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Exploring factors influencing sexual and reproductive health knowledge among in-school adolescents in Nigeria

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ABSTRACT

This study examines the factors influencing sexual and reproductive health (SRH) knowledge among in-school adolescents in Nigeria. Data were collected from a sample of 1,133 adolescents through a semi-structured survey questionnaire. Descriptive statistics, and logistic regression analysis were employed to analyze the data. Adolescents' knowledge levels on critical aspects of SRH education reveal varying levels of comprehension across domains. While 35.7% of adolescents demonstrate understanding of the anatomy and physiology of the reproductive system, only 8.0% display comprehension of contraception and birth control methods. Logistic regression coefficients unveil significant predictors of SRH knowledge, with senior secondary students demonstrating higher odds of SRH knowledge compared to junior secondary students (OR = 2.482, 95% CI [1.335, 3.693]). Urban residence is associated with higher odds of SRH knowledge (OR = 1.172, 95% CI [0.084, 1.350]). Healthcare providers significantly influence adolescents' SRH knowledge (OR = 3.519, 95% CI [2.853, 4.271]), while comfortable discussing SRH topics with teachers predicts higher odds of SRH knowledge (OR = 3.101, 95% CI [2.245, 3.355]). These findings underscore the need for tailored and comprehensive SRH education programs to address knowledge gaps and empower adolescents with accurate information and skills necessary for making informed decisions regarding their sexual health.

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Introduction

Adolescents constitute a significant portion of the global population, with an estimated 1.3 billion individuals aged between 10 and 19 years worldwide (UNICEF, 2024). Within this demographic group, sexual and reproductive health (SRH) represents a critical aspect of overall well-being and development (Fubam et al., 2022; Khan et al., 2023). It encompasses a broad range of issues related to the physical, emotional, and social aspects of sexuality and reproduction (Brunelli et al., 2022; World Health Organization, 2024). SRH includes access to accurate information and education about sexual and reproductive anatomy and physiology, as well as the ability to make informed decisions about one's sexual and reproductive life. It also encompasses access to contraception, prevention and treatment of sexually transmitted infections (STIs), including HIV/AIDS, and comprehensive maternal health services (Ezelote et al., 2024; UNFPA, 2024). For adolescents, SRH is particularly crucial as they navigate the transition from childhood to adulthood, exploring their identities, relationships, and sexual experiences (Arije et al., 2024; Dayal & Gundi, 2022). Access to comprehensive SRH education and services empowers adolescents to make informed decisions about their bodies, relationships, and futures, thereby promoting their overall health and well-being (Abdurahman et al., 2022; Michael et al., 2024).

Addressing SRH needs during adolescence can have long-term implications for individuals' health outcomes, educational attainment, and socio-economic prospects, underscoring the importance of prioritizing adolescent SRH within global health agendas and policies (Janighorban et al., 2022; Vincent & Krishnakumar, 2022). Recognizing the unique needs and challenges faced by adolescents, global, regional, and national policies, frameworks, and programs have been established to promote SRH education, services, and rights (Leekuan et al., 2022; UNFPA, 2014). At the global level, initiatives such as the United Nations Sustainable Development Goals (SDGs), particularly Goal 3 on ensuring healthy lives and promoting well-being for all at all ages, underscore the importance of addressing SRH issues among adolescents (United Nations, 2015). Furthermore, the World Health Organization (WHO) has developed guidelines and recommendations to support countries in implementing evidence-based interventions to improve SRH outcomes among adolescents (World Health Organization, 2018).

Regionally, efforts have been made to tailor SRH interventions to the specific context of different geographic areas. In sub-Saharan Africa, where Nigeria is situated, the African Union's Maputo Plan of Action (2016–2030) prioritizes adolescent SRH as a key component of the continent's health agenda (African Union Commission, 2016). Similarly, regional bodies such as the West African Health Organization (WAHO) have implemented programs aimed at improving access to SRH services and information for adolescents in the West African region (West African Health Organization, 2016).

