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RESEARCH ARTICLE

REINFORCING AND ENABLING FACTORS INVOLVED IN THE UPTAKE OF SICKLE-CELL DISEASE SCREENING AMONG COLLEGE OF EDUCATION STUDENTS IN NIGERIA

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Abstract

Introduction: Sickle cell disease (SCD) is one of the most common hereditary diseases occurring worldwide, which may affect any organ or system of human body. Some studies have shown that the knowledge of SCD and genetic screening among unmarried youths is low in Sub-Saharan Africa countries. However, genetic counseling offers help and guidance to individuals who may have or are at the risk of having genetic diseases based on their genetic information, including their family background.

Aims and Objectives: This study assessed the social support and enabling factors towards sickle cell screening and counseling uptake among students

Materials and Methodology: The cross-sectional study was carried out among students of Emmanuel Alayande College of Education, Oyo and Osun State College of Education, Ilesha. Self-administered questionnaire was administered to 612 participants and 4 FGD was conducted in both study sites. Data was analyzed using SPSS software.

Result: Most (60.9%) and (70.8%) of the respondents were female in both Emmanuel Alayande College of Education (EACE) and Osun State College of Education (OSCE) respectively and respondents aged between 15-30 years. Almost half (47.7%) of respondents in EACE and some (21.8%) of OSCE respondents have not gone for their genotype testing. In the OSCE, most of the FG participants were of the opinion that going for SCD screening is not common due to fear of the result and the effects it may have on them. Most (64.1%) and (69.8%) of the respondent from EACE and OSCE respectively said that support from health care providers is very important in influencing their uptake of SCD screening. In both EACE and OSCE, FGD participants highlighted lack of proper screening centers, distance of such centers, as well as poor attitude of health workers as factors that can hinder the uptake of SCD screening.

Conclusion: The findings from the study revealed that almost half of respondents in EACE and some of OSCE respondents have not gone for their genotype testing. A greater percentage of the respondents stated the need for social support including support from health care providers, friends, families, religious leaders as very important. There should be a collaboration between governmental and non-governmental health organizations to facilitate the promotion of free genotype screening and promote access to genetic counseling in public hospitals for young people.

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Introduction:-

Sickle cell disease is one of the most frequent inherited disorders that can affect any organ or system in the human body. It's an irreversible, treatable health disease that affects a variety of tribes around the world. It is present in people from all over the world, especially those with ancestors from Sub-Saharan Africa, India, Saudi Arabia, and Mediterranean countries (Olakunle et al., 2013).

Primary preventive management includes pre-marital genetic counseling (for school-aged children and couples preparing to marry), prenatal screening (during the second and third trimesters of pregnancy), and newborn screening (within 72 hours of delivery) (Nwabuko, Eke, & Kazadi, 2019). Primary prevention initiatives have also included everything from legally enforced premarital blood problem testing to global public education campaigns (Pecker & Naik, 2018).

The World Health Organization (WHO) has identified a few medical genetic screening programs that are suitable for low- and middle-income countries and could help to reduce the incidence of SCD, such as carrier identification using kinship genealogy and screening tests, and postnatal screening for SCD (WHO 2006 as cited in Mulumba and Wilson, 2015). According to certain studies, unmarried youngsters in Sub-Saharan African countries have little knowledge of SCD and genetic screening (Faremi, Olatubi, & Lawal, 2018). Other studies in Ghana and Nigeria, on the other hand, found that young people have a strong understanding of SCD and a positive attitude toward genetic screening, even though they do not know where to find screening facilities and uptake among young people is low (Nabwire, 2018; Ademiju & Gundu, 2019; Appiah, Korsah, Ampong, Adjei, & Appiah, 2020; Adegbite, 2021). As a result, adequate health communication and effective genetic counseling, as well as knowledge on how to obtain vital resources, are critical for young people.

Genetic counseling provides support and advice to people who may have or are at risk of genetic illnesses based on their genetic information, including their family history (Greenberg, 2015). SCD genetic counseling and testing has been demonstrated to raise awareness and arouse concern in people's minds about the disease, while also allowing those at risk to make educated decisions about marriage and conception (Aneke & Okocha, 2016). When this procedure is started early in life by conducting a screening test and following up with reminder support, genetic counseling becomes a crucial resource for raising awareness and deterring sickle cell trait partners (carrier or AS) from marrying each other (Nwabuko, Eke, & Kazadi, 2019). The aim of this study is to examine the evaluate the enabling and re-enforcing factors that promote the uptake of sickle cell disease among a Nigerian college of education students

Materials And Methods:-**Study design**

The study was a descriptive cross-sectional study involving two study groups: Osun State College of Education, Ilesha, and Emmanuel Alayande College of Education, Oyo State, which provided the investigator with detailed information about the study population's awareness, knowledge, attitude, and perception of sickle cell disease.

