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Investigating the Epidemiological Trends, Cognitive Understanding, and Risk Mitigation Strategies of Sexually Transmitted Infections among Adolescent Female Students at Iyoba College, Benin City

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Abstract **Original Research Article**

Background*:** Sexually transmitted infections (STIs) pose significant public health challenges globally, particularly among adolescents. ***Aim*:** This cross-sectional study aimed to assess the awareness, knowledge, and preventive measures regarding STIs among teenage girls attending Iyoba College in Benin City, Edo State, Nigeria. ***Method: A total of 303 participants, were included in the study. This research is a cross sectional study; a multivariable questionnaire was designed to provide answers to some questions and gather data from the respondents. Ethical approval was obtained from relevant health and education Ministries in Edo state, as well as the school management. ***Results***: Mean age of participants was 16.1 years. Findings revealed that television (52.1%) and radio (31%) were the primary sources of STI information, with varying levels of awareness regarding transmission modes. Despite a generally high level of awareness, misconceptions persisted regarding transmission routes, with 37.6% attributing STI transmission to activities other than sexual intercourse. Among the participants, 12(4%) were found to be infected, primarily with STI, with hospital consultations being the main source of diagnosis (58.3%). Symptoms such as burning sensations during urination (75%) were commonly reported among infected individuals. Furthermore, a notable proportion (11.2%) believed STIs to be uncontrollable. ***Conclusion***: The study underscores the need for comprehensive sex education within school curricula to enhance understanding and promote effective preventive measures among adolescent populations.

Keywords: STIs, Benin City, teenage girls, sexual intercourse, sex education.

INTRODUCTION

Sexually transmitted infections (STIs) represent a significant global public health concern, primarily transmitted through unprotected sexual activity. The impact of STIs on health and development often remains underemphasized. Annually, an estimated 499 million new cases of curable STIs, including gonorrhea, chlamydia, syphilis, and trichomoniasis, are reported, alongside 536 million individuals living with incurable herpes simplex virus type 2 (HSV-2) and human immunodeficiency virus (HIV) infections [1, 2]. The majority, 75%-85%, of these infections are reported in developing nations [3]. STIs contribute substantially to morbidity and mortality, particularly in developing regions, affecting reproductive and child health and facilitating HIV transmission [4]. Globally, HIV/AIDS ranks third among leading causes of mortality, with Africa experiencing a disproportionately high burden, being the primary cause of death among individuals aged 15-29 [5, 6]. It's estimated that 109.7 million people in Africa live with STIs, contributing to approximately 17% of economic losses on the continent [6, 7]. Africa currently bears 20%-35% of the global burden of both curable and non-curable STIs [8]. Although official STI prevalence data for Nigeria are lacking, previous studies

have reported prevalence rates ranging from 0% to 18% among low-risk populations and 23% among sex workers [9, 10]. In Nigeria, the seroprevalence of HIV infection among individuals aged 15 to 49 years averages at 1.4 percent, with markedly higher rates observed among key populations, including sex workers, men who have sex with men, and drug users [11, 12]. Despite comprising only approximately 3.4% of the national population, these high-risk groups contribute to as much as 32% of HIV infections in the country [13]. Within these vulnerable populations, women, young people, children, and orphans are particularly affected, with 3.4% of people living with HIV/AIDS being injectable drug users, of which 58% are women [13].

The limited availability of specialized clinics for STI prevention and treatment across many African countries stems from inadequate health infrastructure and a scarcity of healthcare professionals [9-14]. Consequently, individuals with STIs often resort to seeking care from alternative sources, such as pharmacies, patent medication stores, and traditional healers, as highlighted in various studies [15–17]. To mitigate humiliation and stigma often associated with routine health clinics, adolescents and young individuals frequently resort to self-medication for sexually transmitted infections (STIs). Effective STI prevention strategies encompass comprehensive case management, counseling, and behavioral interventions, alongside investments in rapid point-of-care diagnostic testing, antimicrobial treatment, vaccine research, and ancillary therapies [18–20]. Counseling and behavioral interventions facilitate open communication between caregivers and clients, fostering adherence to treatment protocols and measures to prevent STI recurrence. Culturally sensitive behavioral change communication programs at the community level enhance STI awareness, knowledge, and risk reduction [21].

