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Trends, Prevalence, and Patterns of Management of Sexually Transmitted Infections. Among Nigerian Undergraduates

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Abstract

Background: Sexually transmitted infections (STIs) are the root causes of many health issues negatively impacting the reproductive health of adolescents and young adults. There is a dearth of information regarding the prevalence of STIs among undergraduates in Nigerian Universities. This study assessed the trends, prevalence, and patterns of management of Sexually Transmitted Infections among undergraduates of the University of Ibadan accessing care at the University Health Services. **Methods:** A cross-sectional retrospective design was adopted. Secondary data for three years (2021 to 2023) were retrieved from the hospital health records. A validated checklist was used to extract data from 46 clients' records. Descriptive and inferential analyses were done at $\alpha = 0.05$. **Results:** Findings depict a prevalence of 0.16%. There are decreasing trends in STIs prevalence with 0.31% in 2021, 0.21% in 2022, and 0.11% in 2023. Unspecified diagnosis accounted for 73.9% of the STI cases seen, other diagnoses were candidiasis 13.0%, vulvovaginitis (6.5%), gonorrhea (4.3%), and vaginosis (2.2%). Majority (73.9%) of participants received combinatory antibiotics. There is a significant association between age and prevalence of STIs ($p = 0.003$), as well as sex and prevalence of STIs ($p = 0.011$). **Conclusion:** There is a decreasing trend in prevalence rates of STIs over the study period with overall low prevalence. Targeted interventions to combat the challenges of STIs among university undergraduates are recommended.

Keywords

Prevalence, Trends, Sexually Transmitted Infections, Nigeria, Undergraduates

1. Introduction

Sexually transmitted infections (STIs) have been an ongoing global public health concern. The World Health Organization [1] reported that there are more than a million new cases of STIs reported every day, with widespread and epidemic effects on sexual and reproductive health. STIs increase rates of infertility, contribute to fatal/neonatal mortality, and cause morbidities like HIV, hepatitis, and cervical cancer. These illnesses' complexity transcends boundaries, age ranges, and genders. The social, religious, cultural, and economic practices and beliefs surrounding STIs can occasionally result in stigma, discrimination, and invisibility. Evidence from around the world indicates that minority ethnic groups, particularly teenagers and young adults, are extremely vulnerable and more likely to contract STIs [2].

An estimated 357 million new cases of one of the four STIs— trichomoniasis (143 million), gonorrhoea (78 million), syphilis (5.6 million), or chlamydia (131 million) occur every year in the world. In the United States, there are about 20 million new cases of STIs reported annually, with the majority of cases occurring in those between the ages of 15 and 24 [3]. Teenagers and young adults often self-medicate in order to avoid embarrassment and stigma at standard health clinics.

Although there are no official statistics on the prevalence of STIs in Nigeria, earlier research has indicated that sex workers have a 23% prevalence of STIs that are curable, while the low-risk population has an 18% prevalence. With a higher prevalence among high-risk groups (sex workers, men who have sex with men, and drug users), Nigeria has an average national seroprevalence of HIV infection among people aged 15 to 49 years of 1.4%, despite the country's overall HIV infection rate being approximately 3.4%. Women, young people, children, and orphans are among the most susceptible categories. Of these, 3% of individuals living with HIV/AIDS inject drugs and 58% are women [4]. The prevalence among young Nigerians increased from 1.15% in 2015 to 4% in 2021 in spite of the significant increase in health care spending for STI prevention and treatment in Nigeria [5].

One of the reproductive health treatments offered to young people to fulfill their requirements is the Youth Friendly Reproductive Health Service (YFRHS). YFRHS includes services for sexual and reproductive health counseling, STI testing, and voluntary counseling and testing (VCT). These services should be able to draw in and meet the needs of young people comfortably and effectively, and also be able to keep these young clients for ongoing care. However, there is evidence that teenagers' access to and use of reproductive health care is hampered by low socioeconomic level, a lack of knowledge, stigma, and cultural issues. Lack of sexual education and other family planning myths are a few things that deter young people from using reproductive health care [6].

