Research Article

Evaluating the Knowledge and Attitude Towards Sexual Literacy Among Adolescents

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I N F O

A B S T R A C T

Sexual literacy is a vital component of adolescent development, yet variations in knowledge and attitudes persist due to differences in educational exposure and sociocultural influences (UNESCO, 2018; World Health Organization, 2015). This study aims to evaluate the level of factual knowledge about sexual and reproductive health and the attitudes held by adolescents towards sexual literacy. Equipping youth with age-appropriate knowledge about puberty, sexuality, sexually transmitted infections, and HIV is essential for their overall health and well-being (UNESCO, 2018; World Health Organization, 2015). Proper sex education enables adolescents to prevent unwanted pregnancies, protect themselves from many infections, and reduce vulnerability to sexual abuse (Centers for Disease Control and Prevention, 2016; UNESCO, 2018). Proper sex education empowers individuals by breaking down myths and promoting informed understanding (UNESCO, 2018). A cross-sectional quantitative design will be employed with a sample of 200 adolescents (classes 9–12) drawn from a semi-rural school. The Sexual Knowledge and Attitude Test for Adolescents (SKAT-A) will assess students' sexual knowledge and attitudes, and the data will be analysed using statistical graphs (Fullard, n.d.). The study's results are expected to inform educators and policymakers to develop more effective, culturally sensitive sex education curricula that ultimately contribute to improved adolescent sexual and reproductive health (UNESCO, 2018). Overall, the study discovered that teenagers' attitudes towards sex education are generally balanced across both Class 11 and Class 12. However, Class 12 students demonstrate more accurate knowledge about sex compared to those in Class 11. Males and older students show higher awareness levels than females and younger students. Notably, around half of the respondents reported being unsure or confused about their knowledge and opinions regarding sex — a pattern consistent with other regional studies reporting persistent gaps in adolescent sexual knowledge and reliance on informal sources such as the internet (regional study, n.d.; Fullard, n.d.

Keywords: Sex Education, Sexual Literacy, Adolescents, Reproductive Health, SKAT-A, Cross- Sectional Study

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Introduction

Adolescence (ages 10 to 18) is a distinct phase of human development that bridges childhood and adulthood. This period is crucial for establishing the basis of good health, as it encompasses significant physical, cognitive, and psychosocial growth (World Health Organization, 2023; UNESCO, 2018). These changes influence adolescents' emotions, thoughts, decision-making processes, and interactions with their environment (Piaget, 1952; Erikson, 1968). Sexual literacy plays a crucial role in empowering adolescents with accurate information regarding sexual and reproductive health (WHO, 2023; UNESCO, 2018).

Psychosexual theory views sex education as a construct that can be nurtured in the early years of life (Freud, 1905/1953), psychosocial theory views sex education as a construct that can occur through societal interactions (Erikson, 1968), operant conditioning considers sex education as capable based on behavioural consequences (Skinner, 1953), and social learning views sex education as something that can be modelled (Bandura, 1977).

The current state of sex education in Indian schools varies widely. Many institutions offer minimal or no sexual education, often limiting it to biological aspects taught clinically in science classes, while others substitute it with vague health and hygiene workshops (Drishti IAS, 2023; The Hindu, as cited in Drishti IAS, 2023). This inconsistency reflects a broader cultural reluctance to address sexuality openly, compounded by a lack of political will and societal pushback from conservative groups (Drishti IAS, 2023).

In India, the lack of access to quality sex education often leaves youth to rely on alternative sources such as social media and streaming platforms, which may expose them to misinformation (UNESCO, 2018; WHO, 2023). Furthermore, the prevalence of pornography as an information source has raised concerns regarding the promotion of misogynistic behaviour and sexual violence (Wikipedia, 2016; UNESCO, 2018). Sex education in India has historically faced resistance, with several states banning or refusing to implement formal sex education in school curricula, citing conflicts with "Indian values" (Wikipedia, 2016). The NEP 2020, launched on July 29, 2020, aims to transform education into a holistic, equitable, and inclusive system; however, its treatment of sex education is largely subsumed under broader categories such as "ethical and moral reasoning," which critics argue dilutes specificity and implementation (Government of India, 2020; critical analyses of NEP 2020).

Developmentally appropriate and evidence-based education about human sexuality and sexual reproduction over time — provided by paediatricians, schools, other professionals, and parents — is important to help children

and adolescents make informed, positive, and safe choices about healthy relationships, responsible sexual activity, and their reproductive health (WHO, 2018; UNESCO, 2018).

Sexuality education is more than instruction on anatomy and reproductive physiology; it also covers healthy sexual development, gender identity, interpersonal relationships, intimacy, and body image for all adolescents, including those with disabilities or chronic health conditions (UNESCO, 2018; WHO, 2023). Developing a healthy sexuality is a key developmental milestone that depends on acquiring information and forming attitudes, beliefs, and values about consent, sexual orientation, gender identity, relationships, and intimacy (UNESCO, 2018). Healthy sexuality is influenced by ethnic, racial, cultural, personal, religious, and moral concerns, and includes the capacity to form meaningful relationships, value one's body and health, interact respectfully across genders, and express affection consistent with one's values and abilities (UNESCO, 2018).

All children and adolescents need accurate education about sexuality to understand how to practice healthy sexual behavior. Unhealthy or risky sexual activity can lead to unintended pregnancy and sexually transmitted infections (STIs), including gonorrhoea, chlamydia, syphilis, hepatitis, herpes, human papillomavirus (HPV), and HIV/AIDS (WHO, 2018). A 2012 report by the National Campaign to Prevent Teen and Unplanned Pregnancy found that many high-school seniors reported mixed feelings about their first sexual experiences and suggested that seniors wished younger peers to know that "it was fine to be a virgin" at graduation, indicating complexity in adolescent sexual attitudes and decision-making (National Campaign to Prevent Teen and Unplanned Pregnancy, 2012).

The most common sources of sex education among adolescents include school, family, social media, television, and print media (UNESCO, 2018). Due to the absence of clear national protocols on sex-education content, pedagogy, and implementation, ambiguity persists regarding how services should be delivered across diverse socioeconomic and cultural contexts (Government of India, 2020; UNESCO, 2018).

Evaluating adolescents' knowledge and attitudes towards sexual literacy helps identify gaps and informs the design of curricula that are developmentally appropriate and culturally relevant. Despite its acknowledged importance, limited empirical data exist on adolescents' current knowledge and attitudes in many regional contexts, a gap this study seeks to address by examining the impact of sexual literacy (UNESCO, 2018; WHO, 2023).

