1.04% were General Arts students.

Level of Knowledge on Sickle Cell Disease Among Participants

About 81% of the participants have heard of SCD, and the majority of them, 38.08%, heard it from their friends (Table 4). A few (11.66%) knew their sickle cell status, and the majority (88.34%) did not know their status. About 44% were of the genotype AA, 34.88% were of the genotype SS, 18.60% were of the genotype AS, and 2.33% were of the genotype SC. About 7% of the participants responded that they had family members who suffered from SCD, and 59.22% responded none of their family members had SCD. The rest of the 33.51% were not sure if any family members had the disease or not. About 15% knew people outside their families who had SCD, 67.27% did not know anyone outside their family having SCD, and 17.92% were unsure if they knew anyone outside their family who had the condition.

Table 4: Knowledge of Sickle Cell Disease

Students' knowledge on SCD		Freq	Percent
Have you ever heard of SCD	Yes	313	81
	No	73	19
If yes, from where?	Relatives	31	10
	Friends	123	38
	Health personnel	97	30
	Media	48	15
	Others	24	7
Do you know your status	Yes	45	12
	No	341	88
If yes, which of the following is it?	AA	19	44
	SS	15	35
	AS	8	19
	SC	1	2
Does anyone in your family have SCD?	Yes	28	7
	No	228	59
	Not sure	129	34
Do you know anyone outside the family?	Yes	57	15
	No	259	67
	Not sure	69	18

Association Between Sociodemographic Characteristics and Level of Knowledge on SCD

Further, a Pearson's chi-square test of association was conducted to examine any statistical associations between whether the students have heard about SCD and the characteristics mentioned (Table 5). Out of 386 students, the majority (81.09%) responded in the affirmative that they have heard about SCD across age groups. However, the remaining 18.91% reported that they had not heard about SCD. However, the statistical association test was not significant ($\chi2 = 2.86$; P-value = 0.413), which indicates that there was no statistical association between having heard about SCD and the ages of the students. The results for sex, form, and the various courses of study are similar to age. Regarding the distribution of students who have heard about the disease by sex, form, and courses, about 44% of the students were female, with most of them in Form one (33.16%) and pursuing Home Economics (26.17%). In terms of statistical association among the variables, the Pearson's chi2 test outcome was insignificant in all four (4) tests, implying no associations between sex, form, and courses; and having heard about SCD.

Knowledge of Cure Across Age, Sex, and Course

A Pearson's chi2 test was conducted to check if any associations exist between the sociodemographic characteristics. SCD is curable (Table 6). The results indicate that about 31% perceived SCD as curable. However, 30.05% perceived otherwise, with 18.13% (70) and 20.47% reporting that they were unsure and did not know whether SCD is curable or not, respectively. Most of the students who indicated that SCD was curable were aged 18 - 20 (17.62%), were female (19.43%), and were Home Economics students (11.40%). For those who stated that the disease was not curable, again, most of them were aged 18 - 20 (14.25%), female (17.62%), and pursuing General Science (12.44%). In terms of statistical association, there was no statistical association between age and SCD being curable on the one hand and sex and the disease being curable on the other hand. However, there was a statistical association between the course of study and perception of whether the condition is curable ($\chi2 = 18.77$, P-value = 0.027).

DOI: https://doi.org/10.47740/784.UDSIJD6i

Knowledge on Prevention Across Age, Sex, and Course

A chi2 test of statistical association was conducted to determine whether the variables were associated. About 52% of the students perceived that the disease was preventable, with just about 20% who stated that SCD was unpreventable. Those who were neither sure nor knew about whether the disease was preventable constitute 14% each. For those students who perceived SCD as preventable, most of them were aged 18 - 20 (24.35%), were female (29.79%), and were Home Economics students (17.88). Those students who perceived the disease to be unpreventable mainly were aged 18 - 20 (10.10%), also female (11.92%) but were Science students (8.55%). Regarding any statistical associations among the variables, the P-values from all three tests indicate no statistical associations at the 5% level (Table 7).