There is a dearth of information regarding the incidence and prevalence of STIs in Nigeria, which is as a result of underreporting of STI cases, particularly in the youth. Hence, the objective of this study is to determine the prevalence and patterns of management of sexually transmitted infections among undergraduates in

University of Ibadan while also assisting in the development and implementation of preventative strategies to reduce the incidence of these infections.

2. Methods

2.1. Research Design

A descriptive cross-sectional research design was used for this study. It was designed retrospectively to determine the prevalence and patterns of management of sexually transmitted infections (STIs) among undergraduates accessing care at the University Health Services centre within a period of 3 years between January, 2021 and December, 2023.

2.2. Research Settings

The study was carried out in the University of Ibadan Health Services centre, JAJA clinic, a medical facility located on the campus of the University of Ibadan in Nigeria, Oyo State. The clinic provides healthcare services to students, staff, and the surrounding community. The clinic offers a range of medical services, including general medical consultations, immunization, communicable and non-communicable diseases diagnosis and treatment, family planning, screening for infections including sexually transmitted infections, accidents and emergency services, nutrition, laboratory tests, pharmaceutical services, and more.

2.3. Study Population

The study population comprises of all undergraduates that attended the clinic within the period of January, 2021 through December, 2023.

2.4. Sample Size

The study employed a purposive sampling technique to select undergraduates diagnosed with STIs at the university health centre. Only 46 cases of STIs were diagnosed during the study period, resulting in a sample size of 46 participants as shown in Table 1.

Table 1. Data on the number of students who presented at the clinic per year.

YEAR	TOTAL NUMBER OF PATIENTS (UNDERGRADUATES)	NUMBER OF STI CASES
2021	3877	12
2022	6246	13
2023	18,550	21
TOTAL	**28,673**	**46**

(From Health Records Office, Jaja clinic, 11/01/2024).

Despite a large number of students visiting the health centre, the relatively small sample size may be attributed to various factors such as underreporting of STI cases, variations in healthcare-seeking behavior or stigma surrounding STIs.

Additionally, the study period might have been impacted from institutional disruptions, such as strikes which could have also affected the number of students accessing the health facility for care during the study period. Nevertheless, the prevalence of STIs among undergraduates could be genuinely low during the study period where many students who visited the health centre were diagnosed with other health conditions unrelated to STIs.

2.5. Sampling Procedure

A purposive sampling technique was used to select case files of all STIs patients attended to from January 2021 to December 2023. This purposive sampling approach allowed for in-depth exploration of STI cases among undergraduates, providing valuable insights into this specific population.

2.6. Method of Data Collection

From the medical records office, the case files of students who visited the University Health Service centre from January 2021 to December 2023 and were diagnosed with STIs were retrieved after obtaining written permission from the appropriate authority to use the centre.

Data was collected from the case files using a checklist developed after review of the literature and records from the health centre. The face and content validity of the research instrument was done by experts in the field of study. The service of the personnel in-charge of the record section was utilized in sorting out the necessary information based on the checklist.

To ensure anonymity and confidentiality of the case files, no names were used, only codes and all the data obtained were kept secured.

2.7. Instrument

Data was collected using a checklist developed after review of the literature and records from the health centre. The face and content validity of the research instrument was done by experts in the field of study. The checklist was divided into five (5) sections: Section A provided information on sociodemographic data. Section B provided information on the reproductive features of the respondents. Section C on Common Clinical Manifestations of Sexually Transmitted Infections. Section D on sexually transmitted infections diagnosed and section E on patterns of management of Sexually Transmitted Infections. Data were analyzed using Statistical Package for Social Sciences (SPSS- 27.0) and were presented by descriptive statistics.

2.8. Data Analysis

Descriptive and inferential statistics were among the data analysis tools used. A frequency distribution table and standard deviation were utilized. The inferential statistics were performed using the Chi-square test of independence.

To assess the prevalence of Sexually Transmitted Infections among undergraduates accessing care at the University Health Services, a percentage (given as

number of cases with STI divided by total number of undergraduates, multiplied by 100) was used.