In further understanding how adolescents engage with sexual literacy, several developmental and educational

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theories provide critical insight. Jean Piaget's Cognitive Development Theory suggests that adolescents in the formal operational stage (around age 12 and beyond) begin to think abstractly and logically, making them capable of understanding complex concepts related to sexuality and consent (Piaget, 1952). Erikson's Psychosocial Development Theory emphasizes identity formation during adolescence (identity vs. role confusion), with sexual identity forming a central part of this stage (Erikson, 1968). From a behavioural perspective, B. F. Skinner's Operant Conditioning Theory explains how behaviours are shaped by reinforcement and punishment (Skinner, 1953). Albert Bandura's Social Learning Theory highlights the importance of observational learning and modelling — suggesting that peers, parents, media figures, and educators significantly influence adolescents' sexual attitudes and behaviors (Bandura, 1977). Maslow's Hierarchy of Needs situates sexual health and relationships within broader human motivation (Maslow, 1943). Attachment Theory (Bowlby, 1969; Ainsworth, 1978) is also relevant: early attachment styles influence how individuals approach relationships and sexuality in adolescence and adulthood.

In the Indian context, where cultural taboos and conservative norms often restrict open discourse on sexuality, an evidence-based and theory-informed approach to sex education is especially crucial. Aligning educational strategies with developmental psychology and sociocultural realities can help bridge gaps between adolescent needs and current practices (UNESCO, 2018; Drishti IAS, 2023). Therefore, future interventions in India should integrate insights from these theories so curricula are biologically informative, psychologically supportive, and socially contextualized, promoting respectful, inclusive, and empowering sexual health literacy (WHO, 2018; UNESCO, 2018).

Need for the Study

Sexual literacy is an essential component of adolescent development, influencing their ability to make informed, respectful decisions regarding their sexual health and relationships. However, in many regions, including India, there remains a significant gap in comprehensive, age-appropriate, and culturally sensitive sex education. This lack of structured sexual literacy education often leaves adolescents vulnerable to misconceptions, unprotected sexual activity, unintended pregnancies, and sexually transmitted infections (STIs). Understanding the current level of adolescents' knowledge and attitudes toward sexual literacy is crucial in designing effective educational programs that are both developmentally appropriate and culturally relevant. Despite its importance, empirical data on adolescents' sexual knowledge and attitudes is limited, particularly in non-Western societies.

In India, this gap is compounded by a complex array of cultural taboos, social conservatism, and political resistance, which restrict open discussions about sexuality in schools. As a result, sex education in most schools focuses primarily on biological aspects of reproduction, neglecting emotional, psychological, and relational dimensions of sexuality.

This narrow approach often fails to address issues like consent, gender identity, interpersonal relationships, and sexual rights, which are fundamental to developing a healthy understanding of sexuality.

The lack of formal sexual education often forces adolescents to turn to informal, and frequently unreliable, sources for information, such as peers, social media, or pornography. These sources are often misleading, perpetuating harmful gender stereotypes, unrealistic sexual expectations, and unhealthy behaviors. For example, adolescents who rely on pornography for sexual education may develop skewed views on intimacy and consent, which can have long-term implications on their emotional and sexual well-being. Furthermore, misinformation can increase the risk of sexual violence, unprotected sex, and the spread of STIs.

Given these risks, it is imperative to assess the current level of sexual literacy among adolescents and examine their attitudes toward sex education. Such an evaluation can help identify critical gaps in their knowledge and inform the development of more comprehensive and inclusive educational curricula.

A well-rounded sexual literacy program should not only cover the biological aspects of sexual health but also emphasize the importance of emotional intelligence, mutual respect in relationships, and a clear understanding of consent and personal boundaries.

International studies have shown that countries with comprehensive and inclusive sex education programs, such as the Netherlands, Sweden, and Germany, report lower rates of teenage pregnancies, STIs, and sexual violence. These findings demonstrate the far-reaching benefits of sexual literacy, not only for individual adolescents but for society as a whole. In contrast, the lack of such education in India has contributed to significant health challenges, including rising rates of adolescent pregnancies and STIs, particularly among marginalized and rural populations.

In India, the absence of a standardized sex education curriculum has led to disparities in the quality and scope of education across regions. While some urban schools offer basic sex education, rural areas often lack resources, trained educators, and comprehensive content. Cultural resistance to discussing sexuality further exacerbates the problem, making it difficult to implement effective educational reforms. Additionally, adolescents from lower socio-economic backgrounds face additional barriers,

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including limited access to healthcare and educational services, which prevents them from receiving adequate information on sexual health.

This study aims to address these gaps by evaluating adolescents' current knowledge and attitudes toward sexual literacy. It will explore the sources of information they rely on, their comfort levels with discussing sexual health, and the cultural factors influencing their perceptions of sex education.

By identifying these gaps, the research will contribute to the design of evidence-based, developmentally appropriate, and culturally sensitive curricula that address both the knowledge and emotional needs of adolescents.

Moreover, this study will provide valuable insights into how sexual literacy can be effectively integrated into the broader educational system. It will explore the challenges faced by educators in delivering comprehensive sex education and suggest strategies for overcoming these challenges. Ultimately, the findings of this research will inform the development of policies and programs that equip adolescents with the tools they need to make healthy, informed choices regarding their sexual health and relationships. Empowering adolescents with accurate and comprehensive sexual knowledge is not just about reducing health risks; it is about fostering self-awareness, enhancing emotional intelligence, and promoting respectful, consensual relationships.

As such, this study aims to contribute to the ongoing efforts to improve sexual education in India and ensure that all adolescents have access to the resources they need to lead healthy, fulfilling lives.

Review of Literature

Suchita Singh, Deepika Badkur, and Sumeet Dhruve (2024) demonstrated that although 72.8% of adolescents are aware of sex education, 74.4% have never attended formal classes, relying mostly on internet sources. This finding echoes the concerns raised by Kirby (2002) and UNESCO (2009), who found that comprehensive sex education can significantly delay sexual initiation and reduce risky sexual behaviors. Furthermore, studies by Shukla, Mishra, and Dani (2021) and the review published by Sudiksha, Dr. Poonam Malik, Deeksha Rawat, and Aarti (2024) highlighted the absence of formal, structured sex education programs in India and the reliance on informal, often unreliable, sources like peer groups and digital platforms. Panchal, Dolkar, and Heena (2022) found significant gaps in teenagers' knowledge about sex education in selected schools in Dehradun, India. Their research indicated that cultural and contextual factors, including regional and familial attitudes, heavily influence the adolescents' awareness of sexual health. The restrictive cultural environment in India, as pointed

out by the studies of Shukla et al. (2021) and Sudiksha et al. (2024), directly correlates with poor sexual health outcomes such as teenage pregnancies and higher rates of sexually transmitted infections (STIs). These findings align with Bandura's (1986) Social Cognitive Theory, which suggests that social influences such as family, peers, and media play a crucial role in shaping adolescents' sexual knowledge and behaviors. Research by Ajzen (1991) in the Theory of Planned Behavior emphasizes that attitudes and beliefs about sexuality influence adolescents' intentions and behaviors. Studies consistently show that adolescents who receive formal, comprehensive sex education tend to make safer sexual choices compared to those who rely on informal or no education. For example, a study by Fullard et al. (2005) revealed that adolescents with higher levels of sexual literacy were less likely to engage in risky sexual behavior. Similarly, in a study conducted by Kirby (2002), it was found that adolescents who were taught comprehensive sex education were less likely to engage in early sexual activity and more likely to use contraception. The negative consequences of poor sexual literacy are also well-documented in the literature. Adolescents with limited sexual knowledge are more likely to engage in unprotected sex, leading to higher rates of STIs and unplanned pregnancies. A review by Fullard, Johnston, and Lief (1998) underscores that adolescents with inadequate sexual health education are at higher risk for adverse physical, emotional, and social outcomes. Furthermore, the research conducted by Sudiksha et al. (2024) reiterates that cultural taboos surrounding sex education are directly correlated with negative health outcomes. These findings emphasize the urgent need for a shift towards open, informed, and scientifically accurate sex education in culturally sensitive ways.