At the national level, countries have developed policies and frameworks to address adolescent SRH within their respective contexts. In Nigeria, the National Adolescent Health Policy (2020-2024) provides a strategic framework for promoting the health and well-being of adolescents, including provisions for comprehensive SRH education and services (Federal Ministry of Health, 2019). Additionally, initiatives such as the National Strategic Framework on HIV and AIDS prioritize adolescent-specific interventions to reduce the burden of HIV and other sexually transmitted infections

(STIs) among young people (National Agency for the Control of AIDS, 2017).

Despite these policy efforts, challenges persist in ensuring universal access to accurate SRH information and services for adolescents, particularly those who are in school (Akande et al., 2024; Eze et al., 2023). In Nigeria, where cultural norms, socio-economic disparities, and structural barriers impact SRH outcomes, understanding the factors that influence SRH knowledge among in-school adolescents is crucial for informing targeted interventions and policies (Ekwueme et al., 2024; Emenike et al., 2023). This manuscript seeks to contribute to the existing literature by examining the multifaceted determinants that shape SRH knowledge among in-school adolescents in Nigeria.

Theoretically, the study is guided by the Social Cognitive Theory (SCT) developed by Albert Bandura (Bandura, 1986). SCT emphasizes the interplay between personal factors, environmental influences, and behavior. According to this theory, individuals acquire and maintain behaviors through a continuous reciprocal interaction between cognitive, behavioral, and environmental determinants (Bandura, 2001). In the context of SRH knowledge among in-school adolescents, SCT can help identify how personal beliefs, social influences, and learning environments contribute to the understanding and adoption of SRH information (Odii et al., 2024; Vincent & Krishnakumar, 2022).

Applying SCT to this study, personal factors such as self-efficacy, outcome expectations, and knowledge about SRH play a crucial role. Adolescents with higher self-efficacy are more likely to seek out and retain SRH knowledge, and their outcome expectations regarding safe sexual practices and reproductive health can motivate their learning and behavior (Hensen et al., 2023; Langat et al., 2024). Environmental factors, including school curricula, teacher attitudes, peer influences, and family communication, also significantly shape adolescents' SRH knowledge (Abdurahman et al., 2022; Boku et al., 2024; Parmar et al., 2024). Schools that provide comprehensive SRH education and foster open discussions can enhance students' understanding and awareness. Additionally, the role of media and technology as environmental influencers cannot be underestimated, as they provide both accurate information and misinformation, impacting adolescents' perceptions and knowledge of SRH (Ekpenyong & Michael, 2016; Tilahun et al., 2024).

By using SCT as a framework, this study systematically examines how these personal and environmental factors interact to influence SRH knowledge among adolescents. It also helps in designing targeted interventions that address both individual cognitive factors and broader social influences, ultimately aiming to improve SRH outcomes for in-school adolescents. By exploring the interactions between socio-demographic factors, educational opportunities, cultural norms, and access to SRH services, this study aims to provide insights that can inform evidence-based interventions and policies to improve SRH outcomes for Nigerian adolescents.

Method

This study employed a cross-sectional research design and was conducted in Ibadan, the capital city of Oyo State in southwestern Nigeria. Ibadan was chosen as the study setting due to its diverse population and representation of urban and peri-urban communities, allowing for a comprehensive exploration of factors influencing SRH knowledgeamongsecondaryschoolstudents. The Oyo State has an estimated population of 7,512,855 people (National Bureau of Statistics, 2020). Strengthening the Reporting

of Observational Studies in Epidemiology' (STROBE) statement guided the drafting of this manuscript (Vandenbroucke et al., 2014). The population of interest comprised secondary school students enrolled in both public and private schools in Ibadan. A sample size of 1,170 students was determined using a confidence level of 95%, a margin of error of 3%, and an estimated prevalence of SRH knowledge based on previous studies. Stratified random sampling was utilized to ensure representation across different grades (JSS1 to SS3) and types of schools (public and private). Within each stratum, schools were selected using probability proportional to size, and students were then selected randomly from each selected school to participate in the study.