Study area

The research was carried out at Osun State College of Education, Ilesha, Osun State, and Emmanuel Alayande College of Education, Oyo State. The Osun State College of Education is a state-run higher education institution in Osun State, Nigeria, and was founded in 1979. Its degree programs are associated with the University of Ibadan. On the other hand, the Oyo State-based Emmanuel Alayande College of Education (previously St. St. Andrew's College, Oyo) was established as a Grade II Teacher's College by the Church Missionary Society (C.M.S.) in 1896 and it ranked as the oldest Teachers' Training College in Nigeria.

Study Population

Students from both the Osun State College of Education and the Emmanuel Alayande College of Education were included in the study.

Criteria for inclusion

Year 1 and Year 2 full-time students aged 18 to 35, who were not married, provided their agreement, and were healthy enough to visit the research team were eligible to participate in the study. Students who did not meet these requirements were not allowed to participate in the study.

Sampling procedure

A simple random technique using a balloting procedure was utilized to choose 3 schools out of the five schools in each study site for the sample population. Three schools were chosen by ballot in EACE: the school of education, the school of science, and the school of arts/SOS. Three schools were also chosen at random in OSCE, namely the School of Vocational Studies, the School of Social Science, and the School of Science. Two departments from each selected school were sampled. Only Year 1 and Year 2 pupils were chosen to participate in the study, and responders were chosen based on their desire to do so.

Data collection**Instrument for data Collection**

Quantitative (questionnaire) and qualitative (focus group discussion) methods were employed to collect data.

Questionnaire

This study's data gathering questionnaire consisted of five sections: Socio-Demographics, Awareness of sickle cell disease, Knowledge of sickle cell disease, Attitude toward sickle cell disease, and Perception of sickle cell disease. These instruments were used to obtain data on the enabling and reinforcing factors that promote uptake of sickle cell disease screening.

Focused Group Discussion (FGD)

Focus Group Discussion (FGD) sessions were used to supplement questionnaires in order to ensure that certain information not captured by the questionnaire was gathered through physical interaction between the researcher and the respondents. The purpose of the discussion was to learn more about the factors that support people to uptake sickle cell screening.

Validity of Instruments

The instruments were independently validated by examining relevant literature and professionals in the field of hematology research instrument construction. The instruments were also checked for relevance, appropriateness, and adequacy by the researcher's supervisor and experts in public health promotion and education.

Instrument Reliability

The study instruments were pilot tested with 50 respondents and two FGDs (Male=1; Female=1) among Students of the Federal College of Education, Oyo to ensure that they were reliable. The instrument's total Cronbach Alpha result was 0.79, indicating that it is trustworthy. During the debate, questions that were not clear to the FGD participants were noted and simplified in the FGD guide.

Procedure for Data Collection**Questionnaire**

With the assistance of trained study assistants, the questionnaire was self-administered. Before the respondents were asked to complete the questionnaire, they were given instructions. The questions were verified by a team of research assistants during the survey to ensure they were completely filled out.

Focused Group Discussion

Before the FGD began, the moderator created rapport with the students, and the participants were briefed about the study, its purpose, and were given the opportunity to ask questions about it. Following that, the moderator asked spoken informed consent from the participants as well as permission to record the discussion. Participants were informed of their right to leave at any time throughout the discussion if they were unable to continue.

Data Management, Analysis and Presentation

To eliminate data duplication, the completed questionnaire was serially numbered, and the FGD sessions were tape recorded to capture exact responses from the respondents. The demographic data, knowledge, attitude, and perception data were analyzed using SPSS to provide descriptive statistics, such as simple percentages and frequency.

Results:-

Socio-demographic Characteristics

The average age at Emmanuel Alayande College of Education (EACE) was 20.6 ± 2.3 years, whereas the average age at Osun State College of Education (OSCE) was 20.7 ± 2.7 years. The majority of EACE and OSCE respondents (92.1% and 89.9%, respectively) were under the age of 25 years. At both study sites, there were more female participants, and practically all the participants were Yoruba. However, some respondents (31 percent and 25.6 percent in EACE and OSCE, respectively) thought their health was less than great.