The burgeoning interest in STIs and their management, particularly due to their role in HIV transmission, heightens vulnerability to secondary infections [22]. Rising urbanization, modernization, travel, education, and exposure to Western media correlate with increased STI incidence in emerging nations, fostering heightened sexual activity, particularly among young cohorts [23, 24]. STIs, notably in women, often present asymptomatically. Risk factors include multiple sexual partners, inconsistent condom use, sexual preferences, prior STIs, contact with symptomatic partners, and compromised immunity [25, 26].

Despite the pivotal role of STIs in HIV transmission, they impose substantial morbidity and mortality burdens on infected individuals [22]. Given the diverse socioeconomic, cultural, geographic, and environmental determinants influencing disease profiles across different regions, the design, implementation, and monitoring of targeted intervention programs necessitate meticulous consideration of baseline epidemiological data on STIs, the prevalence of symptomatic and asymptomatic infections, and associated risk behaviors [27].

Between 1985 and 1996, a downward trend in gonorrhea, syphilis, and chlamydia infections was observed across developed nations, encompassing both the general populace and adolescents [28]. However, from the mid-1990s onward, there has been a resurgence in sexually transmitted diseases (STDs), notably syphilis, gonorrhea, and chlamydia, particularly among teenagers aged 16-19 in various European countries [29, 30]. The insidious nature of most STDs, often asymptomatic, facilitates their unnoticed transmission during unprotected sexual activity. Consequently, individuals may remain unaware of their infection status, thereby perpetuating transmission within communities.

Recent investigations underscore the significant impact of knowledge levels regarding STIs on their prevalence among adolescents [31-33]. Studies by Badawi *et al.*, have revealed adolescents' restricted understanding of sexual health information and the barriers impeding access to sexual and reproductive health services, primarily attributable to inadequate sexuality education and familial and scholastic communication gaps [33]. Parents serve as primary educators in sexual matters for children; however, communication deficits on topics related to sex and sexual health persist between parents and adolescents, attributed to parental knowledge gaps and cultural factors [34, 35].

Adolescents necessitate access to comprehensive information and skills to mitigate their susceptibility to STIs [36]. The accuracy and effectiveness of this information hinge significantly on its source, with adolescents exposed to a plethora of STI-related information from various outlets such as magazines, television, radio, schools, social media, and peers, who may disseminate inaccurate information [33-37]. Consequently, adolescents may experience repeated infections due to inadequate knowledge of STIs and challenges in accessing sexual health services [38].

Crucially, awareness of STIs, including their signs, symptoms, and associated complications, serves as a pivotal determinant influencing adolescents' decisions to seek information and treatment for STIs [39]. Despite this imperative, the extent of STI knowledge among teenage girls in secondary schools in Benin City remains unquantified, with a paucity of literature on the subject hindering informed planning by reproductive health care providers to enhance sexual and reproductive health among adolescents in the region.

The objective of this study is to elucidate the level of STI knowledge among adolescents in senior high

schools in Benin City, located in the South-South region of Nigeria, and to assess STI control measures among secondary school teenage girls in the area. By addressing this gap in understanding, this research aim to furnish valuable insights for the formulation of evidence-based strategies aimed at bolstering sexual and reproductive health initiatives targeting adolescents in Benin City.

MATERIALS AND METHODS

Study Area

The study was conducted at Iyoba Girls College, situated within the Egor Local Government Area in Benin City. This location was chosen due to concerns regarding the apparent prevalence of sexually transmitted diseases (STDs), including HIV/AIDS, Candidiasis, Gonorrhea, Syphilis, Scabies, among others, among secondary school teenage girls. Notably, the majority of students at this institution were day scholars, thereby potentially increasing their exposure to interactions with individuals of the opposite sex. Given the concentration of sexually active adolescents at Iyoba College, it served as an appropriate site for the investigation.

Study Design

A cross-sectional design was employed, utilizing a multivariable questionnaire to collect data pertinent to the study's objectives. The questionnaire comprised four main sections, namely Sections A through D. Section A encompassed social demographic variables such as age, gender, marital status, alcohol consumption, smoking habits, among others. Section B delved into information pertaining to sexually transmitted infections (STIs), while Section C focused on participants' knowledge regarding various STDs. Section D elucidated respondents' awareness of STD prevention methods.

Participants in the Study

The study population comprised all day school pupils enrolled at Iyoba College within the Egor Local Government Area. Iyoba College is a public educational institution. The selection of day school attendees from public secondary schools was deliberate, as these individuals are presumed to have heightened exposure due to their participation in organized extracurricular activities and stronger peer relationships, particularly with members of the opposite sex.