A Likert Scale of 2-point score was used to identify the patterns of management of Sexually Transmitted Infections among undergraduates accessing care at the University health services; the scoring system that was used included: Yes = 1, No = 0. The scores were presented in a tabular form in both frequency and percentage. Using the Chi-square test with a 0.05 p-value, association between variables was examined.

3. Results

Table 2 shows the socio-demographic data. The majority of the participants fall within the age range of 21 - 25 years (65.2%). The majority of the participants are male (67.4%) compared to female (32.6%). The distribution of cases across faculties shows that Science (28.63%) has the highest number of reported cases among the sampled undergraduates, followed by Arts (26.1%). The majority of the participants identified as Christians (71.7%). The majority of the participants are Yoruba (76.1%). Most of the participants were single (93.5%).

Table 2. Socio demographic data of the respondents (Ibadan, Nigeria. 2024).

Variables	Responses	Frequency (n = 46)	Percentage (%)
Year of prevalence	2021	12	26.1
	2022	13	28.3
	2023	21	45.7
Age (years)	Below 16	0	0
	16 - 20	5	10.9
	21 - 25	30	65.2
	26 - 30	5	10.9
	Above 30	6	13.0
Gender	Male	31	67.4
	Female	15	32.6
Level	100	0	0
	200	15	32.6
	300	9	19.6
	400	18	39.1
	500	4	8.7
Faculty	Agricultural science	2	4.3
	Arts	12	26.1
	Education	9	19.6
	Science	13	28.6
	Social science	10	21.7

Continued

Religion	Christianity	33	71.7
	Islam	13	28.3
Ethnicity	Yoruba	35	76.1
	Igbo	9	19.6
	Hausa	2	4.4
Marital status	Single	43	93.5
	Married	3	6.5

Table 3 outlines the prevalence of sexually transmitted infections (STIs) among undergraduates over the three years, the prevalence rate decreased from 2021 to 2023 indicating a decreasing trend in STI prevalence among undergraduates. The overall prevalence rate for the entire three-year period was calculated to be 0.16%.

Table 3. Prevalence of sexually transmitted infections among Nigerian undergraduates (Ibadan, Nigeria. 2024).

Periods	No of patients (Undergraduates)	No of patients with STIs	Prevalence rate (%)
2021	3877	12	12/3877 × 100 = 0.31
2022	6246	13	13/6246 × 100 = 0.21
2023	18,550	21	21/15550 × 100 = 0.11
Total	28,673	46	46/28673 × 100 = 0.16

Figure 1 showed the prevalence rates of 0.31, 0.21 and 0.11 for the year 2021, 2022 and 2023 respectively and with a downward slope indicating a decreasing trend in STIs.

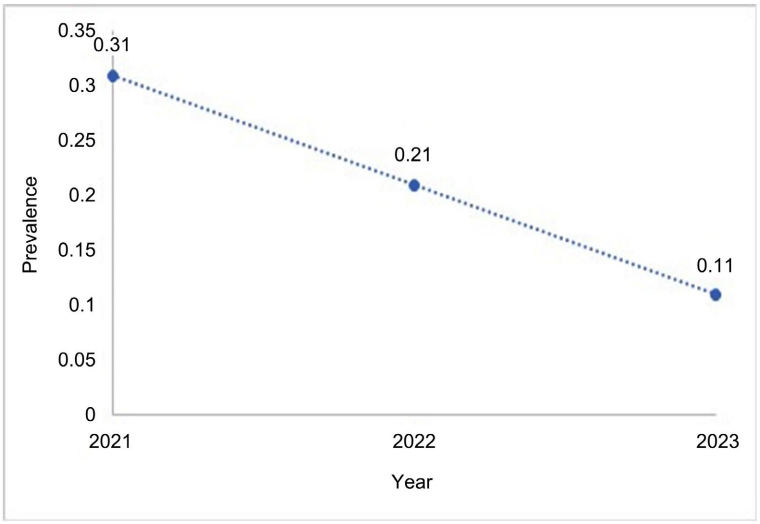

Figure 1. Trends of STIs among Nigerian undergraduates (Ibadan, Nigeria. 2024).

