



Association between Knowledge Level and Adolescents' Attitudes Toward Sexually Transmitted Infections (STIs) Prevention

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Submitted: 2026-07-15

DOI: 10.53088/griyawidya.v5i2.3576

Accepted: 2026-09-28

Published: 2026-09-28

Keywords:	Abstract
Adolescents	Background: This study aimed to determine the relationship between knowledge level and adolescents' attitudes toward STI prevention at SMK Negeri 5 Batam, Indonesia. Method: This analytical observational study employed a cross-sectional design and was conducted on August 28, 2025. The study population consisted of 5,102 students, with 99 respondents selected using proportionate stratified random sampling. Data were collected using a structured questionnaire and analyzed using univariate and bivariate analyses. Univariate analysis was used to describe respondents' characteristics, knowledge level, and attitudes toward STI prevention using frequencies and percentages. Bivariate analysis was performed using the chi-square test to examine the relationship between knowledge level and attitudes toward STI prevention. Result: Of the 99 respondents, 48 (48.5%) had a low level of knowledge, while 38 (38.4%) demonstrated negative attitudes toward STI prevention. Univariate analysis showed the distribution of knowledge levels and attitudes toward STI prevention among respondents. Bivariate analysis using the chi-square test showed a significant relationship between knowledge level and attitudes toward STI prevention ($p = 0.021$). These findings indicate a significant association between knowledge level and attitudes toward STI prevention. Implication: Schools should strengthen reproductive health education through continuous health promotion programs involving teachers and healthcare professionals to improve adolescents' knowledge and foster positive attitudes toward STI prevention. Novelty: This study provides recent empirical evidence on the association between knowledge and attitudes toward STI prevention among vocational high school students in Batam, supporting the development of evidence-based school health promotion programs.
Attitude	
Knowledge	
Sexually	
Transmitted	
Infections	
Prevention	

INTRODUCTION

Sexually transmitted infections (STIs) remain a major global public health challenge, particularly among adolescents, because they can be transmitted through vaginal, anal, or oral sexual intercourse and are caused by bacteria, viruses, fungi, or parasites (Hughes & Sawleshwarkar, 2023). Besides increasing morbidity, untreated STIs may result in severe reproductive health complications, including infertility, neurological disorders, congenital infections, and increased susceptibility to Human Immunodeficiency Virus (HIV) infection (Puspita & Veftisia, 2023). According to the World Health Organization (WHO), more than 374 million new cases of curable STIs occur annually worldwide, indicating that STIs continue to pose a substantial burden on global health systems (WHO, 2024).

Indonesia also faces a growing burden of STIs. National surveillance data reported 19,016 laboratory-confirmed STI cases in 2021, while recent reports indicated an increasing number of HIV, AIDS, syphilis, and gonorrhea cases among adolescents aged 15–19 years during 2024 (Kesehatan, 2022). Adolescents represent one of the most vulnerable populations because they are in a developmental stage characterized by curiosity, experimentation, and limited access to accurate reproductive health information. Consequently, inadequate knowledge may influence adolescents' attitudes toward STI prevention and increase engagement in risky sexual behaviors (Kassie et al., 2020).

At the provincial level, the Riau Islands Health Office reported a continuous increase in STI and HIV cases, particularly among adolescents. Batam City, as an international industrial and tourism hub bordering Singapore and Malaysia, experiences high population mobility that potentially accelerates STI transmission. These epidemiological conditions highlight the importance of strengthening STI prevention efforts among adolescents through school-based health education.

Despite numerous reproductive health promotion programs, adolescents' knowledge regarding STI transmission and prevention remains inadequate. A preliminary survey conducted at SMK Negeri 5 Batam City showed that 14 out of 20 students were unable to correctly identify STI transmission routes. Although most students expressed negative attitudes toward premarital sexual intercourse based on moral and religious values, misconceptions regarding preventive practices, particularly condom use, were still evident. This finding suggests that positive moral beliefs do not necessarily reflect adequate health literacy or appropriate preventive attitudes.

The persistence of inadequate knowledge among adolescents may hinder the effectiveness of STI prevention programs because knowledge constitutes one of the primary determinants influencing health attitudes and subsequent preventive behaviors..

Previous studies have consistently demonstrated that adolescents' knowledge plays an important role in shaping attitudes toward STI prevention. Rahmawati (2018) reported that adolescents with higher knowledge levels tended to exhibit better preventive behaviors. Sulastri and Astuti (2020) found that health education significantly improved adolescents' knowledge and attitudes regarding reproductive health and sexually transmitted infections ($p < 0.001$). The study used a quasi-experimental one-group pretest-posttest design and demonstrated significant differences in adolescents' knowledge and attitudes following health education.