Fullard and colleagues (1998; 2005) developed and validated the SKAT-A instrument used frequently to measure adolescents' sexual knowledge and attitudes, providing a reliable way to assess multiple content domains such as transmission, pregnancy, and consent-related knowledge. UNESCO's technical guidance (2009) supports curriculum approaches that are age-appropriate, culturally sensitive, and that address knowledge, attitudes and skills — not only biological facts. Recent Indian studies mirror these international conclusions: Panchal et al. (2022) reported substantial gaps in basic sex-education knowledge among school adolescents in Dehradun, while Singh et al. (2024) found that although a majority of adolescents report awareness of sex education, most have never attended formal classes and rely on informal (often unreliable) sources such as the internet and peers.

Need and Rationale of the Study

The increasing importance of sexual literacy in the context of adolescent health underscores the need for com-

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prehensive, evidence-based interventions. Adolescents today are at the crossroads of receiving minimal formal sex education while often turning to informal, unreliable sources such as the internet, peers, and pornography. As a result, their knowledge about sexual health may be incomplete, distorted, or inaccurate, leading to risky sexual behaviors. This study seeks to address the gaps identified in the literature by evaluating the current level of sexual literacy among adolescents in both urban and rural settings in India, considering the impact of cultural, familial, and social factors on their knowledge and attitudes.

Additionally, the lack of empirical data on the effectiveness of existing sex education programs in India further highlights the need for this study. By examining the knowledge and attitudes of adolescents towards sex education, the study aims to provide insights that will assist policymakers, educators, and health professionals in designing curricula that are not only developmentally appropriate but also culturally relevant to Indian youth. This research will help bridge the gap between the theoretical frameworks of sex education and its practical application in the Indian context.

Significance and Scope of the Present Study

This study is significant in several ways. Firstly, it addresses a critical gap in the literature by examining the level of sexual literacy among Indian adolescents, taking into account the socio-cultural factors that influence their knowledge and attitudes. Secondly, it offers a unique perspective on the effectiveness of sex education programs in India, which have often been critiqued for their lack of inclusivity and cultural sensitivity.

By employing instruments like the SKAT-A, the study seeks to assess adolescents' sexual knowledge and attitudes in a comprehensive, developmentally appropriate manner, providing a baseline for future research and curriculum development.

The scope of this study extends beyond merely identifying knowledge gaps; it aims to provide actionable recommendations for improving sex education programs, both in schools and through public health initiatives. By incorporating the perspectives of adolescents from diverse socio-economic backgrounds, the study ensures that the findings reflect the experiences of the broader youth population. The results of this research will have wide-reaching implications for educators, policymakers, and health professionals working towards improving adolescent sexual health outcomes in India

Methodology

Methodology is a framework or the blueprint of the entire study. This includes parts such as the hypothesis, the details about the sample, the sampling methods, the tools used to collect data from the sample, the procedure followed to conduct the study and the statistical tools that will be used to analyze the result obtained from the sample. Each one mentioned above has rationale why it is being chosen and the explanations are based on the research questions that has been arrived at, and the methods to obtain the answers for those questions, or to test the hypothesis that has been arrived at. Methodology is detailed at each step and act as a guide to the researcher, as to how to go about, in conducting this particular study. Like mentioned above, the various topics provide more information about the details and tools used in the research study.

Research Topic

Evaluating the Knowledge and Attitude Towards Sexual Literacy Among Adolescents

Aim of the Study

To assess the current level of knowledge about reproductive and sexual health, and attitude towards sexual literacy which further helps researchers and educators to develop evidence- based, age-appropriate, and culturally sensitive programs to impart the sexual literacy.

Objectives

To assess the current level of adolescents' knowledge regarding reproductive and sexual health, and their attitudes towards sexual literacy, with the aim of understanding their educational needs.

Research Questions

What is the current level of knowledge regarding sexual behavior and prevailing attitudes toward sexual literacy among adolescents?

Hypotheses

Adolescents in Grade 12 will have significantly higher knowledge and linear attitudes towards sexual literacy scores than adolescents in Grade 11.

Variables

Independent Variable: Academic Standard (11th, 12th)

Dependent Variables: Knowledge and attitudes toward sexual literacy.

Demographic Variables: Age and Gender.

Sample

A sample of 68 students from classes 11th and 12th, was be selected using stratified random sampling to ensure equal representation.

Research Design

Research design helps the researcher to choose the way to proceed from the research question, that is, how exactly should the research be carried out. It can be said as the

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framework in which the researcher conducts the research. Various research designs such as descriptive, exploratory, etc. are available and according to the need for the particular study, the researcher chooses the research design.

The study uses a quantitative approach to measure and compare levels of sexual knowledge and attitudes across predefined groups (grade 11 vs grade 12; age and gender groups) at a single point in time. A cross-sectional descriptive design is appropriate for estimating the prevalence of correct, incorrect and uncertain responses in this school population and for testing the stated hypothesis that knowledge increases with grade level. Stratified random sampling was used to ensure proportional representation from both grades.

Sampling Design

The sample consisted of 68 students, both males and female students studying in class 11th and 12th grade participated in the study. The subjects were selected from a semi-rural private school in Siliguri, West Bengal,

Inclusion Criteria

Questionnaires are in English language; gender does not play a role in influencing the results. Male and Female students of class 11th and 12th grades were randomly selected.

Exclusion Criteria

Students who did not want to participate were excluded. Those who did not receive parental consent were also excluded

Instrument

The Sexual Knowledge and Attitude Test for Adolescents (SKAT-A) is a developmentally appropriate, paper-and-pencil self-report questionnaire for assessing subjective evaluations and knowledge proficiency regarding sexual behaviour and sexual experience for adolescents (Fullard, Scheier & Lief, 2005).

Knowledge section consists of 41 true, false and not sure items. Attitude section consists of 40 items with 5 Likert scale from strongly agree to strongly disagree.