Students' Beliefs About Sickle Cell Disease

The results show that the majority (72.28%) of the students believed that the disease is transmitted at birth, followed by those who stated that SCD is transmitted

Table 5: Knowledge of Students on Sickle Cell Disease and Student Characteristics

Variables		Do you think the disease is curable?								Pearson's Chi² (P-value)
		Yes		No		Not sure		Don't know		
		Freq.	%	Freq.	%	Freq.	%	Freq	%	
Age	15 – 17	144	37	27	7	171	44	171	44	χ^2 =2.86; P=0.413
	18 – 20	144	37	38	10	182	47	182	47	
	21 & 22	15	4	6	2	21	5	21	5	
	23 & 24	10	3	2	1	12	3	12	3	
Sex	Male	142	37	26	7	168	44	168	44	χ2 =2.29; P=0.130
	Female	171	44	47	12	218	56	218	56	
Form	One	128	33	37	10	165	43	165	43	χ2 =3.49; P=0.174
	Two	115	30	26	7	141	37	141	37	
	Three	70	18	10	3	80	21	80	21	
Course	Home Economics	101	26	20	5	121	31	121	31	χ2 =5.86; P=0.118
	General Science	96	25	33	9	129	33	129	33	
	General Arts	63	16	10	3	73	19	73	19	
	Business	53	14	10	3	63	16	63	16	

Table 6: Knowledge of Cures Across Age, Sex, and Course

Variables		Do you think the disease is curable?								Pearson's Chi² (P-value)
		Yes		No		Not Sure		Don't Know		
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	
Age	15 - 17	39	10.1	54	14.0	36	9.3	42	10.9	χ^2 =13.74 P=0.132
	18 - 20	68	17.6	55	14.3	27	7.0	32	8.3	
	21 & 22	8	2.1	5	1.3	5	1.3	3	0.8	
	23 & 24	6	1.6	2	0.5	2	0.5	2	0.5	
Sex	Male	46	11.9	48	12.4	36	9.3	38	9.8	χ2 =4.16 P=0.244
	Female	75	19.4	68	17.6	34	8.8	41	10.6	
Course	Home Economics	44	11.4	31	8.0	20	5.2	26	6.7	χ2 =18.77 P=0.027
	General Science	26	6.7	48	12.4	24	6.2	31	8.0	
	General Arts	33	8.6	19	4.9	13	3.4	8	2.1	
	Business	18	4.7	18	4.7	13	3.4	14	3.6	

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Table 7: Knowledge of Prevention Across Age, Sex, and Course

Variables		Do you think the disease is curable?								Pearson's Chi² (P-value)
		Yes		No		Not sure		Don't know		
		Freq.	%	Freq.	%	Freq.	%	Freq	%	
Age	15 – 17	87	22.5	35	9.1	23	6.0	26	6.7	χ^2 =7.88; P=0.546
	18 – 20	94	24.4	39	10.1	28	7.3	21	5.4	
	21 & 22	11	2.9	2	0.5	3	0.8	5	1.3	
	23 & 24	9	2.3	1	0.3	0	0.0	2	0.5	
Sex	Male	86	22.3	31	8.0	28	7.3	23	6.0	χ2 =1.92; P=0.589
	Female	115	29.8	46	11.9	26	6.7	31	8.0	
Course	Home Economics	69	17.9	19	4.9	14	3.6	19	4.9	χ2 =9.31; P=0.409
	General Science	59	15.3	33	8.6	17	4.4	20	5.2	
	General Arts	36	9.3	16	4.2	13	3.4	8	2.1	
	Business	37	9.6	9	2.3	10	2.6	7	1.8	