Sample Size

The sample size for the cross-sectional study was calculated using Cochran's formula [40], a standard approach for determining the minimum sample size in such investigations. Employing Cochran's method, and under the assumption of a 50% prevalence rate, a critical value of 1.96 corresponding to a 95% confidence interval, a 5% error margin, and accounting for a 10% non-response rate, the sample size was determined.

$n = Z^2 pq$

d^2

$1.96^2 \times 0.5 \times 0.5$

0.05^2

$1.96^2 \times 0.5 \times 0.5$

0.05^2

$N = 3.8416 \text{ X } 0.25$

0.0025

N = 385. (Total number of 303 participants completed this study)

Inclusion/Exclusion Criteria

The study's inclusion criteria comprised female students aged 10 to 25 years who demonstrated a voluntary expression of interest in study participation and were unmarried. Conversely, exclusion criteria encompassed female students who did not manifest interest in study involvement, those outside the specified age range (i.e., younger than 10 or older than 25 years), and those who were married.

Ethical Consideration

Ethical considerations were meticulously addressed through consultations with relevant authorities and stakeholders, including the Edo State Ministries of Health and Education, and the administrative body of Iyoba College in Benin City. A systematic approach was adopted within senior secondary schools, commencing with the solicitation of approval from school administrations for their participation in the survey. Detailed information regarding the study's objectives, methodology for data collection, voluntary participation, and options for survey withdrawal were provided to the school administrations.

Upon obtaining approval, the study protocol was elucidated to the students under the purview of the school administration, subsequent to which the principal endorsed an informed consent form. Following this, the students were presented with another informed consent form, ensuring their full comprehension and voluntary agreement to participate in the study. Only upon the completion of these procedural steps did the students proceed to complete the questionnaire. It is essential to underscore that participation in the survey remained entirely optional, thereby upholding the principles of autonomy and voluntary consent in research involving minors.

Validity of the Questionnaire

The questionnaire underwent rigorous validation procedures to ensure its validity and reliability, employing Cochran's formula. Data collection involved administering the questionnaire and retrieving responses, providing clarifications where necessary.

Method of Data Collection

The research instrument, a pre-tested 50-item questionnaire, was utilized to collect data on participants' awareness, knowledge, and control of sexually

transmitted diseases (STDs). Prior to implementation, the questionnaire was pre-tested on a sample of 50 participants from the school. Validation of the results was conducted by statisticians, with adjustments made as necessary to align with the study's objectives.

Section A of the questionnaire focused on demographic information and pertinent factors related to STDs, encompassing 13 questions on age, gender, marital status, education level, religious affiliation, smoking habits, alcohol consumption, sexual history, and condom usage. Additionally, substance use before sexual activity was considered.

Section B, titled "Awareness of Sexually Transmitted Infections," comprised four inquiries aimed at understanding participants' familiarity with STDs, including how they acquired knowledge about them and their understanding of transmission modes.

Section C, "Knowledge of Sexually Transmitted Infections," consisted of 7 questions exploring participants' personal experiences with STDs, such as infection history, symptoms observed, and treatment received.

Section D, "Control of Sexually Transmitted Infections," addressed participants' comprehension of various methods for STD prevention and management.

Statistical Analysis

Data analysis was conducted using SPSS version 25.0. Continuous variables were summarized using means and standard deviations, whereas categorical variables were expressed as percentages. The comparative analysis of categorical variables was performed using the chi-square test, with a significance threshold set at $p < 0.05$.

RESULTS

The results detailing sociodemographic factors, lifestyles, sexual behaviors, sources of knowledge regarding sexually transmitted infections (STIs), understanding of STIs, and control knowledge among secondary school teenage girls are presented below.

Table 1 summarizes the sociodemographic characteristics and lifestyles of the study population, consisting of 303 teenage girls with an age range of 13 to 19 years (mean age, 16.1 years). All participants were unmarried, practiced Christianity as their religion, had completed secondary education, and reported no history of smoking. Among them, 28 (9.2%) admitted to consuming alcohol, with a maximum intake of one bottle per day.

Table 2 delineates the sexual behaviors of the participants, revealing that out of 17 girls who reported having sexual relationships with the opposite sex, 9 (52.9%) indicated it was their first sexual experience.