Statistical Tools and Analysis Procedures

Items of the SKAT-A were coded as follows: Correct = 2, Incorrect = 1, Not sure = 0. Subscale scores were computed by summing relevant items for each domain (e.g., KNWPREG — pregnancy knowledge; KNWTRAN — transmission; KNWVIRG — sexual initiation & virginity; KNWORG — orgasm/erection; KNWMAST — masturbation; KNWNEG — negative consequences/rape; KNWHOMO — homosexuality; KNWEDUC — abortion & education).

For all variables and subscales - modes, means, frequencies and percentages were calculated to describe sample perfor-

mance and distribution of "Correct / Incorrect / Not sure" responses. Graphical methods (bar charts/line graphs) were used to visualise domain-level patterns by grade, gender and age group.

Procedure

After obtaining institutional and parental consent, the instruments were administered in classroom settings. A briefing session was conducted to explain the study's purpose, ensure comprehension, and address any questions. Data collected from the 68 students, both male and female of class 11th grade and 12th grade. It was assured that all questions were answered by the subjects. These individuals were explained about the reason and the purpose of the research before data was collected. Participation was voluntary, with confidentiality and anonymity strictly maintained. Informed consent was obtained from institution, parents/guardians and an assent from the adolescents. Appropriate instructions were given to fill the questionnaires and all the doubts and queries were clarified during this process. Thus, the above chapter dealt with how to bring down the variables of the study into numbers using the psychological tools used, the details of the analysis to be done and the sample details were included. The following chapter will be dealing with the results of the analysis that was done based on the scores obtained by the samples in the above-mentioned tools.

Ethical Considerations

Participation will be voluntary, with confidentiality and anonymity strictly maintained. Informed consent will be obtained from institution, parents/guardians and an assent from the adolescents.

Results and Discussion

For all variables and subscales - modes, means, frequencies and percentages were calculated to describe sample performance and distribution of "Correct / Incorrect / Not sure" responses in knowledge section and scoring of five Likert scale (strongly agree to strongly disagree) in attitude section. Graphical methods (bar charts/line graphs) were used to visualise domain-level patterns by grade, gender and age group.

Analyzed Data of Attitude and Knowledge for Class 12th
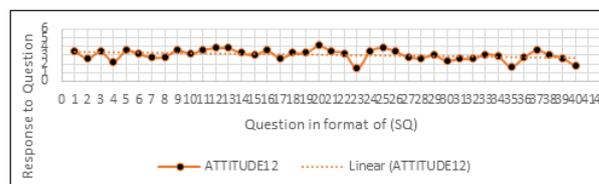
Attitude of Grade 12

Figure 1. Attitude of Grade 12, Author Reference

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The analysis of the student responses, as represented by the graphs, reveals that the general trend of attitudes fluctuates between agreement and uncertainty. Notably, **a majority of students strongly disagreed** with the statement in question **SQ23** ("A woman's fault causes rape"), indicating a rejection of victim-blaming attitudes.

On the other hand, **a significant number of students expressed agreement to strong agreement** with the statement in **SQ20** ("Sex education is required in schools"), highlighting the widespread support for the inclusion of sex education in the school curriculum.

Knowledge of Sex Education in adolescents of different age and gender group (Grade 12)

The knowledge of sex education is divided into the following distinct categories:

- KNOWLEDGE OF PREGNANCY KNWPREG = SUM (of SKAT18 SKAT19 SKAT25 SKAT28 SKAT29 SKAT32 SKAT39);
- KNOWLEDGE TRANSMISSION KNWTRAN = SUM (of SKAT15 SKAT20 SKAT31);
- KNOWLEDGE OF SEXUAL INITIATION & VIRGINITY KNWVIRG = SUM (of SKAT6 SKAT27 SKAT33 SKAT37);
- KNOWLEDGE ABOUT ORGASM/ERECTION KNWORG = SUM (of SKAT1 SKAT2 SKAT3 SKAT5 SKAT8 SKAT26 SKAT30);
- KNOWLEDGE ABOUT MASTURBATION KNWMAST = SUM (of SKAT4 SKAT10 SKAT17 SKAT22 SKAT24);
- KNOWLEDGE ABOUT NEGATIVE CONSEQUENCES/RAPE KNWNEG = SUM(of SKAT9 SKAT14 SKAT16 SKAT21 SKAT23 SKAT36);
- KNOWLEDGE OF HOMOSEXUALITY KNWHOMO = SUM (of SKAT7 SKAT11 SKAT12 SKAT34 SKAT38);
- KNOWLEDGE OF ABORTION & EDUCATION KNWEDUC = SUM (of SKAT13 SKAT35 SKAT40 SKAT41);

Data of these categories has been obtained and analysed with graphical methods
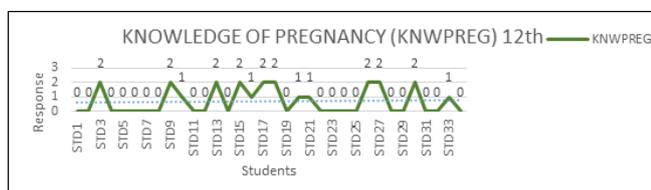
Figure 2.Knowledge of Pregnancy, Author Reference

The graph illustrates the varying levels of knowledge about pregnancy (KNWPREG) among 12th-grade students, where responses range from 0 (no knowledge) to 2 (correct knowledge). The fluctuations in the data suggest inconsistent understanding across students, with some demonstrating correct knowledge (2), while others show limited or no understanding (0 or 1). The dotted line represents the overall trend, highlighting a general low level of knowledge.
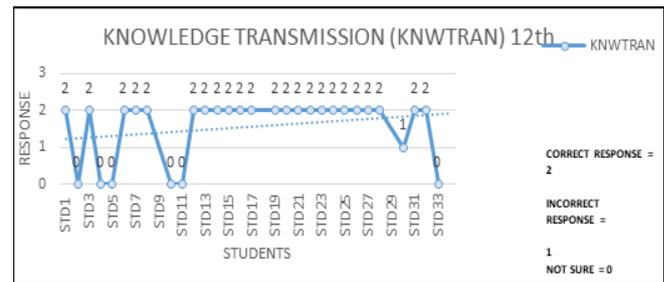

Figure 3.Knowledge of Transmission, Author Reference

The graph illustrates that majority of respondents provided correct responses (coded as 2), with relatively few instances of incorrect responses (1) or expressions of uncertainty (0). The presence of a positive linear trend suggests an overall improvement and consistency in the transmission of knowledge within this cohort.
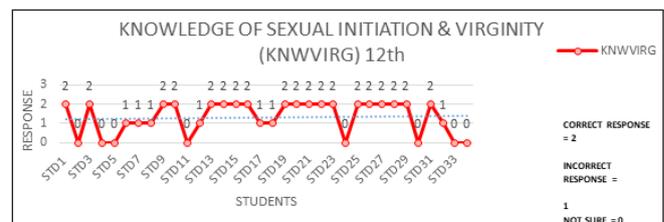