Table 3.1:- Socio-Demographic Characteristics.

Variables	EACE N = 304 (%)	OSCE N = 308 (%)
Age (years)		
Less than 24	280(92.1)	277(89.9)
More than 24	24(7.9)	31(10.1)
Mean age	1.08 ± 0.27	1.10 ± 0.30
Sex		
Female	185 (60.9)	218 (70.8)
Male	119 (39.1)	90 (29.2)
School		
Education	106 (34.9)	3(1.0)
Art & Social Science	106(34.9)	135 (43.8)
Science	38(12.5)	85(27.6)
Vocation	0 (0.0)	85(27.6)
Level		
Year 1	219 (72.0)	145(47.1)
Year 2	85 (28.0)	163 (52.9)
Average Monthly income in naira		
0-149,000	301(99.0)	306(99.4)
150,000-299,000	2(0.7)	1(0.3)
300000-500,000	1(0.3)	1(0.3)
Perceived Health Status		
Excellent		
Very good	210(69.1)	227(73.7)
Good	73(24.0)	64(20.8)
Fair	19(6.3)	13(4.2)
	2(0.7)	2(0.6)
Ethnicity		
Igbo	17(5.6)	19(6.2)
Yoruba	279(91.8)	284(92.2)
Hausa	2(0.7)	3(1.0)
Others	5(1.6)	1(0.3)

Social support factors promoting sickle-cell disease screening

According to Table 3.1, most (64.1%) and (69.8%) of the respondent from EACE and OSCE respectively mentioned support from health care providers as very important in influencing their uptake of SCD screening. In EACE, many (44.7%) and (45.1%) of the respondents affirmed support from friends and religious leaders respectively is very essential in encouraging their uptake of SCD screening. While in OSCE almost half (46.1%) and (48.7%) of the respondents said that support from friends and religious leaders respectively is very important in encouraging their uptake of SCD screening. Also, many (45.1%) of respondents from EACE stated support from religious leaders as very important in encouraging the uptake of SCD screening. Many (33.1%) and (45.5%) of the respondents from EACE and OSCE respectively highlighted that follow up through short message service (SMS) and phone calls influence their uptake of sickle-cell screening. A little more than half (55.9%) and (56.2%) of respondents in both EACE and OSCE respectively said support from family is very important in encouraging their uptake of SCD screening.

During the FGD, half of the participants from OSCE, mentioned that availability of free screening centers as well as closer venues will promote uptake of SCD screening. The other half of the participants however strongly opposed that notion. A male participant said;

“Not everybody will go there since some people are afraid”

In EACE, the role of government and health workers in promoting uptake of SCD counseling was emphasized. A female participant said:

“I think government should make the screening free because most of the people have issue with money, they do not have money for screening. Government should provide clinic in almost all area, like they should bring mobile clinic to most people”

The place of awareness in schools, marketplaces and churches was highlighted by a participant.

Table 3.2:- Social Support Factors Promoting Sickle-Cell Disease Screening.

Social Support	Control N=304 (%)	Intervention N=308(%)
Support from healthcare providers will influence your uptake of SCD screening		
Very important	195(64.1)	215(69.8)
Important	90(29.6)	76(24.7)
Somewhat important	10 (3.3)	11(3.6)
Not important	9(3.0)	6(1.9)
Support from friends encourage your uptake of SCD screening		
Very important	136(44.7)	142(46.1)
Important	134(44.1)	124(40.3)
Somewhat important	22(7.2)	30(9.7)
Not important	12(3.9)	11(3.6)
Follow up through short message service (SMS) and phone calls influence your uptake sickle-cell screening		
Very important	131(43.1)	140(45.5)
Important	103(33.9)	101(32.8)
Somewhat important	51(16.8)	43(14.0)
Not important	19(6.3)	24(9.8)
Support from your religious leaders encourage your uptake of SCD screening		
Very important	137(45.1)	150(48.7)
Important	114(37.5)	90(29.2)
Somewhat important	37(12.2)	42(13.6)
Not important	16(5.3)	26(8.4)
Support from family encourage your uptake of SCD screening		
Very important	170(55.9)	173(56.2)
Important	104(34.2)	91(29.6)
Somewhat important	21(6.9)	28(9.1)
Not important	9(3.0)	15(4.9)
Support from your community encourage your uptake of SCD screening		
Very important	147(48.4)	144(46.8)
important	115(37.8)	107(34.7)
Somewhat important	26(8.6)	31(10.1)
Not important	16(5.3)	25(8.1)

