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KNOWLEDGE, PREVALENCE, AND RISK FACTORS FOR SELF-REPORTED SEXUALLY TRANSMITTED DISEASES AMONG UNIVERSITY STUDENTS IN SIERRA LEONE

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Original Article

ABSTRACT

Introduction: Sexually transmitted infections (STIs) are a worldwide health concern. Students often engage in sexual activity while away at college, putting themselves at risk for STDs, unintended pregnancies, and unsafe abortions because of their lack of parental supervision. This research aimed to determine the prevalence of STDs and the variables that contribute to their spread among Sierra Leonean University students.

Methods: An institution-based cross-sectional study was conducted on 340 Njala University students selected using the multistage sampling technique in August 2022. The data were collected using a structured, pre-tested self-administered questionnaire. Multinomial logistic regression analyses and Pearson chi-square were employed through SPSS version 26 to identify factors associated with sexually transmitted infections. The odds ratio with a 95% confidence interval was computed to determine the level of association. In the regression analysis, variables with a p-value of less than 5% were considered statistically significant associations between covariates and sexually transmitted infections.

Result: The prevalence of a positive test for STIs among the sexually active respondents was found to be (33.6%). The knowledge of STIs among the respondents was very high (90.6%). All respondents in the various age groups (16-20, 21-25, 26-30, 31-35, 36-40 and 41-450) were likelier to have good knowledge of STIs with OR >1 and $p < 0.05$.

Conclusion: Self-reported STI infection rates among Sierra Leonean University students were relatively high. Therefore, it is crucial to educate students about the dangers of sexual promiscuity and the need to continue using condoms.

Keywords: Sexually transmitted infections, University, Students, Sierra Leone.

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INTRODUCTION

Sexually transmitted infections (STIs) are a significant public health concern worldwide, especially among young people. According to the (World Health Organization 2016), more than one million STIs are acquired every day globally, and about 376 million new cases of four common STIs (chlamydia, gonorrhoea, syphilis and trichomoniasis) occur annually(World Health Organization 2016). STIs can have serious consequences, such as infertility, ectopic pregnancy, cervical cancer, pelvic inflammatory disease, and an increased risk of HIV transmission (World Health Organization 2016). Moreover, STIs can affect individuals' and communities' psychological and social well-being, leading to stigma, discrimination, and violence (Newman et al. 2015)

Knowledge about STIs is an essential predictor of prevention and control of STIs. A study conducted among university students in Sierra Leone found that knowledge about STIs was low (Small et al. 2021).This highlights the need for targeted interventions to improve knowledge about STIs among university students in Sierra Leone.

In sub-Saharan Africa, where the burden of STIs is highest, young people aged 15-24 account for about 40% of new STI cases (Seidu et al. 2020).University students are particularly vulnerable to STIs among this population group due to exposure to multiple risk factors such as early sexual debut, multiple sexual partners, inconsistent condom use, alcohol and drug use, and lack of access to sexual and reproductive health services. The prevalence of STIs among university students in sub-Saharan Africa is high. A cross-sectional study conducted among university students in Nigeria found that the prevalence of STIs was 27.7% (Nzoputam et al. 2022). In Ethiopia, a study conducted among university students found that the prevalence of STIs was

18.2% (Kassie et al. 2019). However, there is limited data on the prevalence and determinants of STIs among university students in Sierra Leone, with only one study reporting a prevalence of 32% among college students (Small et al. 2021).

Risk factors for STIs among university students in sub-Saharan Africa include early sexual debut, multiple sexual partners, inconsistent condom use, and alcohol and drug use. A study conducted among college students in Sierra Leone found that adverse childhood experiences increase the risk of early initiation of sexual activity and the number of lifetime sex partners, increasing the risk of STDs (Small et al. 2021). Similarly, a study conducted among female university students in Nigeria found that having multiple sexual partners was a significant risk factor for STIs (Nzoputam et al. 2022). These risk factors highlight the need for targeted interventions to promote safer sexual practices among university students in sub-Saharan Africa.