Figure 4.Knowledge of Sexual Initiation & Virginity, Author Reference

The graph illustrates a predominance of correct responses (2), although instances of incorrect answers (1) and uncertainty (0) are also visible. The positive linear trend reflects a generally sound level of knowledge within the cohort, though variations highlight areas where misconceptions or gaps remain.
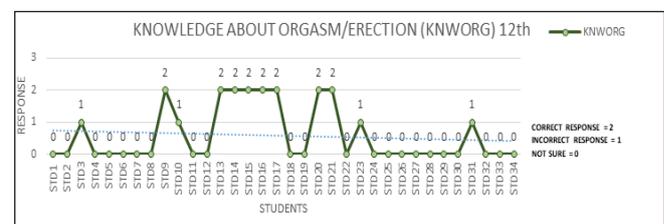

Figure 5.Knowledge About Orgasm/Erection, Author Reference

The graph illustrates a substantial level of uncertainty (0), with relatively few students providing correct (2) or incorrect (1) responses. The negative slope of the trend line suggests limited and inconsistent understanding in this area, indicating that orgasm and erection remain among the least comprehended aspects of sexual knowledge within the cohort.
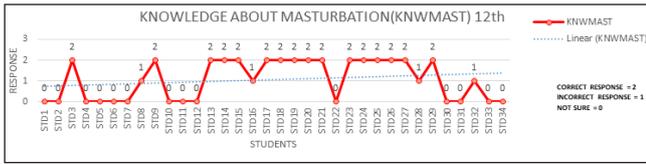
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Figure 6.Knowledge About Masturbation, Author Reference

The graph illustrates significant variation, with a considerable number of students reporting uncertainty (0) and fewer showing incorrect responses (1). Despite these gaps, the positive linear trend indicates a gradual improvement in awareness, though knowledge in this domain remains inconsistent compared to other areas.
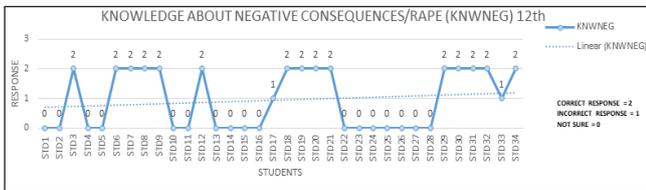

Figure 7.Knowledge About Negative Consequences/ Rape, Author Reference

The graph illustrates a highly fragmented understanding, with clusters of correct responses interspersed with long stretches of uncertainty (0). The lack of a consistent upward trend suggests that awareness in this domain is sporadic and unevenly distributed, underscoring critical gaps in sexual health education related to risks and consent.
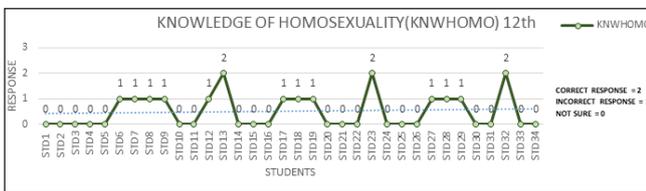
Figure 8.Knowledge of Homosexuality, Author Reference

The graph illustrates a predominantly low awareness, with most students responding as "not sure" (0). Correct responses (2) and partial knowledge (1) appear sporadically, with only a slight concentration toward the later part of the cohort. This suggests that understanding of homosexuality is limited, inconsistent, and unevenly distributed, reflecting the influence of inadequate exposure and possible social stigmatization surrounding the topic.
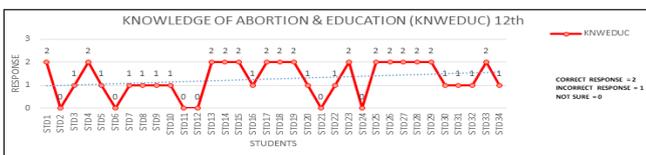

Figure 9.Knowledge of Abortion & Education, Author Reference

The graph illustrates a significant inconsistency, with responses oscillating between correct knowledge (2), partial understanding (1), and a large proportion of "not sure" (0). While some students demonstrate accurate awareness, the overall trend highlights **fragmented and uneven comprehension**, suggesting gaps in formal instruction and the influence of social or cultural silences around the subject.

The following section presents an analysis of the responses of Class 12th students, categorized according to their respective age groups:
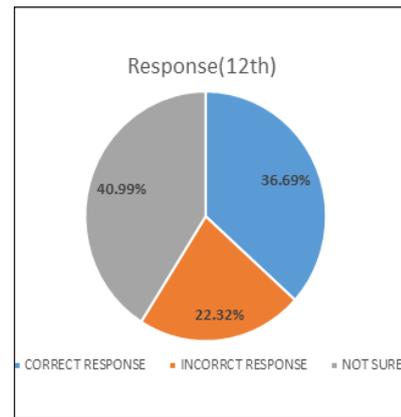

Figure 10.Pie Chart of % of Responses, Author Reference

- A significant proportion of students (40.99%) selected "Not Sure," indicating uncertainty and highlighting gaps in awareness and confidence.
- Correct responses accounted for 36.69%, reflecting a moderate but limited level of accurate knowledge among the students.
- Incorrect responses (22.32%) reveal the persistence of misconceptions, emphasizing the need for improved clarity and structured educational interventions.
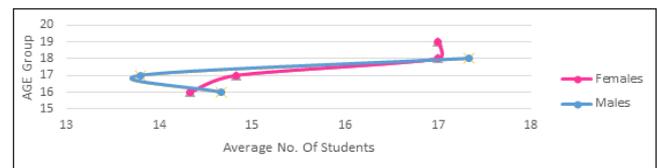

Figure 11.Gender-Based Correct Responses, Author Reference

The graph illustrates the distribution of correct responses among Class 12th students across different age groups, disaggregated by gender. It shows that both males and females demonstrate an overall increase in correct responses with age, with females peaking at age 19 while males show steadier progress between 16 and 18. This suggests that knowledge acquisition improves with age, though gendered variations in response accuracy are evident, highlighting differential learning patterns.
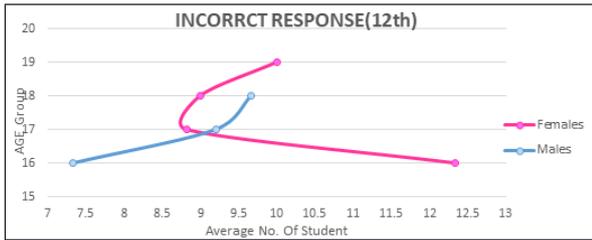
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Figure 12.Gender-Based Incorrect Responses, Author Reference

The graph illustrates the average number of students with incorrect responses across different age groups, separated by gender. Female students display a non-linear trend, with incorrect responses peaking around age 19 at approximately 10 students, while the lowest occurs at age 16 with about 12.5 students, indicating significant fluctuations. In contrast, male students exhibit a more consistent, linear increase in incorrect responses from age 16 to 18, reaching a peak of around 9.5 students. These patterns suggest differing academic response behaviors between genders across age groups.
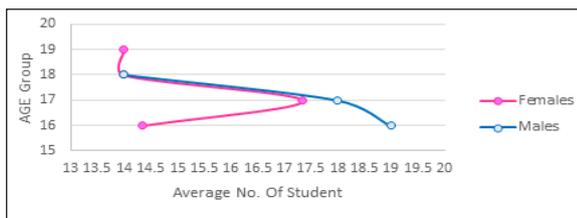

Figure 13.Gender-Based Not Sure Items, Author Reference

The graph illustrates the average number of students who were uncertain in their responses, segmented by age and gender. Male students show a clear downward trend with increasing age, indicating a decrease in uncertainty from around 18.5 students at age 16 to 14 at age 19. In contrast, female students exhibit a U-shaped pattern—uncertainty is lowest at age 18, but higher at both younger (age 16) and older (age 19) ends, suggesting more fluctuating confidence levels across age groups.