Table 8: Students' Beliefs About SCD

Summary of beliefs of students	Freq	Percent
SCD transmission		
Sexual intercourse	78	20.21
Birth	279	72.28
Airborne	13	3.37
Food	6	1.55
Others	10	2.59
Is SCD a problem in Ghana		
Yes	225	58.29
No	43	11.14
Not sure	65	16.84
Don't know	53	13.73
Is the transmission of SCD spiritual?	52	13.47
Yes		
No	238	61.66
Not sure	54	13.99
Don't know	42	10.88
Would you seek spiritual intervention?	188	48.70
Yes		
No	149	38.60
Not sure	49	12.69
Having a child with SCD could be scary	52	13.47
Strongly disagree		
Disagree	79	20.47
Don't care	43	11.14
Agree	132	34.20
Strongly agree	80	20.73

through sexual intercourse (20.21%), airborne (3.37%), others (2.59%) and through food (1.5%). About 58% thought that SCD is a problem in Ghana, 11.14% said it is not a problem, 16.84% were unsure if it was a problem, and 14% did not know whether it was a problem. The majority (61.66%) stated that SCD is not transmitted spiritually, while 13.47% said spiritual as a mode of transmission. Again, 48.70% indicated they would seek spiritual intervention when they have SCD, with 38.60% stating they would not. About 34% agree that having a child with SCD, 20.73% strongly agree, and 20.49% disagree that having a child with an SCD would be scary (Table 8).

Discussion

Being aware of one's SCD status is key to its prevention. It was acknowledged in this study that just a few of the study participants (11.16%) knew their sickle cell status, with 88.84% not aware of their status. This finding demonstrates a low level of knowledge among the study participants who may soon transit into adults and procreate subsequently. A two-decade study by Ogamdi (1994) showed some consistency in a similar study. It showed that about 81% of the participants, mostly students, were not unaware of their SCD status. Consistent with Singh et al. (2010), findings in another related study among students showed that most students lack knowledge of their status of SCD. Nonetheless, the current study finding on knowledge of SCD status was not consistent

DOI: https://doi.org/10.47740/784.UDSIJD6i

with what was maintained in a related survey by Acharya et al. (2009) and Ameade et al. (2015), which found that more than half of married couples were not aware of their genotypes of hemoglobin. The observed differences in knowledge levels can partially be accounted for by the differences in the sample sizes and the category of persons involved in these studies. Notwithstanding these differences, the statistics portrayed in these studies remain significant and disturbing, as knowledge about carrier status would guide individuals to make good decisions when it comes to making decisions concerning their reproductive choices. The use of the HBM in this study demonstrated that it could be relied on to provide good information for sickle cell screening programmes. Some previous studies have also reported little or no knowledge of SCD, even among individuals who may be at risk of SCDs. As an illustration, Boyd et al. (2005) maintained in a related study that about 30% of the participants did not have any knowledge of SCDs, and only 11% knew the status of their SCDs. The observation of knowledge about SCDs in the current study, combined with other studies by Acharya et al. (2009), and Boyd et al. (2009) gives enough evidence that most populations of reproductive age are not adequately informed about SCDs. This observation is disturbing as most of these populations would start childbearing. As stated by Boyd et al. (2007), adequate information on SCD, the incidence, and the inheritance patterns among individuals in their reproductive stage are considered instrumental in decisions concerning marriage and childbearing.

For individuals to have the right health-seeking behaviours, it is paramount to develop the right attitudes and perceptions. The current study noted that several participants (88.34%) had not been screened for SCD. Of those who have never been screened for the disease, most had no reasons for not being screened (43.59%). Other reasons noted among the study participants included not falling sick easily, not considering it as necessary, fear of testing positive, and other reasons. Learning from the HBM, persons with enhanced knowledge make good and healthier health choices (Hollister & Anema, 2004). The HBM proposes that an individual must believe that SCD is a serious disease; they are at risk of developing the disease. There are benefits and few barriers to the interventions. Therefore, these students and the larger population should be targeted by adopting the HBM as a model to address SCD as a health challenge. More importantly, the study showed that most (72.28%) participants believed that the disease is transmitted at birth, followed by those who stated that SCD is transmitted through sexual intercourse (20.21%).