Sierra Leone is a low-income country in West Africa that has experienced a prolonged civil war (1991-2002) and a devastating Ebola outbreak (2014-2016), disrupting the

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country's health system and social fabric. The country has one of the highest maternal mortality ratios and the lowest life expectancy in the world. It also faces a high burden of HIV/AIDS, with an estimated prevalence of 1.5% among adults aged 15-49. However, there is scarce information on the epidemiology of other STIs in Sierra Leone, especially among university students. (Casey et al. 2006) looked at the Changes in HIV/AIDS/STI knowledge, attitudes, and behaviours among the youth in Port Loko, Sierra Leone and (Small et al. 2021) studied Sexually Transmitted Diseases Among College Students in Sierra Leone: A Life Course Ecological Analysis. Therefore, this study aims to fill this knowledge gap by assessing the prevalence and risk factors of self-reported STIs among university students in Sierra Leone.

MATERIALS AND METHODS

Study settings

Njala University Njala campus is in the Moyamba District of Southern Sierra Leone. The main campus attracts students from all over the country, primarily interested in pursuing higher education in agriculture, science, and technology.

Study population and sample size

All students attending Njala University Njala campus in the regular undergraduate program during the study period were eligible for the study. The sample size was calculated using the single population proportion formula using the 32% prevalence of STIs among college students in Sierra Leone (Small et al. 2021), 1.96 critical value for a 95% confidence interval, 4% error margin and 10% non-response rate. The final sample size was 340. A systematic random sampling technique was used to the final sample size across six faculties at Njala University, Njala campus.

Research Instrument

The data were collected using a self-structured questionnaire adapted from (Nzoputam et al. 2022). The questionnaire was structured into various sections: socio-demographic characteristics, sexual debut, sexual practices, knowledge of HIV/AIDS and other sexually transmitted infections, and its complications.

Data Collection Procedure

The questionnaire was written in English language and was administered to the respondents on a one-on-one basis. Data were collected by the primary investigator with the help of two research assistants who were postgraduate students in the same institution. The research assistants were given two days of training on the questionnaire's content, data collection procedure, research ethics, interviewer skills, seeking consent and the administration of questionnaires. The data collection lasted three weeks.

Variables and Their Measures

The outcome variables of this study were the participants' awareness of HIV/AIDS and other STIs and the prevalence at which these conditions were experienced. We assessed their knowledge of STIs based on how much the respondents knew about HIV/AIDS, the transmission channels for STIs, and their HIV status and other STIs. The question "Have you tested positive for HIV/AIDS or any other STIs?" was used to determine the prevalence of STIs: these factors and all of the demographic characteristics that served as covariates were analysed. The age, gender, religion, marital status, current education level, monthly allowance, and current residence were the independent factors.

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Statistical Analysis

The extracted data were entered into an Excel version 19 spreadsheet and transported into SPSS for Windows, Version 26.0 Software for analysis. The analyses were undertaken in two stages. In the first stage, the frequency and simple proportion were used to describe the characteristics of respondents. In the second stage, multinomial logistic regression analysis using a Pearson Chi-square test was used to test for a significant association between the levels of knowledge of STIs, including HIV/AIDS, the prevalence of STIs and HIV/AIDS and the various socio-demographic characteristics of respondents.

Ethical Consideration

The Institutional Review Board at Njala University provided ethics approval for the study. All participants gave their informed consent. Participants had the option to discontinue participation at any time without penalty.

RESULTS

Table 1 shows the socio-demographic characteristics of the respondents. The respondents' mean, standard deviation age was 0.43 ± 0.496 years. Their ages range from 16 to 45 years. About half (41.8%) of the respondents were young adults (they belonged to the 21–25 years age bracket); (36.2%) were adolescents, that is, 16-20 years; and (16.8%) were 26-30 years (3.82%) were within 31-35 years, (0.6%) and (0.9%) were within 36-40 and 41-45 years respectively. More than half (54.4%) of the respondents were males, and (45.6%) were females. Most of the respondents (42.4%) reside in private domiciles, (39.4%) reside in campus hostels, and (18.2%) reside in family homes. The majority (49.7%) of the respondents were Christians, followed by Muslims (42.4%) and (2.7%) other types of religious practices. The majority (79.7%) of the respondents were single, married (10.6%), Divorced (7.6%) and widow/widower (2.1%). The majority (33.2%) of the respondents were drawn from the faculty of Agriculture, followed by Environmental science (27.7%), social science (14.1%), Natural Resources Management (10.9%), Technology (9.7%), and Education (4.4%). Regarding the monthly allowance of the respondents, 60.6% get a monthly allowance of 0 to 250 Leones, 28.8% have 251 to 500 Leones, 5.6% have 501 to 750 Leones, and 5.0% have 751 to 1,000 Leones.