The study employed a multi-stage sampling procedure. First, a list of secondary schools in Ibadan was obtained from the database list of schools in Oyo State, and schools were stratified by type (public/ private) and grade level. Next, schools were selected using systematic random sampling, with the sampling interval calculated based on the total number of schools in each stratum. Upon selecting schools, students within each selected school were sampled randomly using class rosters or student lists provided by school administrators. Inclusion criteria comprised students aged 13 to 19 years who were currently enrolled in secondary school in Ibadan and provided informed consent to participate in the study. Voluntary participation was ensured, and informed consent was acquired from both school authorities and students' parents or guardians. To uphold confidentiality and anonymity, individual participants were assigned unique identification codes, and personal identifying details were securely segregated from survey responses.

Data collection was facilitated through a semi-structured questionnaire developed specifically for this study, aligning with the WHO guidelines and recommendations for adolescents SRH (World Health Organization, 2018), and the United Nations Educational, Scientific and Cultural Organization (UNESCO)'s technical guidance on sexuality education (UNESCO, 2018). The questionnaire consisted of both closed-ended and Likert-scale items covering various domains related to SRH knowledge, including demographics, access to SRH education, sources of information, attitudes towards SRH, and sexual behaviors. The questionnaire was pretested among a small sample of secondary school students in Ibadan to assess clarity, relevance, and appropriateness of the items, and necessary revisions were made based on feedback received. Data collection was conducted over a period of two months by trained research assistants under the supervision of the principal investigator. Prior to administering the questionnaire, informed consent was obtained from both students and their parents/guardians. Data collection took place during school hours in designated classrooms or school halls to ensure privacy and minimize distractions. Completed questionnaires were checked for completeness and consistency before data entry.

Quantitative data analysis was conducted using statistical software such as SPSS (Statistical Package for the Social Sciences). Descriptive statistics such as frequencies and percentages were used to summarize demographic characteristics and responses to survey items. Inferential statistics such as chi-square tests and regression analysis were employed to examine associations between variables and identify factors influencing SRH knowledge among the secondary school students. Only significant variables from the chi-square test advanced to the final stage of analysis. Collinearity among predictor variables was assessed using the Variance Inflation Factor (VIF). Results

Table 1. Study variables and descriptions

Outcome Variable: Sexual and Reproductive Health (SRH) Knowledge • ***Definition:*** Understanding and awareness of key concepts related to sexual and reproductive health, including anatomy and physiology of the reproductive system, menstrual health and hygiene, contraception and birth control methods, prevention of sexually transmitted infections (STIs), HIV/AIDS transmission and prevention, and pregnancy prevention and family planning. • ***Measurement:*** Composite score based on responses to questions assessing knowledge in each domain, calculated as the sum of correct answers. Furthermore, this was recoded to obtain: not have SRH knowledge = 0, have SRH knowledge = 1 for logistic regression analysis.
Explanatory Variables ***Demographic Characteristics:*** • Age: Age of the participant in years. • Gender: Gender identity of the participant (Male, Female). • Grade Level: Grade level of the participant (JSS1 to SS3). • Type of School: Type of school attended by the participant (Public, Private). • Residence: Type of residence school was located (Urban, Rural). ***Sources of SRH Information:*** • School-based Education: Participation in school-based sexuality education classes (Yes, No). • Internet/Websites: Use of the internet or websites as a source of sexual and reproductive health information (Yes, No). • Parents/Guardians: Discussion of sexual and reproductive health topics with parents or guardians (Yes, No). • Friends/Peers: Discussion of sexual and reproductive health topics with friends or peers (Yes, No). • Healthcare Providers: Receipt of sexual and reproductive health information from healthcare providers (Yes, No). • Media: Exposure to sexual and reproductive health information through media sources (TV, Radio, Magazines, etc.) (Yes, No). ***Comfort Level in Discussing SRH Topics:*** • Comfort Level: Participant's comfort level in discussing sexual and reproductive health topics with parents/guardians, teachers/school staff, friends/peers, and healthcare providers (Measured on a scale from Very Uncomfortable to Very Comfortable).

indicated no evidence of collinearity, with VIF values ranging from 1.054 to 1.354. Analysis excluded any missing or 'don't know' responses.

Furthermore, the research was carried out in compliance with the principles outlined in the Declaration of Helsinki and obtained approval from relevant institutions. It upheld ethical standards, ensuring voluntary participation, obtaining informed consent from all participants, and guaranteeing confidentiality and anonymity throughout the study.