Table 3 outlines the sources of respondents' knowledge about STIs and their modes of transmission. The majority (52.1%) acquired information about STIs from television, followed by radio (31%), friends (20.5%), newspapers (10.6%), and other miscellaneous sources (7.5%). Additionally, 37.6% of respondents believed that sexual activity beyond sexual contact contributed to STI transmission, while 29.3% were uncertain about the mode of transmission. Most participants (80.5%) correctly identified HIV as an STI, with awareness also extending to gonorrhea (9.6%), syphilis (3.3%), and Staphylococcus aureus (1.7%), among other types. However, 2.3% were unaware of any STIs.

Table 4 presents the level of understanding among teenage girls regarding STI types, symptoms, and diagnosis/treatment. Among those with prior STI infections (n=12), Staphylococcus aureus was predominant (91.7%), while one participant (8.3%) had candida infections. The majority (58.3%) obtained information about their STI from hospitals, followed by medical laboratories (25%) and self-awareness of symptoms (16.7%). Symptoms commonly reported included "burning sensations while urinating" (75%) and "itching of the private part" (8.3%). Notably, two infected girls were unaware of STI symptoms, but all received treatment, with 58.3% opting for orthodox medical care and 41.7% receiving herbal medicine.

Table 5 displays the level of STI control knowledge among participants, with 41.6% unaware of control methods. Noteworthy responses included advocating total abstinence from sex (6.3%), increasing sex education campaigns (19.1%), using antibiotics post-sex (22.8%), and improving personal hygiene (1.7%). Additionally, 11.2% believed STIs to be uncontrollable.

Figure 1 illustrates the awareness levels of STIs among teenage girls, revealing that 95.7% (n = 290) were aware, while 4.3% (n = 13) were not ($p = 0.001$).

Figure 2 presents the incidence of STIs among the teenage girl population studied, with 96% (n=291) uninfected and 4% (n=12) previously infected ($p < 0.001$).

Table 1: Socio-demographic Characteristics and Life-styles of the Study Population

Characteristics	Number of Respondents	Mean ± SD or Percentage
Age (years)	303	16.1 ± 0.9*
Marital Status		

Characteristics	Number of Respondents	Mean ± SD or Percentage
Single	303	100%
Educational Status		
Primary	-	-
Secondary	303	100%
Religion		
Christianity	303	100%
Islam	-	-
Smoking Habit		
No	303	100%
Yes	-	-
Alcohol Use		
No	275	90.8%
Yes	28	9.2%

*Mean and standard deviation

Table 2: Sexual Behaviors of Participants

Characteristics	Number of Respondents	Percentage
Use of Condom During Sex (n = 17)		
No	6	35.3
Always	2	11.8
Occasionally	4	23.5
No Response	5	29.4
Use of Drug Before Sex (n = 17)		
No	17	100
Yes	0	0

Table 3: Source of awareness, and knowledge of the types of STI and their modes of transmission

Variables	Number of Participants	Percentage
Source of Knowledge of STI		
Radio	94	31.0
Television	158	52.1
Newspaper	32	10.6
Friends	62	20.5
School	23	7.6
Knowledge of the Modes of Transmission of STI		
Through sexual intercourse only	89	29.3
Through the toilet only	23	7.6
By touching male students only	3	1.0
Through other forms of sexual activities (anal and oral sex)	120	37.6
Do not know	72	23.8
Knowledge of the Types of STI		
HIV	244	80.5
Hepatitis B	18	5.9
Gonorrhea	29	9.6
Syphilis	10	3.3
Chlamydia	0	0
Staphylococcus aureus	5	1.7
Others	0	0
Do not know	7	2.3

Note: Multiple responses were provided for some of the options by respondents

Table 4: The level of knowledge of secondary school teenage girls on the types, symptoms and the diagnosis/treatment of sexually transmitted infections

Variables	Number of Participants	Percentage
Types of STD Suffered by Infected Participants (n = 12)		
HIV	-	-
Hepatitis B	-	-

Variables	Number of Participants	Percentage
Gonorrhea	-	-
Syphilis	-	-
Chlamydia	-	-
Candida	1	8.3
Staphylococcus aureus	11	91.7
Source of Knowledge of STI type (n = 12)		
Through Symptoms	2	16.7
From the Hospital	7	58.3
From Medical Diagnostic Laboratory	3	25.0
Symptoms of sexually transmitted infections observed by infected participants (n = 12)		
Burning sensation while urinating	9	75.0
Itching of the private part	1	8.3
Discharge from the private part	-	-
Sore on the private part	-	-
Do not know	2	16.7
Treatment for the STI (n = 12)		
Yes	12	100
No	0	0
Type of Treatment Received		
Orthodox Medicine	7	58.3
Herbal Medicine	5	41.7