Analyzed Data of Attitude and Knowledge of Grade 11
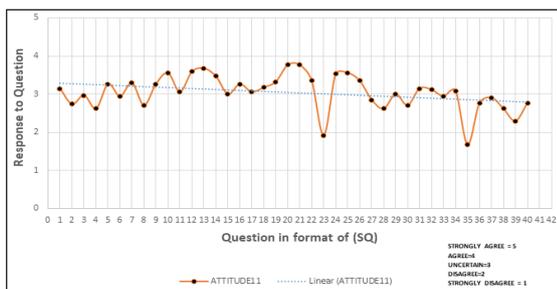
Attitude of Grade 11

Figure 14.Attitude of Grade 11, Author Reference

The representation of the graph indicates a trend in students' attitudes shifting from agreement to uncertainty regarding the survey questions. A majority of students strongly disagreed with **SQ35**, while most expressed agreement to strong agreement with **SQ20** (*"Sex education is required in schools"*) and **SQ21** (*"Children should not see their parents naked"*). Additionally, a notable portion of students disagreed with **SQ23** (*"Sex between adolescents is not okay"*) and showed considerable agreement with **SQ13** (*"Abortion is murder"*). Overall, the graph reflects a pattern of uncertainty in students' responses across the questions surveyed.

Knowledge of Sex Education in adolescents of different age & gender group of Grade 11

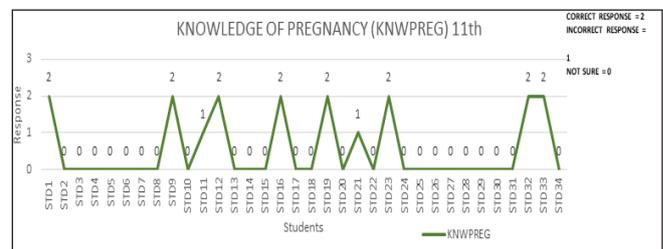Data of these categories has been obtained and analysed with graphical methods-

Figure 15.Knowledge of Pregnancy, Author Reference

The graph illustrates students' responses on a scale where 0 indicates no knowledge, 1 indicates partial knowledge, and 2 indicates full knowledge. A significant majority of students (over 70%) scored **0**, reflecting a widespread lack of understanding regarding pregnancy. Only a few students demonstrated full knowledge (score 2), with very sparse representation of partial knowledge (score 1), indicating a critical gap in reproductive health education at this level.
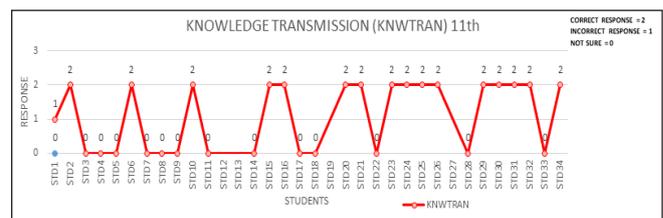

Figure 16.Knowledge of Transmission, Author Reference

The graph illustrates a relatively strong understanding of disease transmission among students. A majority of respondents scored **2**, indicating full knowledge, with only a few scattered instances of **0** and **1** responses, suggesting minimal or partial understanding. This pattern reflects a generally high level of awareness regarding transmission mechanisms, likely due to greater emphasis in educational content or public health messaging.
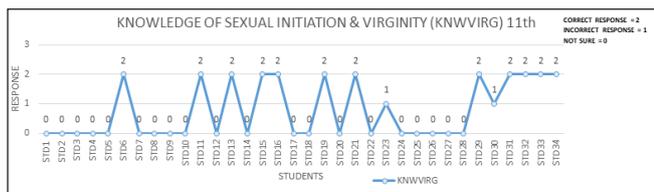
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Figure 17.Knowledge of Sexual Initiation & Virginity, Author Reference

The graph illustrates a significant lack of awareness among students, with the vast majority scoring **0**, indicating no knowledge. Only a few students demonstrated full understanding (**score 2**), and just one showed partial knowledge (**score 1**). This data suggests that topics related to sexual functioning remain under-addressed or stigmatized in the current educational framework, pointing to a critical need for comprehensive and age-appropriate sex education.
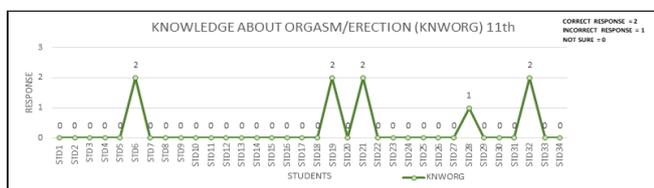

Figure 18.Knowledge About Orgasm/ Erection, Author Reference

The graph illustrates a significant lack of awareness among students, with the vast majority scoring 0, indicating no knowledge. Only a few students demonstrated full understanding (score 2), and just one showed partial knowledge (score 1). This data suggests that topics related to sexual functioning remain under-addressed or stigmatized in the current educational framework, pointing to a critical need for comprehensive and age-appropriate sex education.
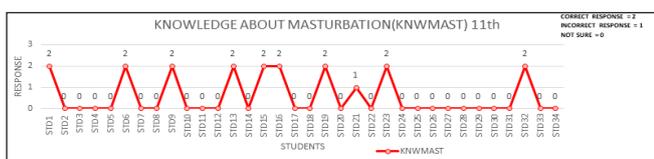

Figure 19.Knowledge About Masturbation, Author Reference

The graph indicates substantial variation in students' understanding of the topic. While a small number of students demonstrated full knowledge (score 2), the majority reflected a complete lack of awareness (score 0), and only one student showed partial understanding (score 1). This disparity underscores a significant gap in sexual health education, suggesting the need for inclusive and accurate instruction on masturbation to dispel myths and promote healthy sexual development.
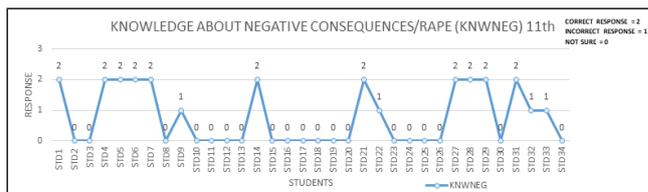