Results and Discussion

Table 2 offers a depiction of the socio-demographic characteristics and SRH knowledge of 1,133 in-school adolescents, along with insights into their sources of SRH information and comfort levels discussing SRH topics with different individuals. It illustrates the distribution of respondents across various demographic variables, providing both the number and percentage of respondents within each category. Additionally, the table showcases the

Table 2. Socio-demographics and SRH knowledge of in-school adolescents

Variables	Sample (N = 1,133)		SRH Knowledge			
	n	%	No (%)	Yes (%)	χ^2	p-values
Gender					0.544	0.461
Male	565	49.9	53.6	46.4		
Female	568	50.1	55.8	44.2		
Age					1.518	0.218
Under 15	513	45.3	56.7	43.3		
15+	620	54.7	53.1	46.9		
Grade Level					9.292	0.002
Junior Secondary	494	43.6	58.7	41.3		
Senior Secondary	639	56.4	49.6	50.4		
Type of School					7.359	0.007
Public	566	50.0	58.7	41.3		
Private	567	50.0	50.7	49.3		
Residence					86.156	<0.001
Rural	577	50.9	68.7	31.3		
Urban	556	49.1	41.2	58.8		
Sources of SRH information						
School-based Sexuality Education Classes	92	8.1	9.8	90.2		
Internet/Websites	309	27.3	83.8	16.2	392.309	<0.001
Parents/Guardians	99	8.7	98.0	2.0		
Friends/Peers	290	25.6	42.1	57.9		
Healthcare Providers	105	9.3	1.9	98.1		
Media (TV, Radio, Magazines, etc.)	238	21.0	55.0	45.0		
Person Comfortable Discussing SRH Topics With					214.902	<0.001
Parents/Guardians	177	15.6		61.0	39.0	
Teachers/School Staff	190	16.8		46.8	53.2	
Friends/Peers	490	43.2		62.0	38.0	
Healthcare Providers	276	24.4		23.9	76.1	

Note: n – number; X^2 – Chi-square value; Significant at $p < .05$

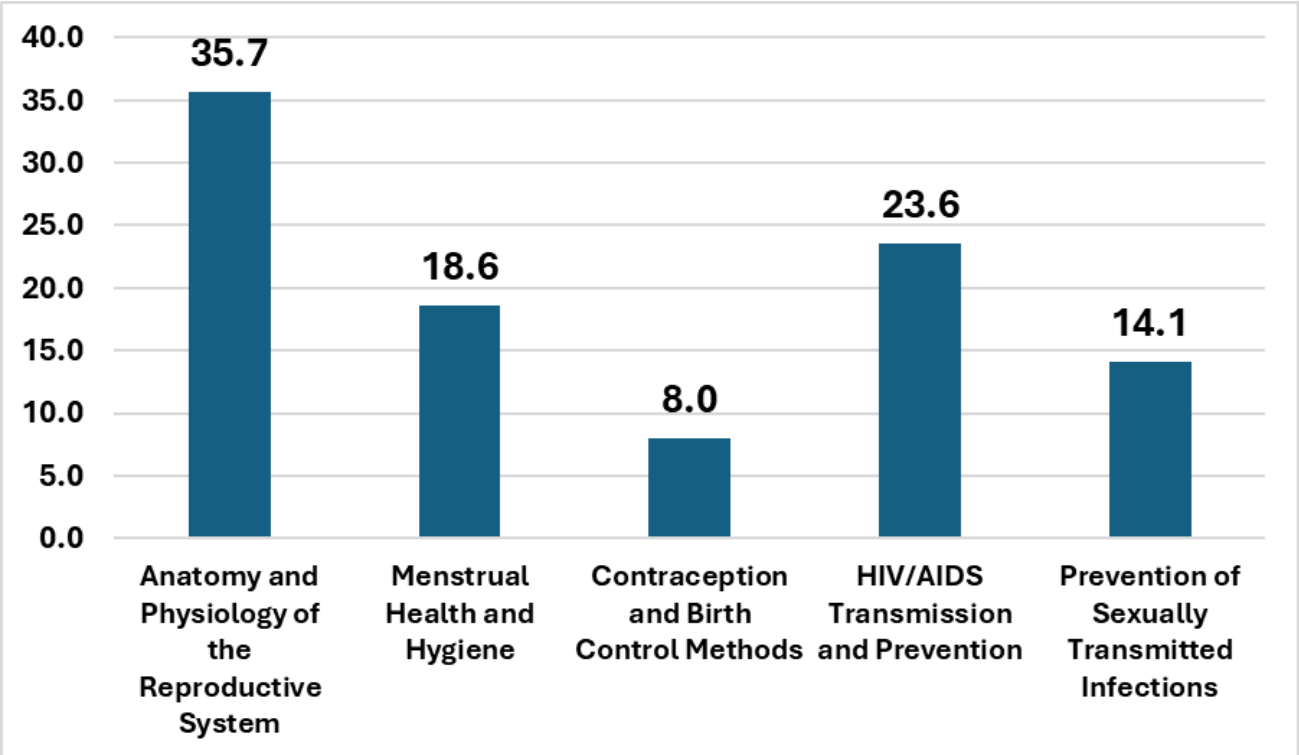
proportion of respondents with and without SRH knowledge, aiding in understanding the prevalence of SRH awareness among different groups. Furthermore, the inclusion of chi-square values and corresponding p-values highlights statistically significant associations between socio-demographic factors and SRH knowledge or access to information. For instance, the chi-square results reveal significant disparities in SRH knowledge based on gender ($\chi^2 = 0.544$, $p = 0.461$), grade level ($\chi^2 = 9.292$, $p = 0.002$), type of school ($\chi^2 = 7.359$, $p = 0.007$), residence ($\chi^2 = 86.156$, $p < 0.001$), and sources of SRH information ($\chi^2 = 392.309$, $p < 0.001$). These findings indicate the importance of tailored interventions and comprehensive sexuality education programs to address diverse