Table 5: Knowledge of the control of sexually transmitted infections among the teenage secondary school girls

Variables	Number of Participants	Percentage
Use of condoms	-	-
Improvement on personal hygiene	5	1.7
Increase the campaign on sex education among students	58	19.1
Periodic medical check-up	64	21.1
Total abstinence from sex	19	6.3
It cannot be controlled	34	11.2
Do not know	126	41.6

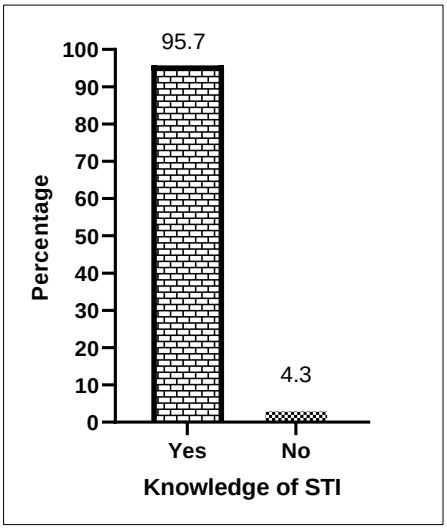

Figure 1: The level of awareness of sexually transmitted infections among teenage secondary school girls.

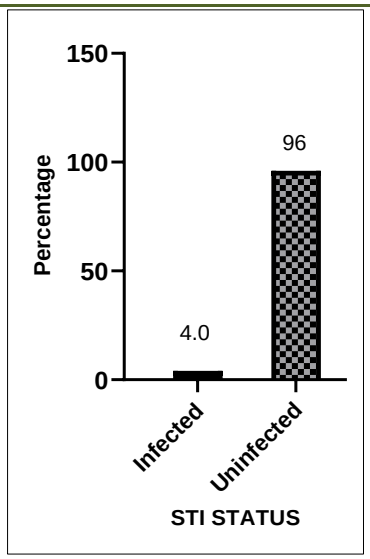

Figure 2: The incidence of sexually transmitted infections among the teenage girl population studied.

DISCUSSION

Sexually transmitted infections (STIs) pose significant health challenges, particularly among young individuals, both in developing and developed nations, contributing substantially to morbidity and mortality rates, especially among adolescents. This study observed a mean participant age of 16.1 years, with all participants being unmarried, practicing Christianity, completing secondary education, and abstaining from smoking. A subset (9.2%) reported alcohol consumption, limited to one bottle per day. Comparative analysis with previous studies showed agreement in mean age with work done by Koray (2022) [41], but disparity with Nzoputam (2022) [42], where university students reported a mean age of 21.4±2.6 years, whose focus was not on adolescent population.

The examination of sexual behaviors revealed that 52.9% of participants who engaged in sexual activity reported it as their first experience, consistent with Nzoputam (2022) [42], which reported 53.0% prevalence of sexual intercourse among participants.

Sources of STI knowledge were predominantly mass media (93.7%) and friends (7.3%), diverging from findings in Ambala Haryana, India, where hospitals and schools served as primary sources (91.5% and 83%, respectively) [43]. The study highlighted gaps in knowledge concerning non-HIV STIs, underscoring the need for comprehensive education.

Regarding STI understanding, 75.5% of respondents demonstrated knowledge of transmission modes, contrasting with Koray (2022) [41], who reported 89%. Notably, respondents exhibited significant awareness of symptoms, with 83.3% symptomatic and 16.7% asymptomatic cases. Similarly, other researchers observed in their studies that young adults showed very good knowledge of STIs, especially the signs and symptoms of STIs [33-44]. Among the STIs they were aware of, HIV garnered the highest recognition. There is widespread information on HIV/AIDs in the Nigeria media space. Meanwhile, findings of this study presented the neglect and lack of information on other important STIs in Nigeria, e.g., syphilis, trichomoniasis, and HPV. Nonetheless, many of the respondents knew gonorrhea. These findings corresponded with similar studies conducted previously [31, 32].

Control knowledge among participants varied, with 41.6% unaware of control methods. Notably, 6.3% identified abstinence as preventive, aligning with previous studies [38-31] while 11.2% perceived STIs as uncontrollable, contradicting Koray (2022) [41], findings. Additionally, 49.9% displayed overall preventive measure knowledge, reflecting a good understanding.