Enabling factors involved in sickle-cell disease screening uptake

In Table 3.3 many (44.7%) and (41.2%) of the respondents from both EACE and OSCE respectively noted that availability of free SCD screening is very important in their decision to obtain the SCD screening service. However,

a few (4.3%) and 6.8% of the respondents in both EACE and OSCE respectively noted that it was not important. Many (44.1%) and (44.5%) of the respondents in both EACE and OSCE respectively reported attitude of healthcare providers play a very important role in the uptake of SCD screening. Almost half (47.0% and 47.1%) of the respondents in both EACE and OSCE respectively said that the availability of SCD screening centers is very important in the uptake of screening. Similarly, almost half (47.7%) and (46.8%) of the respondents in both EACE and OSCE respectively agreed that increased awareness is very important in SCD screening uptake.

During the FGD, participants from OSCE listed illiteracy and lack of finance as common factors that can hinder the uptake of SCD screening. Ignorance of SCD was also emphasized by a female participant, who said;

“Ignorance, some people are not non-challenge we that we are educated we should know that this is a normal thing for us. Some people are not educated to the extent that let me go for a check-up. Some people will just go into any thrash relationship, and they will give birth themselves at the end of the day”

In both the EACE and OSCE, participants unanimously agreed that lack of proper screening centers, distance of such centers, as well as poor attitude of health workers are factors that can hinder the uptake of SCD screening. Most participants in the OSCE suggested creating awareness in both urban and rural areas as the major way to promote SCD screening. A male participant said

“It is not only here that we need this kind of orientation, we need it in villages where there is no civilization, when their eye is opened, they will know what is right and what is wrong. If there can be a way to take it close to these people”

In the EACE, the role of social media for creating awareness was highlighted as a way of promoting SCD screening, awareness on radio and religious worship centers availability of screening centers in the campuses were mentioned by a female participant. The participant specifically said;

“For we the students that are on campus, this should be available at the health center for we to go there for the medical check-up, it should be free since this medical money has been paid with our school fees, everything should be free for we the students and also to all those clinics that are empty, because we just go to a clinic like this, they don't have drugs they don't have anything, they just discriminate and say go to this person to go and buy the drugs for you to use, so my advice for the government of our so called nation is that they should try should care about the health of the citizen. All these materials they will use for the screening, they should be available in every clinic in the community”

Table 3.3:- Enabling Factors Involved in Sickle Cell Disease Screening Uptake.

Variables	EACE N= 304 (%)	OSCE N=308 (%)
The ability to pay influence my uptake of sickle cell screening		
Very Important	152 (50)	161 (52.3)
Important	106 (34.9)	98 (31.8)
Somewhat important	28 (9.2)	32 (10.4)
Not Important	18 (5.9)	17 (5.5)
Making SCD screening free make me to be willing to obtain the service		
Very Important	136 (44.7)	127 (41.2)
Important	118 (38.8)	125 (40.6)
Somewhat important	37 (12.2)	34 (11.0)
Not Important	13 (4.3)	21 (6.8)
Anxiety/Fear influence my uptake of Sickle Cell Screening		
Very Important	93 (30.6)	99 (32.1)
Important	110 (36.2)	114 (37.0)
Somewhat important	53 (17.4)	48 (15.6)
Not Important	48 (15.8)	46 (14.9)

Attitude of healthcare providers influence my uptake of Sickel Cell Screening		
Very Important	134 (44.1)	137 (44.5)
Important	100 (32.9)	113 (36.7)
Somewhat important	45 (14.8)	41 (13.3)
Not Important	25 (8.2)	17 (5.5)
Availability of Sickel Cell Screening centre influence my uptake of Sickel Cell screening		
Very Important	143 (47.0)	145 (47.1)
Important	105 (34.5)	108 (35.1)
Somewhat important	42 (13.8)	38 (12.3)
Not Important	14 (4.6)	17 (5.5)
Increased level of awareness about Sickel Cell will influence obtaining SCD Screening Services		
Very Important	145 (47.7)	144 (46.8)
Important	95 (31.3)	101 (32.8)
Somewhat important	52 (17.1)	47 (15.3)
Not Important	12 (3.9)	16 (5.2)

Uptake of sickle-cell disease counseling

Based on the findings in Table 3.4, almost half (47.7%) of respondents in EACE and some (21.8%) of OSCE respondents have not gone for their genotype testing. Also, some (22.8%) and (16.2%) of the respondents in both EACE and OSCE reported their genotype as 'AS'. Most (60.7%) and a little more than half (59.2%) of the respondents in EACE and OSCE respectively said since been admitted to school, they have never done SCD screening. Most (62.9%) and (64.4%) of the respondents in EACE and OSCE respectively were willing to participate in SCD counselling services. Similarly, most (73.0%) and (71.8%) of the respondents in EACE and OSCE respectively, were willing to obtain SCD awareness/advocacy program.