informational needs and promote the sexual health and well-being of adolescents across different demographic backgrounds.

Figure 1 presents percentages reflecting in-school adolescents' knowledge levels on critical aspects of SRH. It provides insights into adolescents' understanding across various domains of SRH education. Notably, around 35.7% of adolescents demonstrate comprehension of the anatomy and physiology of the reproductive system, encompassing knowledge of biological structures and functions within both male and female reproductive systems. Additionally, approximately 18.6% exhibit awareness regarding menstrual health and hygiene, including aspects of the menstrual cycle and practices for maintaining menstrual hygiene. However, there are notable gaps in knowledge observed, particularly in contraception and birth control methods, with only 8.0% of adolescents displaying understanding in this area. Furthermore, while about 23.6% exhibit knowledge of HIV/AIDS transmission and prevention, and 14.1% demonstrate comprehension of preventing sexually transmitted infections (STIs), these figures indicate room for improvement in comprehensive SRH education.

Table 3 provides valuable insights into the determinants of sexual and reproductive health (SRH) knowledge among in-school adolescents in Nigeria, as revealed by logistic regression coefficients. The table highlights significant predictors of SRH knowledge, shedding light on factors that influence adolescents' understanding of SRH topics. Firstly, grade level emerges as a significant predictor, with senior secondary students demonstrating higher odds of SRH knowledge compared to their junior secondary counterparts (OR = 2.482, $p < 0.001$). Additionally, urban residence is associated with higher odds of SRH knowledge (OR = 1.172, $p < 0.001$), indicating that adolescents residing in urban areas are more likely to possess adequate SRH knowledge compared to those in rural areas.

Figure 1. Knowledge about key aspects of SRH education



The table underscores the pivotal role of information sources in shaping adolescents' SRH knowledge. Adolescents who received SRH information from healthcare providers exhibited significantly higher odds of SRH knowledge (OR = 3.519, $p < 0.01$), emphasizing the importance of accessible healthcare services in promoting SRH awareness among adolescents. Similarly, SRH information obtained from teachers/ school staff is associated with increased odds of SRH knowledge (OR = 3.101, $p < 0.001$), highlighting the instrumental role of school-based sexuality education programs in imparting comprehensive SRH knowledge. However, sources such as internet/websites (OR = 0.017, $p < 0.001$), parents/guardians (OR = 0.004, $p < 0.001$), friends/peers (OR = 0.315. $p < 0.046$), and media (OR = 0.331, $p < 0.43$) also play varying lower likelihood roles in influencing adolescents' SRH knowledge, underscoring the need for diverse and accessible SRH education channels.