The study revealed high STI awareness (95.7%), consistent with findings in Ekiti state, southwest Nigeria (93%) [38], albeit with poor knowledge scores (6.9%). This underscores the importance of ongoing health education efforts, emphasizing the need for sex education in school curricula to enhance understanding and reduce STI incidence among adolescents.

CONCLUSION

This study conducted at Iyoba College, Edo State, Nigeria, revealed a high level of STI awareness among secondary school girls. Among the STIs they were aware of, HIV garnered the highest recognition. Radio and television emerged as prominent sources of information, although opinions on STI transmission methods varied among participants. Moreover, the depth of understanding regarding STI control measures was limited among the participants. There is a clear need for stakeholders, particularly curriculum developers, to

prioritize the inclusion of comprehensive sex education in the students' curricula. Additionally, mothers were identified as significant sources of STI information for adolescents, suggesting the importance of involving parents, especially mothers, in health programs targeting adolescent sexuality. Public health initiatives should focus on educating and sensitizing parents on the importance of engaging in open and comprehensive sexual and reproductive health discussions with their children.

Study's Limitation

1. The study incorporated testing to determine the prevalence of sexually transmitted infections (STIs) among secondary school students. Despite approval from the Ministry of Health, logistical challenges arose in obtaining parental consent for their children's participation in the tests, rendering the testing component unsuccessful.
2. Another limitation pertained to a notable attrition rate among volunteers, resulting in reduced participation and hindering broader engagement with the study.

Author Contributions

Conceptualization, KNN., BIGA and FOO, methodology KNN., UCO and MOO, data curation, OSO, BIGA and FOO, writing—original draft preparation, FOO and KIE, writing—review and editing, SE and COU supervision, BIGA, funding acquisition KNN and BIGA. All authors have read and agreed to the published version of the manuscript.

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REFERENCES

1. Centers for Disease Control and Prevention. STDs in Adolescents and Young Adults—2018 Sexually Transmitted Diseases Surveillance. 2019. Available online: https://www.cdc.gov/std/stats18/adolescents.htm (accessed on 10 April 2024).
2. Sexually Transmitted Infections (STIs). Available online: https://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-(stis) (accessed on 30 March 2024).
3. Abdissa, B., Addisie, M., & Seifu, W. (2017). Premarital Sexual Practices, Consequences and Associated Factors among Regular Undergraduate Female Students in Ambo University, Oromia Regional State, Central Ethiopia, *Health Science Journal*, 11, 1.
4. Arega, W. L., Zewale, T. A., & Bogale, K. A. (2019). Premarital sexual practice and associated factors among high school youths in Debretabor town, South Gondar zone, North West Ethiopia, 2017. *BMC research notes*, *12*, 1-7.
5. Lucar, J., Hart, R., Rayeed, N., Terzian, A., Weintrob, A., & Siegel, M. (2018). Sexually Transmitted Infections Among HIV-Infected Individuals in the District of Columbia and Estimated HIV Transmission Risk: Data From the DC Cohort. Open Forum. *Infectious Disease*, 5, 17.
6. Hughes, G., & Field, N. (2015). The epidemiology of sexually transmitted infections in the UK: Impact of behavior, services and interventions. *Future Microbiology*, *10*, 35–51.
7. Unprotected Nation The Financial and Economic Impacts of Restricted Contraceptive and Sexual Health Services. SSHA. 2013. Available online: https://ssha.info/unprotected-nation-the-financial-and-economic-impacts-of-restricted-contraceptive-and-sexual-health-services/ (accessed on 12 March, 2024).
8. Newman, L., Rowley, J., Vander Hoorn, S., Wijesooriya, N. S., Unemo, M., & Low, N. (2015). Global Estimates of the Prevalence and Incidence of Four Curable Sexually Transmitted Infections in 2012 Based on Systematic Review and Global Reporting. *PLoS ONE*, 10, e0143304.
9. Lewis, D. A. (2011). HIV/sexually transmitted infection epidemiology, management and control in the IUSTI Africa region: Focus on sub-Saharan Africa. *Sexually Transmitted Infection*, *87*, 10–13.
10. Fatusi, A., & Wang, W. (2009). Multiple sexual partnership mediates the association between early sexual debut and sexually transmitted infection among adolescent and young adult males in Nigeria. *European Journal Contraceptive Reproductive Health Care*, *14*, 134–143.
11. Federal Ministry of Health Nigeria. Integrated Biological and Behavioural Surveillance Survey; Federal Ministry of Health: Abuja, Nigeria. Available online: https://naca.gov.ng/wp-content/uploads/2016/11/Final-Nigeria-IBBSS-2014-report.pdf (accessed on 6 March, 2024).
12. New Survey Results Indicate That Nigeria Has an HIV Prevalence of 1.4%|UNAIDS. Available online: https://www.unaids.org/en/resources/presscentre/pressreleaseandstatementarchive/2019/march/20190314_nigeria (accessed on 6 March, 2024).
13. HIV and AIDS in Nigeria. Avert. 2015. Available online: https://www.avert.org/professionals/hiv-around-world/sub-saharan-africa/nigeria (accessed on 10 February 2024).
14. Mayaud, P., & Mabey, D. (2004). Approaches to the control of sexually transmitted infections in developing countries: Old problems and modern challenges. *Sexually Transmitted Infection*, *80*, 174–182.
15. James, P. B., Wardle, J., Steel, A., & Adams, J. (2018). Traditional, complementary and alternative medicine use in Sub-Saharan Africa: A systematic review. *BMJ Global Health*, *3*, e000895.
16. Nuwaha, F., & Muganzi, E. (2008). Predictors of use of traditional medicine by patients with sexually