In OSCE, most of the participants were of the opinion that going for SCD screening is not common due to fear of the results and the effects it may have on them. A male participant said;

"It is not common, and the reason is that people are getting afraid that what if I get tested and I confirm that am a sickle cell. The last time we would have gone to check it, most of my colleagues said that they will write what they know there. The last time we wanted to do for HIV, the person doesn't want to have the result and at the end of the day, people who even paid said "I don't even need the result ". Someone like me I don't even want to go for the result"

Similar reports were observed in the EACE, as they said the SCD screening is not common as people don't go for screening unless they have health issues. A female participant however said it was common because some institutions place the test as a criterion before being admitted. A female participant said;

"It is common to some extent, some universities, before you can enter such university, you must have done your blood test, so some are doing it for the sake of admission, some institution compulsory it like LAUTECH, U.I and so on"

In both EACE and OSCE, all the participants noted that premarital counselling has a major role to play in reducing cases of SCD, a female participant said;

"It a good role, because during pre-marital counseling, they already know the Dos and Don'ts and the consequences. Since they know the consequences, they won't not want something that will cause a bad havoc to them so they will not want to go into it"

Table 3.4:- Uptake of sickle-cell disease (SCD) counseling.

Variable	EACE N= 304 (%)	OSCE N=308 (%)
Ever gone for SCD testing		
Yes	159(52.3)	241(78.2)
No	145(47.7)	67(21.8)

Genotype		
AA	110(69.6)	186(77.2)
AS	36(22.8)	39(16.2)
AC	11(7.0)	14(5.8)
SS	1(0.6)	2(0.8)
Reason for obtained the test		
Curiosity	78(25.7)	131(42.5)
To know SCD status	80(26.3)	100(32.5)
Others	146(48.0)	77(25.0)
Reason for not ever obtained SCD screening		
Nothing	108(74.5)	56(84.8)
No time for it yet	20(13.8)	9(13.6)
Don't know any screening center/how to go about it	6(4.1)	1(1.5)
Lack of money	6(4.1)	
I don't have SCD	2(7)	
Ever done SCD screening since been admitted to school		
Yes		
No	42(25.8)	71(29.0)
Can't remember	99(60.7)	145(59.2)
	22(13.5)	29(11.8)
Provided with your result in school		
Yes	42(64.6)	64(62.7)
No	9(13.6)	11(10.8)
Can't remember	14(21.5)	27(26.5)
Willing to participate in SCD counselling services		
Yes	190(62.9)	199(64.6)
No	78(25.8)	76(24.7)
Not Sure	34(11.3)	33(10.7)
If No and not sure, why		
I am not sickle celled	11(10.4)	6(5.6)
Nothing	95(89.6)	92(86.0)
Genotype already known		2(1.9)
Not interested		5(4.7)
Lack of money/time		2(1.9)

Discussions:-

Majority of the participants in both study sites were female, this does not imply that there are more female in the colleges, although females were more willing to participate in the study unlike their male counterparts. In both study site the least age of participants was 15 years, and the highest age was 30 years, averagely participants were in their twenties, this indicate that participants are majorly in their reproductive age. Although most respondents in both study site perceived their health status as excellent, however, many perceived their health status to be below excellent, this likely suggest that many of the students may have underlying ailments that needs medical attention, although further questions were not solicited from the students to identify their health conditions. Based on the findings of this study, a greater percentage of the respondents stated the need for social support including support from health care providers, friends, families, religious leaders as very important. The FGD also corroborate this finding, as participants mentioned the role of awareness in schools, marketplaces, and churches in promoting SCD screening uptake. This aligns with the findings of Long et al., (2011) who also observed that participants said lack of family discussion or support can discourage them from up-taking SCD services. Aneke & Okocha, (2016) also reiterated the role of religious bodies in influencing SCD services uptake. A larger percentage of the respondents stated the need for follow up through short message service (SMS) and phone calls as very important in influencing their uptake of sickle-cell screening. This study reaffirms the need for health intervention programs among students to use social support system including family, friends, religious leaders, health care providers and phone calls as avenues for promoting SCD screening.