Table 1: Social Characteristics of Respondents (n = 340)

	Variables	Frequencies	Percentage
Age Range	16-20	123	36.2
	21-25	142	41.8
	26-30	57	16.8
	31-35	13	3.8
	36-40	2	0.6
	41-45	3	0.9
Sex	Female	155	45.6
	Male	185	54.4
Residence	campus hostels	134	39.4
	family home	62	18.2
	Private	144	42.4
Religion	Christian	169	49.7
	Muslim	144	42.4
Table 1 cont…			
	Other	**9**	**2.7**
	prefer not to say	18	5.3

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Marital status	Divorced	26	7.6
	Married	36	10.6
	Single	271	79.7
	Widow/widower	7	2.1
Faculty	Agriculture	113	33.2
	Education	15	4.4
	Environmental science	94	27.7
	Natural Resources Management	37	10.9
	social science	48	14.1
	Technology	33	9.7
Current level	First-year	187	55.0
	Second year	55	16.2
	Third year	62	18.2
	Final year	36	10.6
Monthly allowance (Le)	0-250	206	60.6
	251-500	98	28.8
	501-750	19	5.6
	751-1000	17	5.00
Mean age (0.43) and SD (± 0.496) of the respondent's years			

Table 2 shows the prevalence of sexual practices among the respondents. The prevalence of sexual intercourse among the studied population was found to (95.3%), compared to (4.7%) who had not had sexual intercourse. Among those who had had sex, the majority (54.9%) had their sexual debut within the age of adolescence (15 to 19 years), 25.9% had theirs at the age of 20 to 24 years, while (16.1%) had their sexual debut at the age ≤14 years and 3.1% at the age ≥25 years. The mean SD age of sexual debut was 0.496 ± 0.720 years. The respondents who had sexual intercourse were sexually active in a few weeks (35.8%) and the last six months (35.8%), days ago (20.7%), and years ago (7.7%). The majority of those who had experienced sexual intercourse (52.2%) had their sexual debut with their girlfriends in comparison to those who had theirs with their boyfriends (34.6%), husbands (7.4%), casual friends (3.1%) and another set of individuals (2.8%). Of the respondents who had had sex, (41.7%) had multiple sexual partners in the last six months. Of the respondents who had had sex, (61.7%) have used condoms, and (38.3%) have never used condoms.

Table 2: Prevalence of sexual practices among the respondents

Variables	Frequencies	Percentages
Had sex	**(n= 340)**	
No	16	4.7
Yes	324	95.3
Age at Sexual Debut	**(n=324)**	
≤14	52	16.1
15-19	178	54.9
20-24	84	25.9
above 25	10	3.1
Partner at sexual debut		
Boyfriend	109	33.6
casual friend	19	5.9
Girlfriend	170	52.5
Husband	15	4.6
others (not say)	11	3.4
Time since the most recent sex		
days ago	67	20.7
last six months	116	35.8
weeks ago	116	35.8
years ago	25	7.7
Last sex partner		
Boyfriend	112	34.6
casual friend	10	3.1
Girlfriend	169	52.2

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Husband	24	7.4
others (not say)	9	2.8
Number of sexual partners in last six months		
1	164	50.6
2	100	30.9
3 or more	35	10.8
None	25	7.7
Have you ever used a condom?		
No	124	38.3
Yes	200	61.7
The mean SD age of sexual debut was 0.496 ± 0.720 years.		

Table 3 revealed that, overall, the knowledge of STIs among the respondents was very high (90.6%). Overall, the composite knowledge scores of the respondents showed that the majority (44.1%) had basic knowledge of STIs, as compared to (25.0%) who had extensive knowledge and (21.5%) who had intermediate knowledge of STIs. The remaining (9.4%) respondents do not know anything about STIs. The most reported STI known to the respondents was gonorrhoea (77.6%), followed by HIV/AIDS (77.1%), Staphylococcus (21.8%), Hepatitis-B (21.1%) and Chlamydia (13.0%). The last reported known STIs were Human Papillomavirus and Herpes Simplex Virus (11.7%) and (11.0%), respectively. Unprotected sexual intercourse (73.1%) was the most reported route of transmission of STIs. On the other hand, the least reported routes of transmission of STIs and HIV/AIDS were through Blood Transfusion (19.2%) and infected sharp objects (18.2%).