transmitted infections in southwest Uganda. *The Journal of Alternative and Complementary Medicine*, *14*(6), 733-739.
17. Mmari, K. N., Oseni, O., & Fatusi, A. O. (2010). STI treatment-seeking behaviors among youth in Nigeria: are there gender differences?. *International Perspectives on Sexual and Reproductive Health*, 72-79.
18. Peltzer, K. (2009). Utilization and practice of traditional/complementary/alternative medicine (TM/CAM) in South Africa. *African journal of traditional, complementary, and alternative medicines*, *6*(2), 175.
19. World Health Organization. Global Health Sector Strategy on Sexually Transmitted Infections, 2016–2021. 2016. Available online: https://www.who.int/reproductivehealth/publications/rtis/ghss-stis/en/ (accessed on 6 January 2024).
20. Garrett, N. J., McGrath, N., & Mindel, A. (2017). Advancing STI care in low/middle-income countries: has STI syndromic management reached its use-by date?. *Sexually transmitted infections*, *93*(1), 4-5.
21. Romero, C. P., Marinho, D. S., Castro, R., de Aguiar Pereira, C. C., Silva, E., Caetano, R., ... & Dixon, S. (2020). Cost-effectiveness analysis of point-of-care rapid testing versus laboratory-based testing for antenatal screening of syphilis in Brazil. *Value in Health Regional Issues*, *23*, 61-69.
22. Nwadike, V. U., Olusanya, O., Anaedobe, G. C., Kalu, I., & Ojide, K. C. (2015). Patterns of sexually transmitted infections in patients presenting in special treatment clinic in Ibadan south western Nigeria. *Pan African Medical Journal*, *21*(1).
23. Oharume, I. M. (2020). Knowledge, sexual behaviours and risk perception of sexually transmitted infections among students of the polytechnic, Ibadan, Oyo state. *African Health Sciences*, *20*, 39–44.
24. Akokuwebe, M. M. E. (2016). Knowledge and attitude of sexually transmitted diseases among adolescents in Ikeji-Arakeji, Osun State, in South-Western Nigeria. African *Journal of Medicine and Medical Sciences*, *45*, 281–289.
25. Archibong, M. A. (2016). Perceptions about Sexually Transmitted Diseases in Akwa Ibom State of Nigeria: A Qualitative Study of Young Adults Age 18–24. Ph.D. Thesis, Walden University, Minneapolis, MN, USA, 2016. Available online: https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=3620&context=dissertations (accessed on 6 March 2024).
26. Nwabueze, S. A., Azuike, E. C., Ezenyeaku, C. A., Aniagboso, C. C., Azuike, E. D., Iloghalu, I. C., ... & Nwone, O. F. (2014). Perception of sexually transmitted infection-preventive measures among senior secondary school students in Nnewi-north local government area, Anambra State, Nigeria. *Open Journal of Preventive Medicine*, *4*(09), 708.
27. National Institute of Health. HIV and Opportunistic Infections, Coinfections, and Conditions:- HIV and Sexually Transmitted Diseases (STDs). Available online: https://hivinfo.nih.gov/understanding-hiv/fact-sheets/hiv-and-sexually-transmitted-diseases-stds (accessed on 6 March 2024)
28. World Health Organisation: Global prevalence and incidence of selected curable sexually transmitted infections. WHO, Geneva; 2001. (accessed on 11 April 2024).
29. Panchaud, C., Singh, S., Feivelson, D., & Darroch, J. E. (2010). Sexually transmitted diseases among adolescents in developed countries. *Family Planning Perspective*, *32*, 24-32.
30. Adler, M. W. (2006). Sexually transmitted infections in Europe. *Eurohealth*, *12*, 3-6.
31. Osanyin, G. E., Ogunyemi, D. O., Oluwole, E. O., & Oyekanmi, O. D. (2020). Knowledge, attitude and preventive practices of sexually transmitted infections among unmarried youths in an urban community in Lagos State, Nigeria. *African Journal of Primary Health Care and Family Medicine*, *12*(1), 1-7.
32. Wanje, G., Masese, L., Avuvika, E., Baghazal, A., Omoni, G., & Scott McClelland, R. (2017). Parents' and teachers' views on sexual health education and screening for sexually transmitted infections among in-school adolescent girls in Kenya: a qualitative study. *Reproductive health*, *14*, 1-11.
33. Badawi, M. M., SalahEldin, M. A., Idris, A. B., Hasabo, E. A., Osman, Z. H., & Osman, W. M. (2019). Knowledge gaps of STIs in Africa; Systematic review. *PLoS One*, *14*(9), e0213224.
34. Yazıcı, S., Dolgun, G., Öztürk, Y., & Yilmaz, F. (2011). The level of knowledge and behavior of adolescent male and female students in Turkey on the matter of reproductive health. *Sexuality and disability*, *29*, 217-227.
35. Visalli, G., Picerno, I., Vita, G., Spataro, P., & Bertuccio, M. P. (2014). Knowledge of sexually transmitted infections among younger subjects of the city of Messina (Sicily). *Journal of preventive medicine and hygiene*, *55*(1), 17.
36. Bankole, A., Biddlecom, A., Guiella, G., Singh, & Zulu, E. (2008). Sexual behavior, knowledge and information sources of very young adolescents in four sub-Saharan African countries. *African Journal of Reproductive Health*, *11*(3), 28-43 .
37. Shiferaw, K., Getahun, F., & Asres, G. (2014). Assessment of adolescents' communication on sexual and reproductive health matters with parents and associated factors among secondary and preparatory schools' students in Debremarkos town, North West Ethiopia. *Reproductive health*, *11*, 1-10.
38. Amu, E. O., & Adegun, P. T. (2015). Awareness and Knowledge of Sexually Transmitted Infections among Secondary School Adolescents in Ado Ekiti,