Some of the participants stated that anxiety/fear of test results can influence their uptake of sickle cell screening, Long et al., (2011), also corroborate this finding, as he observed that participants feared test results, due to the likelihood of testing positive. Participants in EACE, highlighted the role of social media in creating awareness for promoting SCD screening, awareness on radio and religious worship centers availability of screening centers in the campuses were mentioned by a participant. This aligns with the result of Long et al., (2011) were participants said health education on media should be given more attention in promoting sickle cell screening. Many of the respondents said attitude of health workers is very important in up-taking sickle cell screening, Long et al., (2011) also observed this as one of his participants complained that health workers do not provide enough information about sickle cell that can promote sickle cell screening. This suggest the need for positive attitude among health workers, and it can be achieved through training of health workers on interpersonal relationship techniques. The study also showed that a larger percentage of the respondents were of the opinion that availability of free SCD screening, screening centers, and increased awareness is very important in promoting uptake of SCD screening services. It is therefore highly essential that both governmental and non-governmental organization should focus on making screening centers easily accessible, affordable, and ensure increased awareness among the public on the need to uptake screening services. Responses from the FGD also establishes this fact, as half of the participants mentioned that the availability of free screening centers as well as closer venues will promote uptake of SCD screening.

Almost half of respondents in EACE and some of OSCE respondents have not gone for their genotype testing, this findings align with the result of Adegbite, O.A. (2016) who reported that some of his respondents have never had genotype screening. Other research results of Olatona et al., (2012) and Olubiyi et al., (2013) also stated that lack of knowledge of genotype status among respondents. This finding shows that a wide gap still exists between those that know their genotype and those that do not know their genotype and therefore support the importance of conducting genotype screening. The fact that a little more than half of the respondents stated they have not gone for SCD screening since been admitted into the school, raises a serious public health concern, and implies that little or no intervention programs in terms of awareness or free screening services has been carried out in the school. It is paramount for the school authorities to make it mandatory for students to undertake SCD screening as a prerequisite during the admission process, this will play a vital role in ensuring uptake of SCD screening services. Most of the respondents were willing to go for genetic counseling and all FGD participants affirmed the essential role of pre-marital genetic counseling in reducing cases of SCD, in the words of a female participant, *"It a good role, because during pre-marital counseling, they already know the Dos and Don'ts and the consequences. Since they know the consequences, they won't not want something that will cause a bad havoc to them so they will not want to go into it"* This demonstrates a favorable attitude toward genetic counseling prior to marriage, which is backed up by Olubiyi et al., (2013) who observed that 77.4 percent of respondents feel premarital genetic counseling can eliminate sickle cell disease, and 94.6 percent have a favorable attitude toward genetic counseling before marriage. Moronkola et al. (2006), also found that 63.6 percent of research participants had a favorable attitude toward genetic counseling prior to marriage. However, a favourable attitude towards genetic counseling does not translate to uptake of genetic counseling service especially, if the services are not easily accessible and assessable, it is therefore pertinent for government to make adequate provisions for these services to be affordable and easily accessible to the public especially young adults.

Conclusion:-

The study identified that almost half of respondents in EACE and some of OSCE respondents have not gone for their genotype testing. Findings from the study has also revealed reinforcing factors promoting uptake of sickle cell screening, as a greater percentage of the respondents stated the need for social support including support from health care providers, friends, families, religious leaders as very important. Also, enabling factors were identified, as a larger percentage of the respondents believed availability of free SCD screening and screening centers, and increased awareness is very important in promoting uptake of SCD screening services. Genetic counseling services need to be accessible to the public this would be extremely beneficial to young people, particularly when it comes to mankind's decision-making regarding sexual partners' compatibility and reproduction. It is suggested that higher universities make medical screening available and cheap for those who are unsure of their status. Collaboration between governmental and non-governmental health groups and agencies should be encouraged, as should the promotion of free genotype screening and the subsidization of the charge in public hospitals for young people. Religious groups can be an effective means of disseminating health information since individuals frequently refer to places of worship and religious leaders. Ethical values of fairness, autonomy, secrecy, beneficence, and respect for people's dignity should be followed, as this will enhance people's acceptance premarital genetic screening.

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