Table 3: Knowledge assessment of STI among the respondents.

Row Labels	Frequency (n=340)	Percentages
Awareness of HIV/AIDS and STIs		
Yes	308	90.6
No	32	9.4
Level of knowledge about STIs		
Extensive	85	25.0
Intermediate	73	21.5
Basic	150	44.1
None	32	9.4
Known STIs *	**(n=308)**	
Gonorrhea	239	77.6
HIV/AIDS	219	71.1
Chlamydia	40	13.0
Hepatitis B	65	21.1
Human Papillomavirus,	36	11.7
Staphylococcus	67	21.8
Herpes Simplex Virus	34	11.0
STIs routes of transmission*		
Blood Transfusion	59	19.2
Sharing Sharp Objects	56	18.2
Unprotected Sexual Intercourse	225	73.1
*** = Multiple responses.**		

Table 4 shows the multinomial regression model for determinants of respondents' knowledge of STIs. The model was statistically useful (Model Fitting Information = 52.111, p=0.001). All respondents in the various age groups (16-20, 21-25, 26-30, 31-35, 36-40 and 41-450) were likelier to have

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good knowledge of STIs with OR >1 and p < 0.05. Females were more likely to have good knowledge of STIs with odds ratios of 2.227 (95% CI: 0.881 - 5.625, p > 0.05) when compared with respondents who were males with a redundant OR, CI and P-value. The respondents who were in their first year with OR 1.261 (95% CI: 0.207 - 7.672), Second year with OR 1.544 (95% CI: 0.214 - 11.144) and Third year 6.375(95% CI 0.462 - 87.906) were more likely to have good knowledge of STIs and statistically significant (their p values is >0.005) whereas the OR, CI and p-value for Final year students is redundant.

Table 4: Multinomial logistic regression model for determinants of respondents' knowledge of STIs.

Predictors	Categories	Sig.	AOR	95% CI for AOR	
				Lower	Upper
Age groups	16-20	0.000	1.53E-09	5.24E-11	4.49E-08
	21-25	0.000	1.65E-09	5.69E-11	4.80E-08
	26-30	0.000	1.85E-08	5.52E-10	6.17E-07
	31-35	.	9.20E-09	9.20E-09	9.20E-09
	36-40	.	3.391	3.391	3.391
	41-45	.	.	.	.
Sex	Female	0.091	2.227	0.881	5.625
	Male	.	.	.	.
Residence	Private	0.743	1.19	0.421	3.363
	family home	0.998	1.001	0.303	3.305
	campus hostels	.	.	.	.
Religion	Christian	0.426	1.913	0.387	9.463
	Muslims	0.783	1.262	0.24	6.636
	Others	.	.	.	.
Marital status	Married	0.002	417.377	9.403	18526.94
	Single	**0.001**	**766.341**	**17.51**	**33539.23**
	Divorced	.	3.1E+11	3.1E+11	3.1E+11
	Widow/widower	.	.	.	.
Faculty	Agriculture	0.537	0.514	0.062	4.258
	Natural Resources Management	0.082	0.143	0.016	1.276

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	Education	0.411	0.337	0.025	4.513
	Environmental science	0.917	0.891	0.101	7.886
	social science	0.386	0.379	0.042	3.393
	Technology	.	.	.	.
Current level	First-year	0.801	1.261	0.207	7.672
	Second year	0.667	1.544	0.214	11.144
	Third year	0.166	6.375	0.462	87.906
	Final year	.	.	.	.
Monthly allowance	0-250	0.909	0.866	0.075	10.055
	251-500	0.969	0.951	0.079	11.487
	501-750	0.68	0.533	0.027	10.574
	751-1000	.	.	.	.

CI = confidence interval, AOR = adjusted odds ratio. Model Fitting Information = 52.111 (p=0.001)

Table 5 shows the prevalence of STIs among the respondents. The prevalence of a positive test for STIs among the sexually active respondents was found to be (33.6%). The most prevalent positive STI test was for gonorrhoea (73.4%), then syphilis (14.7%), Hepatitis B (4.6%), Chlamydia (3.7%), and staphylococcus and HIV/AIDS each (1.8%). Most (79.8%) of the respondents used antibiotics for the treatment of the STI they tested positive for, while (18.3%) used a herbal mixture and (1.8%) used antiretroviral therapy (ART). Regarding the place of treatment, (53.2%) were treated in the hospital, (28.4%) in a pharmacy shop, and (18.3%) in a herbal healer's home.