Figure 20.Knowledge About Negative Consequences / Rape, Author Reference

The graph reveals a significant gap in knowledge about the negative consequences of rape among 11th-grade students, with the majority scoring 0. Only a small group demonstrated adequate awareness (score of 2), indicating the need for focused educational interventions on sexual violence.
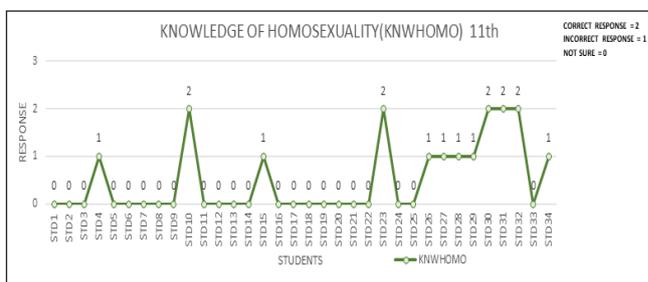

Figure 21.Knowledge of Homosexuality, Author Reference

The graph illustrates the knowledge levels of 11th-grade students regarding homosexuality, with responses ranging from 0 to 2. A majority of students scored 0, indicating limited or no knowledge, while a smaller portion demonstrated moderate knowledge (response 1) or higher understanding (response 2). This distribution suggests a significant gap in awareness or education on the topic within this group.
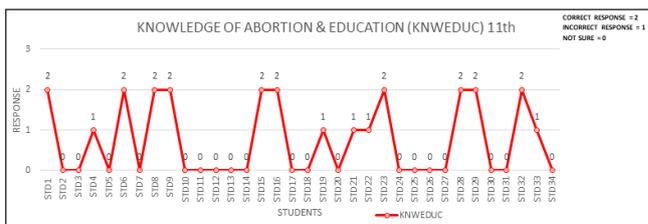

Figure 22.Knowledge of Abortion & Education, Author Reference

The graph highlights a considerable disparity in students' awareness levels. While a subset of students demonstrates complete knowledge (score 2), a significant portion shows no knowledge at all (score 0), and a smaller group reflects only partial understanding (score 1). This variation suggests inconsistent exposure to accurate information about abortion and reproductive education, pointing to a pressing need for standardized, comprehensive sexuality education within the curriculum.

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The following section presents an analysis of the responses of Class 11th students, categorized according to their respective age groups:
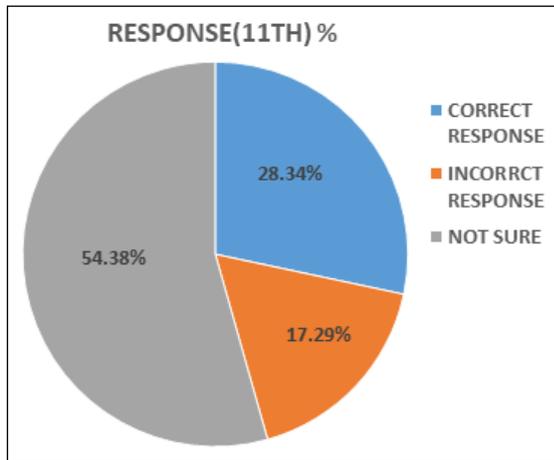

Figure 23.Pie Chart Showing Responses, Grade 11, Author Reference

- **High Uncertainty:** Over half of the students (54.38%) responded with "Not Sure," indicating a significant lack of clarity or awareness regarding the topic of rape and its consequences.
- **Limited Correct Understanding:** Only 28.34% of students gave correct responses, suggesting that less than a third have an accurate understanding of the issue.
- **Prevalence of Misconceptions:** 17.29% provided incorrect answers, highlighting the presence of misinformation or misconceptions that may hinder effective awareness and prevention efforts.
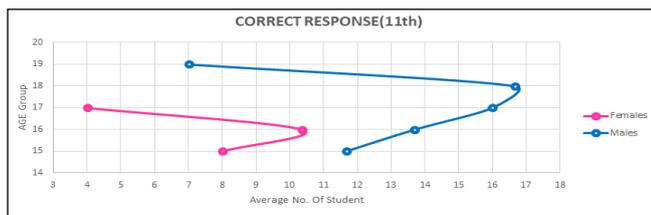

Figure 24.Gender-Based Correct Responses, Author Reference

The graph illustrates age-wise correct responses among 11th-grade males and females regarding knowledge of rape consequences. Males consistently outperform females across all age groups, with the highest accuracy seen among 18-year-olds. Females show relatively lower and less varied response rates, indicating a potential gender gap in awareness that warrants targeted educational strategies.
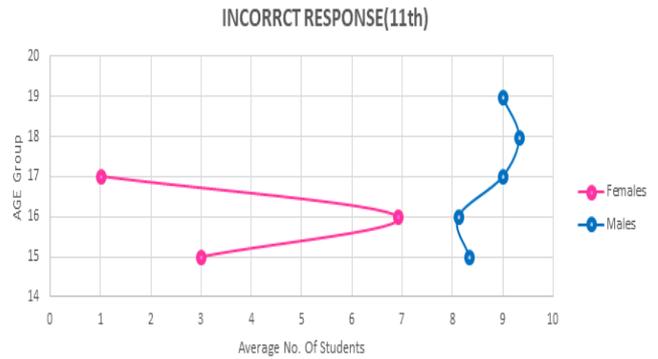

Figure 25.Gender-Based InCorrect Responses, Author Reference

The graph illustrates that incorrect responses are more prevalent among male students across all age groups, particularly between ages 16 to 19, with an average close to 9 students. In contrast, female students show significantly fewer incorrect responses, suggesting either lower participation or greater caution, but also possibly indicating lower overall engagement or confidence in answering. This disparity points to the need for gender-sensitive education approaches to address misconceptions more effectively.
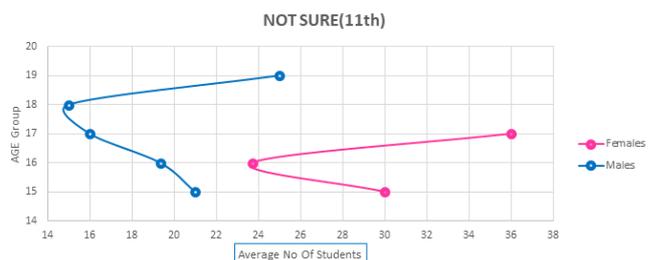
Figure 26.Gender-Based Not Sure Items, Author Reference

The graph highlights that a significantly higher number of female students across all age groups expressed uncertainty regarding the topic, with averages peaking around 36 students. Male students also showed considerable uncertainty, though in comparatively lower numbers. This trend indicates a widespread lack of confidence or awareness, particularly among females, emphasizing the need for comprehensive, gender-responsive educational interventions.