Table 4 presents the diagnosed sexually transmitted infections (STIs) among the undergraduates. 4.3% of the participants were diagnosed of gonorrhoea. The

majority of the diagnosed cases (73.9%) were queried as STIs, suggesting that they presented symptoms or were suspected of having an STI but did not receive a specific diagnosis. Small percentages (2.2%) of the participants were queried for vaginosis, which refers to an imbalance of bacteria in the vagina. 6.5% of the participants were diagnosed with vulvovaginitis, which is an inflammation of the vulva and vagina. Lastly, 13.0% of the participants were diagnosed with candidiasis, a yeast infection.

Table 4. Sexually transmitted infections diagnosed (Ibadan, Nigeria. 2024).

Diagnosis of the patient	No. of the patient (n = 46)	Percentage (%)
Unspecified STI	34	73.9
Gonorrhea	2	4.3
Queried vaginosis	1	2.2
Vulvo-vaginitis	3	6.5
Candidiasis	6	13.0

Table 5 explains the patterns of management of Sexually Transmitted Infections (STIs) among the undergraduates. A smaller proportion of participants received antihistamines (17.4%), analgesics (13.0%), antifungal agents (17.4%), and topical agents (19.6%) for symptom management. The respondents undergo the following set of investigations. 30.4% of participants underwent VDRL (Venereal Disease Research Laboratory). Only 2.2% of participants received Pelvic USS (Ultrasound Scan). 26.1% of participants underwent Rapid Viral Screening. High Vaginal Swab, Urine m/c/s (Microscopy, Culture, and Sensitivity), Urethral Swab, and Full Blood Count were performed on varying percentages of participants, with urine m/c/s being the most common (47.8%). 23.9% of participants received counselling as part of their management. Only 17.4% of participants' partners were treated. Lastly, a small percentage (4.3%) of participants were referred to a particular treatment clinic.

Table 5. Patterns of management of sexually transmitted infections (Ibadan, Nigeria. 2024).

Variables	Responses	Frequency (n = 46)	Percentage (%)
Medications			
Combinatory antibiotics	Yes	34	73.9
Antihistamine	Yes	8	17.4
Analgesics	Yes	6	13.0
Antifungal	Yes	8	17.4
Topical agents	Yes	9	19.6
Antispasmodic drug	Yes	1	2.2
Urinary alkalinizer	Yes	2	4.3
Antimitotic agent	Yes	1	2.2
Passaries	Yes	1	2.2

Continued

Laboratory investigations			
VDRL (Venereal Disease Research Laboratory)	Yes	14	30.4
Pelvic USS	Yes	1	2.2
Rapid viral screening	Yes	12	26.1
High vaginal swab	Yes	11	23.9
Urine m/c/s	Yes	22	47.8
Urethral swab	Yes	6	13.0
Full blood count	Yes	1	2.2
Counseling	Yes	11	23.9
Partner treated	Yes	8	17.4
Referral to special treatment clinic (STC), UCH	Yes	2	4.3

Table 6 shows the result of the Chi-square test indicating a significant association between student's sex and the prevalence of sexually transmitted infections ($x^2 = 0.732$, $p = 0.011$) at $p < 0.05$. The conventional significance level adopted is 0.05 and since the p-value obtained is less than the significance level, hereby the null hypothesis is not accepted. Hence, there is significant association between the sex and prevalence of sexually transmitted infections among the undergraduates.

Table 6. Association between the sex and prevalence of sexually transmitted infections among undergraduates in University of Ibadan (Ibadan, Nigeria. 2024).

Variables		Prevalence of sexually transmitted infections among undergraduates in University of Ibadan			X^2-value	p-value	Df
		2021	2022	2023			
Sex	Male	6 (19.4%)	7 (22.6%)	18 (58.1%)	0.732[2]	0.011	9
	Female	3 (20.0%)	5 (33.3%)	7 (46.7%)			

P: Pearson's chi-square value, df: degree of freedom, P: Probability value, *: significant at $p < 0.050$.