These findings were consistent with Access (2013), who maintained that most study participants (80.0%) demonstrated that SCD is an inherited disorder. However, other perceived causes, as noted among the participants in the current study, included airborne (3.37%) and food (1.5%). This observation reflects the misconceptions and the shared lack of knowledge of SCD among the participants. It rings the clarion call for stakeholders to address the observed misconceptions, especially among students who also form an important part of the general population. Again, Alghamdi et al. (2018) highlighted some misconceptions about SCDs in a related study, indicating that some participants reported fever, infection, and high altitudes believed to be responsible for SCDs. Alghamdi et al. (2018) equally added that some participants associated foods, including fava beans, lentils, falafel made with fava beans, and vigna nuts, were associated with SCDs. More importantly, Alghamdi et al. (2018) observed that most misconceptions about SCDs come from participants who have had some previous experience with SCD patients.

Another important acknowledgment in the current study was the observation of some participants (13.47%), indicating that SCDs have a spiritual root. This misconception is likely to influence their way of seeking healthcare for SCDs and even the advice they may offer to persons with traces of SCDs. As an illustration, about 48.70% of participants in the current study indicated that they would seek spiritual intervention when they have SCD. Atorkey et a. (2017) maintained that adolescents might have several years to live before dying. Therefore, if these misconceptions on SCDs, as noted among the current study participants, are not addressed, it will go a long way to influence their health -seeking behaviors negatively. Another study in Ghana has shown significant relationships between religious beliefs and medical care. Dennis-Antwi et al. (2018) and Cotton et al. (2009) have indicated that young adults with SCD typically attended religious events, believed in God, prayed regularly, and had elevated levels of spirituality.

There was a significant association between sex (p-value = 0.004), religion (p-value = 0.004) and belief if SCD is a problem in Ghana. These findings are important for prevention programs. Another important consideration for prevention planning relates to demographic differences. Findings from the study showed no significant association between age, sex, course, form, and ever having sickle cell screening. There was a significant association between sex (p-value = 0.030) and making friends with people who have SCD. These findings are important for programme planning and implementation. Many of the participants (43.59%) could not provide any reason for not testing. Again, 13.11% were scared of testing positive, 14.53% considered it unnecessary to screen, and 22.22% said they did not test because they do not fall sick easily and so

were not susceptible and perceived no benefits to screening. Consistent with similar findings from other studies (Stewart, 2007; Treadwell et al., 2006), females in this study had more knowledge about SCD than males. It is important to consider this when planning for programmes. Looking at the hereditary nature of SCD, both sexes must know about the disease, especially the reproductive consequences.

This study also discovered that males had more negative attitudes toward SCD carrier screening than females. This finding has numerous considerations for prevention schemes. As males had little knowledge about SCD, it is not surprising that females had more positive attitudes towards SCD carrier screening. The Health Belief Model proposes that the individual must perceive SCD to be severe to seek screening. Again, there was a significant relationship between sex (p-value = 0.010), course (p-value = 0.037), and how they believed SCD to be transmitted. However, there was no relation between their belief in seeking spiritual intervention when diagnosed with SCD.

Conclusion

The study participants have heard about SCDs, with only a few knowing their SCD status. However, there were statistically significant associations between the levels of students (Form) and knowledge of SCD, the course of study, and whether they knew SCD or not. The beliefs of students on sickle cell disease among the participants included the belief that SCD is transmitted at birth (72.28%), sexual intercourse (20.21%, airborne (3.37%), food (1.5%), and spiritual as a mode of transmission (13.47%). There were significant associations between mode of transmission and sex (χ^2=13.31, p-value = 0.010) and mode of transmission and course of study (χ^2=22.02, p-value = 0.037). Also, most of the participants had not been screened for SCD, and the reasons assigned included not falling sick easily, not considering it necessary, and the fear of testing positive.

Ethical Clearance

Ethical clearance was obtained from University for Development Studies Institutional Review Committee before data collection commenced. Before conducting the survey, permission to carry out the study was also sought from the affiliated secondary schools of the respondents. An introductory letter from Ghana Education Services (GES) was also sent to the study area for approval before administering questionnaires. Respondents were free to decline or opt out of the study without any intimidation.

Competing Interest

There is no competing interest.

Source of Funding

The study was self-financed.

Acknowledgment

Authors acknowledged the role played by the participants, staff and students in this study.

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