South Western Nigeria *Journal of Sexually Transmitted Disease*, 2015, 260126.

39. Avuvika, E., Masese, L. N., Wanje, G., Wanyonyi, J., Nyaribo, B., Omoni, G., ... & McClelland, R. S. (2017). Barriers and facilitators of screening for sexually transmitted infections in adolescent girls and young women in Mombasa, Kenya: a qualitative study. *PLoS One*, *12*(1), e0169388.
40. Cochran, W.G. Sampling Techniques, 3rd ed. Available online: https://www.wiley.com/en-us/Sampling+Techniques%2C+3rd+ Edition-p-9780471162407 (accessed on 11 April 2024).
41. Koray, M. H., Adomah-Afari, A., Punguyire, D., & Naawa, A. (2022). Knowledge of sexually transmitted infections among senior high school adolescents in the Wa Municipality of Ghana. *Global Health Journal*, *6*(2), 95-101.
42. Nzoputam, C., Adam, V. Y., & Nzoputam, O. (2022). Knowledge, prevalence and factors associated with sexually transmitted diseases among female students of a Federal University in Southern Nigeria. *Venereology*, *1*(1), 81-97.
43. Kumar, R., Goyal, A., Singh, P., Bhardwaj, A., Mittal, A., & Yadav, S. S. (2017). Knowledge attitude and perception of sex education among school going adolescents in Ambala District, Haryana, India : a cross-sectional study. *Journal of Clinical Diagnostic Research*, 11(3), LC01-LC04.
44. Folasayo, A. T., Oluwasegun, A. J., Samsudin, S., Saudi, S. N. S., Osman, M., & Hamat, R. A. (2017). Assessing the knowledge level, attitudes, risky behaviors and preventive practices on sexually transmitted diseases among university students as future healthcare providers in the central zone of Malaysia: a cross-sectional study. *International journal of environmental research and public health*, *14*(2), 159.