4. Discussion

Findings from this study showed variations across the years, 12 cases of STI were reported in 2021, followed by 13 cases in 2022 and 21 in 2023. The absolute number of STI cases increased across the years, which could be attributed to an increase in the total population of undergraduates who presented at the clinic in each year. This highlights the potential impact of population size on reported prevalence rates.

Despite the increase in number of STI cases, the study revealed a decrease in the prevalence of STIs among undergraduates over the three-year period, indicating a reduced trend in STI among the undergraduates. The overall prevalence rate for the entire three-year period was calculated to be 0.16%, indicating a relatively

low prevalence of STIs among the undergraduate population during this time frame.

This is contrary to the report of the study conducted among young people in a community close to the University of Benin, Benin city [7] where the prevalence rate of STI was 20.6%, which can be said to be relatively high.

This findings of this study suggests that the decline in STI prevalence can be attributed to a multiple of factors. On one hand, limitations such as a small sample size, underreporting of cases, and reduced utilization of reproductive health services may have played a role. On the other hand, positive outcomes of interventions including Sexual Health Education incorporated into the curriculum during the early year in school, which raises awareness and promotes healthy behaviors, thereby resulting in a possible reduction in risky behaviors, such as having multiple sexual partners, engaging in unprotected sex, alcohol or substance misuse have also likely contributed to the decline [8].

While this may be reassuring, it does not diminish the importance of ongoing surveillance and preventive measures. It may as well underscore the need for continuous comprehensive sexual health education for university students to mitigate STI transmission [9].

This decline in STI prevalence observed in the study has far-reaching implications. Globally, it supports the United Nations' goal of ending the AIDS epidemic by 2030 [10]. This indicates that targeted interventions, awareness campaigns, and improved access to reproductive health services have proven effective in reducing new infections thus underscoring the importance of continued investment in HIV prevention and control programs, especially for high-risk populations [11]. Also, low prevalence could reduce transmission rates, particularly among international travelers or partners [12].

Locally, the decreasing trend in STI prevalence allows for resource reallocation to other health priorities or enhanced STI prevention [10]. However, concerns persist as regional variations in STI prevalence among undergraduates exist. A study among female students in a federal university in southern Nigeria found a prevalence rate of 27.7% for STIs, with gonorrhea being the most frequent STI. This rate is higher than among undergraduate female students in other regions, such as Ambo University in Central Ethiopia [4].

The majority of the students affected were within the age range of 21 - 25; this is similar to the studies of Archibong *et al.* and Odimegwu & Somefun [13] [14] which indicates that young adults are at higher risk of acquiring STIs due to an increase in sexual activity and exploration.

This study also discovered a huge disparity in gender as there was a greater prevalence of STIs among male undergraduate students than among their female counterparts. This is contrary to the traditional stereotypes that view women as being more vulnerable to STIs. This, however, shows the importance of addressing sexual health problems among young men [3] [15]. Furthermore, this study showed that most participants are single, thus highlighting the significance of

conducting targeted interventions among unmarried young adults [16] [17].

Gonorrhea diagnoses were infrequent, suggesting potential variations in sexual practices, healthcare accessibility, and STI testing habits among undergraduates. Early identification and treatment of gonorrhoea are crucial in averting complications like pelvic inflammatory disease (PID) and infertility [18]. The predominant categorisation of diagnosed cases as STIs indicates that participants displayed symptoms or were suspected of having an STI without receiving a specific diagnosis.

The high number of unspecified STI cases may be attributed to students failing to undergo confirmatory testing and follow up with treatment when STIs are suspected. Implementing strategies including addressing barriers and concerns such as access to standard testing centres or laboratories, cost implication or stigmatization concerns, streamlining STI diagnosis and treatment protocols, partnering with specialized STI clinics for accurate diagnosis and effective treatment can improve STI care and management among students. Timely identification and intervention for STIs are paramount in preventing infection spread and mitigating long-term health repercussions [19] [20].