Discussion

- **Overall knowledge and uncertainty:** Across the sample, a substantial proportion of responses were "Not sure" (≈40.99%), with correct responses ≈36.69% and incorrect responses ≈22.32% on aggregate domain

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scoring—indicating substantial uncertainty and knowledge gaps in key sexual literacy domains.

- **Grade differences:** Class 12 students performed better on knowledge indices than Class 11 students, consistent with the hypothesis that knowledge increases with grade.

- **Gender and age:** Males and older adolescents tended to have higher average knowledge scores in several domains, though patterns varied by domain and some gender differences were small or non-uniform. In Class 11th, males demonstrated a greater level of accuracy in their responses compared to females. In Class 12th, however, both genders exhibited similar levels of accuracy. Interestingly, young females in Class 12th and older males in the same class were more likely to give incorrect responses.

- **Domain-level findings:** Areas with relatively higher correct responses included knowledge of transmission (KNWTRAN), whereas domains such as orgasm/erection and homosexuality had more "Not sure" responses and lower correct rates—highlighting sensitive areas with larger knowledge gaps.

- **Attitudes Towards Sex-Related Questions:** The attitudes of Class 11th and 12th students towards sex-related questions are largely similar. Both groups disagree with the statement in SQ23 ("A woman's fault causes rape") and SQ35. Additionally, a significant majority from both classes agree with statements like SQ20 ("Sex education is required in schools"), SQ21 ("Children should not see parents naked"), and SQ25 ("Teenagers should remain virgins").

- **Knowledge of Pregnancy:** Class 12th students exhibit a more accurate understanding of pregnancy than Class 11th students. However, despite this difference, a notable proportion of students in both classes are still unsure about various aspects of pregnancy.

- **Knowledge of Transmission:** Class 12th students provided more accurate responses regarding sexual transmission compared to Class 11th students. Both classes, however, demonstrated a general accuracy in their responses, with only a few expressing uncertainty or providing incorrect answers.

- **Knowledge of Sex Initiation and Virginity:** Class 12th students were more knowledgeable about sex initiation and virginity compared to Class 11th students, the latter of whom displayed higher levels of uncertainty regarding these topics.

- **Knowledge of Orgasm and Erection:** Both classes demonstrated uncertainty regarding orgasm and erection, with Class 12th students providing more accurate responses than Class 11th students. Around 80% of Class 11th students expressed uncertainty regarding these topics.

- **Knowledge of Masturbation:** Class 12th students displayed a higher level of understanding regarding masturbation than Class 11th students. However, Class 11th students were more likely to express uncertainty, with many providing incorrect answers or no response at all.

- **Knowledge of Negative Consequences:** Both classes exhibited uncertainty regarding the negative consequences of sexual activity, with more than half of the students from both classes indicating they were unsure about the topic.

- **Knowledge of Abortion:** Class 11th students showed a higher level of uncertainty regarding abortion, while Class 12th students demonstrated greater accuracy in their responses. However, Class 12th students also gave more incorrect responses compared to Class 11th students.

- **Uncertainty Among Students:** A significant portion of students from both classes (approximately half) expressed uncertainty or confusion about various aspects of sexual knowledge, including their opinions on sexual health. This indicates the need for more comprehensive and clear sex education in schools.

The high rate of "Not sure" responses mirrors findings reported in recent Indian samples where adolescents report awareness but lack formal instruction (Singh et al., 2024; Panchal et al., 2022). The pattern of stronger knowledge about transmission but weaker understanding of sexual functioning and sexuality-diversity suggests curricula (where present) emphasize biological/medical facts while neglecting relational, affective and diversity topics; this pattern is consistent with UNESCO and WHO recommendations that comprehensive sexuality education should include emotional, relational and rights-based content.

The gender patterns suggest the influence of sociocultural norms and differential access to information (e.g., boys accessing particular informal sources). Overall, findings support targeted, developmentally appropriate interventions addressing the weakest domains and reducing uncertainty.

Key Insights

Accuracy of Responses: Overall, Class 12th students provided more correct responses across most topics. However, they also exhibited a higher incidence of incorrect responses when compared to Class 11th students, who generally showed more uncertainty.

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Limitations

This study has some limitations which might have affected the study.

The size of the sample may challenge the generalization of the result.

1. In the study population are only from a semi-rural school, Siliguri West Bengal. Hence this study can't be generalized fully to general population.

2. The literature review is limited in this draft and should be expanded with up-to-date peer-reviewed sources.

3. Socio-economic and educational background of the family is not assessed.

Recommendations

1. Introduce age-appropriate, evidence-based sexual literacy modules in the school curriculum.
2. Provide structured teacher training and safe classroom protocols for sensitive topics.
3. Expand future studies (larger, multi-site samples) and use pre-post designs to evaluate intervention effectiveness.
4. Samples can be taken from many places or from many schools in different state. That will help the researcher to generalize results.
5. Curriculum developers and school policymakers should consider enhancing sexual literacy curricula, particularly focusing on subdomains with low knowledge scores.
6. Program evaluation using pre-post designs could measure program efficacy.

Implications

- **Curriculum development:** Schools and curriculum designers should integrate comprehensive sexuality education that addresses knowledge (pregnancy, transmission), interpersonal skills (consent, boundaries), and diversity (sexual orientation, gender identity), with extra focus on domains showing highest uncertainty (orgasm/erection, masturbation, homosexuality).
- **Teacher training:** Educator training is essential to equip teachers to handle sensitive topics accurately and culturally sensitively so students receive reliable information rather than misinformation from peers or internet.
- **Policy & evaluation:** Policymakers should pilot and evaluate school-based interventions (e.g., pre-post designs) and scale effective ones; program evaluation will help determine impact on knowledge, attitudes and behaviour.
- **Targeted outreach:** Because some subgroups (younger students, females in specific domains) showed more uncertainty, targeted workshops or peer-education sessions could reduce gaps in those groups.

Summary

This graphical cross-sectional study of 68 adolescents using the SKAT-A instrument quantified knowledge and attitudes across multiple sexual literacy domains. While support for school-based sex education was strong, large proportions of students reported uncertainty across many items, and knowledge accuracy increased with grade and age. Domain-level gaps—particularly around sexual functioning and sexual diversity—highlight the need for more inclusive and comprehensive instruction. This study reveals that adolescents in grade 12 possess higher knowledge and more linear attitude towards sexual literacy than grade 11, the deviation, however, is within a narrow range.

Conclusion

The study concludes that the knowledge and attitude towards sexual literacy of grade 12 adolescents is seen greater than the adolescents of grade 11. Large proportions of uncertain responses across various domain suggest that existing informal information channels are insufficient to build confident, accurate sexual literacy among adolescents. School-based, developmentally appropriate, evidence-based curricula—supported by teacher training and program evaluation—are necessary to address uncertainty and correct misconceptions. These steps are likely to improve sexual and reproductive health outcomes and foster respectful, informed attitudes among adolescents.

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