Furthermore, the analysis reveals the impact of individuals with whom adolescents feel comfortable discussing SRH topics. Adolescents who feel comfortable discussing SRH topics with teachers/school staff exhibited significantly higher odds of SRH knowledge (OR = 3.101, $p < 0.001$), underscoring the pivotal role of school-based sexuality education programs in fostering comprehensive SRH awareness. Similarly, feeling comfortable discussing SRH topics with friends/peers and healthcare providers was associated with increased odds of SRH knowledge, highlighting the importance of supportive social networks and accessible healthcare services in promoting SRH education. Overall, the logistic regression analysis provides a nuanced understanding of the factors contributing to SRH knowledge among in-school adolescents, offering valuable insights for targeted interventions and comprehensive SRH education programs tailored to the specific needs and contexts of adolescents in Nigeria.

The current study's findings offer valuable insights into in-school adolescents' SRH knowledge and its determinants. Findings illustrate adolescents' varying levels of comprehension across critical aspects of SRH education. Notably, while a substantial proportion demonstrates understanding of the anatomy and physiology of the reproductive system and awareness regarding HIV/AIDS transmission and prevention, notable gaps exist, particularly in contraception and birth control methods and prevention of sexually transmitted infections. These findings align with previous studies in Pakistan (Khan et al., 2023) and Zambia (Hensen et al., 2023), highlighting deficiencies in adolescents' SRH knowledge, emphasizing the urgent need for tailored and comprehensive sexuality education programs to address these gaps.

One aspect of the current study findings that deviates from some previous studies is the relatively lower level of knowledge observed among adolescents regarding contraception and birth control methods. While the current study reports that only 8.0% of adolescents display understanding in this area, some previous studies have shown higher levels of knowledge or awareness among adolescents regarding contraception. For example, a study by Esievo and Ese found that a larger proportion of adolescents demonstrated knowledge about contraceptive methods (Esievo & Ese, 2023). Also, while the current study records good of knowledge of HIV/ AIDS among students, a previous study by Ezelote and colleagues in Nigeria found poor knowledge of HIV/AIDS among adolescents (Ezelote et al., 2024). This disparity suggests potential variability in SRH knowledge levels among adolescents across different contexts or populations within Nigeria. It could be attributed to differences in study settings,

Table 3. Logistic regression of SRH knowledge of in-school adolescents

Variables	S.E.	Wald	p-value	Odds ratio	95% CI	
					Lower	Upper
Grade Level						
Junior Secondary (Ref)				1.000		
Senior Secondary	0.185	15.538	<0.001	2.482***	1.335	3.693
Type of School						
Public (Ref)				1.000		
Private	0.182	0.975	0.160	0.774	0.542	1.106
Residence						
Rural (Ref)				1.000		
Urban	0.363	23.493	<0.001	1.172***	0.084	1.350
Sources of SRH information						
School-based Sexuality Education Classes (Ref)				1.000		
Internet/Websites	0.497	66.546	<0.001	0.017***	0.007	0.046
Parents/Guardians	0.937	33.820	<0.001	0.004***	0.001	0.027
Friends/Peers	0.628	3.381	0.066	0.315	0.092	1.079
Healthcare Providers	1.110	3.301	0.009	3.519**	2.853	4.271
Media (TV, Radio, Magazines, etc.)	0.546	4.110	0.043	0.331*	0.113	0.964
Person Comfortable Discussing SRH Topic With						
Parents/Guardians (Ref)				1.000		
Teachers/School Staff	0.495	25.569	<0.001	3.101***	2.245	3.355
Friends/Peers	0.433	12.122	<0.001	1.584***	0.937	2.515
Healthcare Providers	0.408	15.538	<0.001	2.924***	2.239	3.961
Overall model evaluation						
Omnibus tests: 707.369***						
Nagelkerke R square: 0.621						
-2 log likelihood: 853.182						
Hosmer and Lemeshow Test: 0.412						

*Significance at *p < 0.05; **p < 0.01; ***p < 0.001; Ref - reference category; CI - confidence interval*

sample characteristics, or methodologies used in assessing SRH knowledge.