A minor proportion of participants received diagnosis related to vaginosis, an imbalance of vaginal bacteria. Despite its relatively low occurrence in this study, the identification and treatment of vaginosis are pivotal for enhancing vaginal health and diminishing the risk of complications [21]. A limited number of participants were diagnosed with vulvovaginitis, characterised by inflammation of the vulva and vagina. Accurate diagnosis and effective management can enhance the quality of life and prevent recurrent infections [22]. Finally, some participants received candidiasis diagnoses, commonly known as a yeast infection. Candidiasis, a fungal infection affecting various body parts, including the genitals, may not always be sexually transmitted but can be triggered by factors like sexual activity, hormonal changes, and antibiotic use. Proper diagnosis and treatment of candidiasis are imperative for symptom relief and preventing recurrence [23].

This study delineated the management patterns of sexually transmitted infections (STIs) among undergraduates at the University of Ibadan. The predominant approach involved the administration of combination antibiotics for STI management. If inappropriate, the widespread use of antibiotics poses a significant risk of contributing to antimicrobial resistance. Hence, it underscores the critical importance of judicious antibiotic prescribing practices and adherence to treatment guidelines [24] [25]. A few participants received adjunctive therapies, including antihistamines, analgesics, antifungal, and topical agents, to address symptoms such as itching, pain, and inflammation associated with STIs. While providing symptomatic relief is crucial for patient comfort, healthcare providers should prioritise addressing the underlying infection through suitable antimicrobial therapy [26].

Various diagnostic investigations were prescribed to inform management decisions. VDRL (Venereal Disease Research Laboratory) testing, primarily for

syphilis diagnosis, was standard. Pelvic ultrasound scans were less frequently employed, with a limited number of participants undergoing this examination. Rapid Viral Screening, High Vaginal Swab, Urine Microscopy, Culture and Sensitivity (m/c/s), Urethral Swab, and Full Blood Count were also prescribed on varying percentages of participants. Notably, Urine m/c/s emerged as the most prevalent diagnostic investigation, aiding healthcare providers in accurate STI diagnosis, treatment decision-making, and treatment response monitoring [27].

Approximately one-third of the participants received counselling as part of their management. Effective counselling was identified as a potential enhancer of treatment outcomes, reduction in transmission rates, and empowerment of individuals to make informed decisions about their sexual health, in alignment with findings by Kingsberg *et al.* [28]. Only a small proportion of the participants' partners received treatment, indicating missed opportunities for partner notification and treatment. Additionally, a minority of participants were referred to special treatment clinics, suggesting the necessity for specialised care in instances of complex or recurrent STIs. Timely referral to specialised clinics is crucial for ensuring access to comprehensive care and expertise in managing STIs [29] [30].

5. Limitations of the Study

The utilization of health records of undergraduates in this research study faced the challenge of a lack of uniform template in the clerking of patients with STI by different medical doctors. The health records did not capture comprehensive information about students' medical histories, including relevant details about pre-existing conditions, risky sexual explorations, or lifestyle factors. This limitation impeded the ability to explore more variables of importance.

Moreso, failure of many students to return for follow-up visits after a doctor orders laboratory investigations resulted in lack of review of results to give a definitive diagnosis. This could be due to various reasons, such as academic commitments, time constraints, or a lack of perceived urgency regarding the test results.

6. Recommendations

Comprehensive sexual health education programmes which target undergraduate students at every level of study should be implemented to increase awareness of STIs, modes of transmission, preventive measures and the significance of regular screenings. Routine STI screening protocol should be developed and implemented among all undergraduate students during orientation, annual physical examination and reproductive health visitation. Students should be engaged in interdisciplinary research, advocacy and policy initiatives to address systemic barriers, promote sexual health policies and allocate resources effectively.

7. Conclusions

The prevalence and patterns of management of sexually transmitted infections

(STIs) among undergraduates of the University of Ibadan revealed a complex landscape influenced by various socio-demographic factors, presentation of symptoms, healthcare-seeking behaviours, appropriate diagnosis and treatment. A decreasing trend in STI prevalence over time was reported, coupled with diverse management strategies, including antibiotic therapy, diagnostic investigations, counselling, and partner treatment.

By understanding and addressing the underlying determinants of STI prevalence and management patterns, stakeholders can work together to promote sexual health, prevent STIs, and improve the overall quality of care for undergraduates.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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