Table 5: Prevalence of STI among the respondents (n = 109)

Row Labels	Frequency	Percentages
Tested positive for STIs	**(n=324)**	
No	215	66.3
Yes	109	33.6
STIs ever tested positive for	**(n=109)**	
Chlamydia	4	3.7
Gonorrhea	80	73.4
hepatitis b	5	4.6
HIV/AIDS	2	1.8
Staphylococcus	2	1.8
Syphilis	16	14.7
Drug/treatment used		
Antibiotics	87	79.8
antiretroviral therapy	2	1.8
herbal mixture	20	18.3
Place of treatment		
herbal healer home	20	18.3
Hospital	58	53.2
pharmacy shop	31	28.4

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Table 6 shows the association between the socio-demographic characteristics of the respondents and the positive test for STIs. More males (59.6%) than females (40.4%) tested positive for STIs. This association was statistically significant (p = 0.017). More Christians and Muslims (44.0% and 40.0%, respectively) tested positive for STIs as compared to respondents who rather not say (15.6%) about their religious practices, and this association was statistically significant (p <0.05). Respondents who were in year one had a higher (45.9%) prevalence of STIs than the ones in year two (12.8%), year three (25.7%) and final year (15.6%). The association was statistically significant (p = 0.005). As the average monthly allowance of the respondents increases, there is a corresponding decrease in the number of positive STI tests.

Table 6: Socio-demographic characteristics and positive test to STIs among respondents. (Pearson Chi-square)

Labels	Positive Test for STIs		p-Value	X^2
	no (n =215)	yes (109)		
Sex				
Female	104 (48.4)	44 (40.4)	0.017	5.75
Male	111 (51.6)	65 (59.6)		
Age groups				
16-20	77 (35.8)	34 (31.2)	0.063	10.57
21-25	93 (43.3)	47 (43.1)		
26-30	37 (17.2)	18 (16.2)		
31-35	5 (2.3)	8 (7.3)		
36-40	(-)	2 (1.8)		
41-45	3 (1.)	(-)		
Residence				
campus hostels	87 (40.5)	38 (34.9)	0.557	1.17
family home	40 (18.6)	20 (18.4)		
Private	88 (40.9)	51 (46.8)		
Religion				
Christian	109 (50.7)	48 (44.0)	0.01	11.45
Muslim	96 (44.7)	44 (40.4)		
Other	10 (4.7)	6 (15.6)		
Marital Status				
Divorced	17 (7.9)	7 (6.4)	0.338	3.37
Married	24 (11.2)	12 (11.0)		
Single	172 (80.0)	85 (78.0)		
Widowed	2 (1.0)	5 (4.6)		
School or Faculty				
Agriculture	74 (34.4)	33 (30.3)	0.37	5.4
Education	10 (4.7)	4 (3.7)		
Environmental science	51 (23.7)	37 (33.9)		
Natural Resources Management	29 (13.5)	8 (7.3)		

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social science	31 (14.4)	17 (15.6)		
Technology	20 (9.3)	10 (9.2)		

Table 6 continues

Academic year status				
year one	126 (58.6)	50 (45.9)	**0.005**	**12.93**
year two	41 (19.1)	14 (12.8)		
year three	31 (14.4)	28 (25.7)		
final year	17 (7.9)	17 (15.6)		
Monthly Allowance				
0-250	137 (63.7)	59 (54.1)	0.095	6.37
251-500	61 (28.4)	32 (29.4)		
501-750	9 (4.2)	10 (9.2)		
751-1000	8 (3.7)	8 (7.3)		

DISCUSSION

Identifying sexually transmitted infections, providing relevant information, and offering the necessary health services are highly effective interventions in preventing and controlling STIs. The prevalence of STIs among sexually active respondents was found to be (33.6%). The most prevalent positive STI test was for gonorrhoea (73.4%), then syphilis (14.7%), Hepatitis B (4.6%), Chlamydia (3.7%), and staphylococcus and HIV/AIDS each (1.8%). The prevalence in this study is higher than that reported from Hawassa (5.1%) [Hailemariam et al. 2013], Port Harcourt Rivers state (5%) [Kennedy and Ibinabo 2013], Abuja University (2.9%) [10], Gambella (11.3%), [Ali et al. 2016], Jimma (17.2%) [Shimelis et al. 2012], Gondar (20.8%) [Airu et al.2015], Southern Mozambique (14%) [Menendez et al. 2010], and lower than the study reported in Uganda (59%) [Florence et. Al 2012]. The variation in prevalence rate might be because of variation in the study population.