Findings unveil significant predictors of SRHknowledgeamongin-schooladolescents, providing further insights into the factors influencing their understanding of SRH topics. Consistent with past research, grade level emerges as a significant predictor, with senior secondary students demonstrating higher odds of SRH knowledge compared to junior secondary students (OR = 2.482, p < 0.001) (Agu et al., 2024; Fubam et al., 2022). Additionally, urban residence is associated with higher odds of SRH knowledge (OR = 1.172, p < 0.001), corroborating previous findings that urban adolescents tend to have better access to SRH information and services compared to their rural counterparts (Ismail et al., 2024). Furthermore, the pivotal role of information sources, such as healthcare providers and teachers/school staff, in shaping adolescents' SRH knowledge echoes findings from prior studies emphasizing the importance of school-based and healthcare-based SRH interventions (Brunelli et al., 2022; Embleton et al., 2023).

The current study's findings regarding the impact of information sources on adolescents' SRH knowledge diverge slightly from some previous research. While the study underscores the significant role of healthcare providers and teachers/school staff in shaping SRH knowledge, it also highlights the varying impact of other sources such as internet/websites, parents/guardians, friends/peers, and media. However, some previous studies have indicated a more uniform influence of specific sources, such as school-based sexuality education programs, on adolescents' SRH knowledge (Michael, 2024). This discrepancy may reflect differences in the availability and accessibility of SRH information sources across different study settings or populations, underscoring the need for tailored interventions that account for these contextual variations (Bekele et al., 2022; Ma et al., 2022). This also highlights the need for multifaceted approaches to SRH education that leverage diverse channels and address adolescents' informational needs comprehensively (Arije et al., 2024; Vincent & Krishnakumar, 2022).

Additionally, the analysis underscores the significance of supportive social networks and accessible healthcare services in promoting SRH education, emphasizing the need for interventions that foster open communication and provide adolescents with the necessary support and resources to navigate SRH issues effectively (Bekele et al., 2022; Leekuan et al., 2022; Zepro et al., 2023). Overall, the current study's findings contribute to a nuanced understanding of SRH knowledge among in-school adolescents in Nigeria and provide valuable insights for policymakers, educators, and healthcare professionals to develop targeted interventions and comprehensive SRH education programs tailored to adolescents' specific needs and contexts.

Conclusion

This study sheds light on the complex interplay of factors influencing SRH knowledge among in-school adolescents in Nigeria. The findings underscore the critical need for targeted interventions and comprehensive SRH education programs to address the identified knowledge gaps and empower adolescents with accurate information and skills necessary for making informed decisions regarding their sexual health and well-being. The significant predictors of SRH knowledge, including grade level, residence, and information sources such as healthcare providers and teachers/school staff, highlight the importance of multifaceted approaches that leverage diverse channels and address adolescents' informational needs comprehensively.

Moving forward, policymakers, educators, and healthcare professionals should prioritize the development and implementation of evidence-based SRH education interventions tailored to the specific needs and contexts of adolescents in Nigeria. These interventions should encompass comprehensive sexuality education programs delivered through schools and healthcare facilities, ensuring accessibility and inclusivity. Additionally, efforts should be made to enhance the availability and accessibility of SRH information sources, including internet-based resources and community outreach programs. Furthermore, engaging parents/guardians and promoting open communication about SRH topics within families can contribute to creating supportive environments that facilitate adolescents' access to accurate information and encourage healthy decision-making. By addressing these recommendations, stakeholders can work towards improving adolescents' SRH

knowledge and ultimately promoting their sexual health and well-being in Nigeria.

Declaration of Ownership

This article is my original work.

Conflict of Interest

There is no conflict of interest to declare in this article.

Ethical Clearance

This study was approved by the institution.

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