In the present study, most (79.8%) of the respondents used antibiotics for the treatment of the STI they tested positive for, while (18.3%) used a herbal mixture and (1.8%) used antiretroviral therapy (ART). Regarding the place of treatment, (53.2%) were treated in the hospital, (28.4%) in a pharmacy shop, and (18.3%) in a herbal healer's home. In a similar study, most young people preferred seeking health care from patent medicine stores and pharmacy shops, especially when this is a reproductive health issue, except in complicated situations [Ikimalo et al. 1999]. This attitude may be due to feelings of shame, fear of stigmatisation, and the attitude of health workers in the hospital [Ikimalo et al. 1999]. Therefore, effort must be made to reorient and train healthcare providers in government hospitals for adolescent- and youth-friendly skills. This training is essential because the current lack of adolescent- and youth-friendly skills among healthcare providers makes young people more likely to visit a pharmacy shop or patent medicine store to purchase antibiotics or be treated when infected with an STI. These institutions are less likely to identify the actual causative

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agent of the infection and, thereby, mistreat the patient, potentially creating a drug-resistant strain of that STI.

The overall knowledge of STIs among the respondents was very high (90.6%). The overall knowledge here is lower than the 95% reported by (Nzoputam et al. 2022). The most reported STI known to the respondents was gonorrhoea (77.6%), followed by HIV/AIDS (77.1%), Staphylococcus (21.8%), Hepatitis-B (21.1%) and Chlamydia (13.0%). The least reported known STIs were Human Papillomavirus and Herpes Simplex Virus (11.7%) and (11.0%), respectively. Unprotected sexual intercourse (73.1%) was the most reported route of transmission of STIs, which is lower than a similar study done by (Nzoputam et al. 2022), where the most frequent STIs reported by the respondents were gonorrhoea 98.8% and HIV/AIDS 95.3%, with unprotected sexual intercourse, 94.3%, and multiple sexual partners, 80.1%, being the most reported routes of transmission of STIs. However, a multinomial logistic regression analysis of the level of knowledge of STIs in our study showed that respondents in the various age groups were more likely to have good knowledge of STIs, Females were more likely to have good knowledge of STIs when compared with respondents who were males. The respondents in their First, second, and Third years were more likely to have good knowledge of STIs than the Final year students. The unmarried respondents in this study had better knowledge of STIs than the married respondents, and those who were younger also had better knowledge than those older. This may suggest that the younger respondents, who also constitute most of the unmarried participants in this study, were more exposed to information regarding STIs and HIV/AIDS.

The prevalence of sexual intercourse among the studied population was (95.3%) higher than 53.0%, reported by (Nzoputam et al. 2022). Among those who had had sex, the majority (54.9%) had their sexual debut within the age of adolescence (15 to 19 years), which is similar to the study reported by (Nzoputam et al. 2022) in which the respondents made their sexual debut within the age of adolescence (≤19 years). Of the respondents who had had sex, (41.7%) had multiple sexual partners in the last six months, which is slightly lower than the (43.3%) reported by (Nzoputam et al. 2022).

As a limitation, physical findings and laboratory investigations did not support this study to confirm cases. Therefore, asymptomatic respondents may be missed, and others may be miss reported as STDs based on syndromes; thus, syndromes used to calculate STDs prevalence may over or underestimate the STI prevalence. Thus, it is better to use syndromic approaches with physical examination and laboratory investigation in future studies. The study result can be used by colleges, health sectors and other stakeholders to promote and launch different school-based services for STI prevention, early diagnosis and treatment if occurred. The result of this study also can be used by other researchers as a benchmark.

CONCLUSION

The prevalence of self-reported STDs was (33.6%) among university students in Sierra Leone. This finding implies that much work must be done to keep a safe learning environment for university students

regarding sexually transmitted infections. This study also revealed that age, sex and monthly allowance were associated with STIs.

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