Other studies have further documented that adolescents generally possess insufficient knowledge regarding reproductive health. Previous studies have shown that adolescents continue to have inadequate knowledge of reproductive and sexual health, particularly regarding pregnancy prevention, HIV prevention, and youth-friendly reproductive health services, while research by Hutton-Nyameaye et al., 2024 demonstrated that inadequate STI knowledge was associated with a higher likelihood of STI infection.

Collectively, these studies suggest that knowledge is an essential factor influencing adolescents' attitudes toward STI prevention.

Therefore, this study aimed to analyze the relationship between adolescents' level of knowledge and their attitudes toward sexually transmitted infection prevention among students of SMK Negeri 5 Batam City. The findings are expected to provide empirical evidence to strengthen adolescent reproductive health education and to support policymakers, schools, and healthcare providers in designing more effective STI prevention interventions tailored to local contexts.

METHOD

Type and Design

This study employed an analytical observational research design using a cross-sectional approach. An analytical observational design was selected to examine the association between adolescents' level of knowledge and their attitudes toward the prevention of sexually transmitted infections (STIs) without manipulating the study variables. The cross-sectional approach allows the measurement of both independent and dependent variables simultaneously at a single point in time, thereby enabling the identification of relationships between variables within the study population (Creswell & Creswell, 2018; Wang & Cheng, 2020). Accordingly, this study aimed to investigate the relationship between adolescents' knowledge level and their attitudes toward STI prevention among students of SMK Negeri 5 Batam.

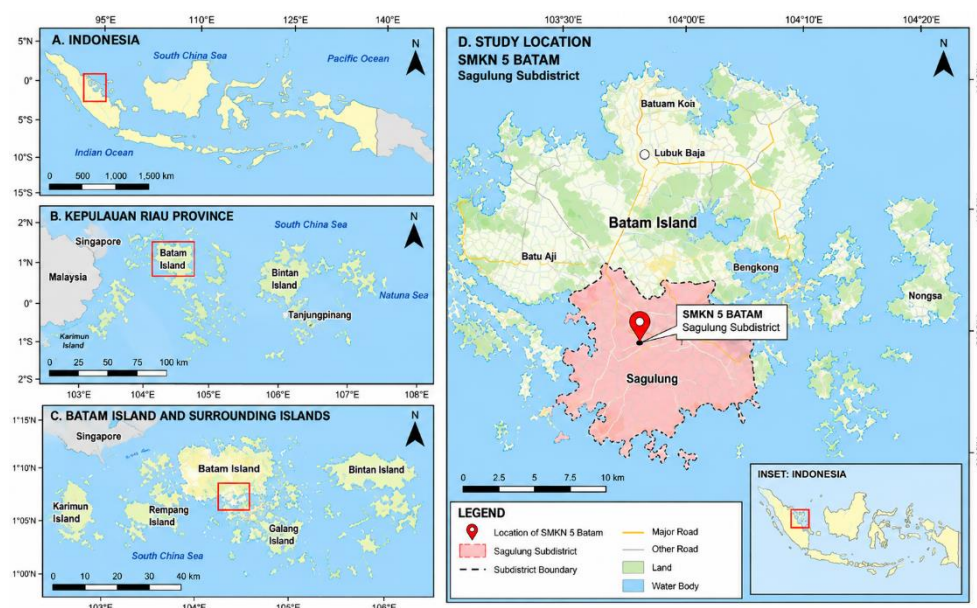


Figure 1: Location of present study

Population and Sample

The study population consisted of all Grade X and Grade XI students enrolled at SMK Negeri 5 Batam, Indonesia, during the 2025 academic year, totaling 5,102 students. The required sample size was determined using the Slovin formula with a 10% margin of error, resulting in a minimum sample of 99 participants.

Participants were selected using proportionate stratified random sampling, in which each class served as a sampling stratum to ensure proportional representation of the study population. The number of participants selected from each class was determined

proportionally to class size, and respondents within each class were then selected by simple random sampling.

The inclusion criteria were students aged 15–19 years who were enrolled in Grade X or Grade XI at SMK Negeri 5 Batam during the study period and who voluntarily agreed to participate in the study. Students were excluded if they were absent during data collection, had cognitive impairments that prevented them from completing the questionnaire, or declined to participate.

Data and Data Sources

The study utilized primary data collected directly from respondents through a structured self-administered questionnaire. The questionnaire was administered to students of SMK Negeri 5 Batam who met the predetermined inclusion criteria. The collected data comprised respondents' demographic characteristics, knowledge regarding sexually transmitted infections (STIs), and attitudes toward STI prevention.

The research instrument was adapted from previously validated questionnaires reported in published studies and was used with permission from the original authors. The knowledge questionnaire assessed respondents' understanding of STI transmission, symptoms, risk factors, and preventive measures, whereas the attitude questionnaire evaluated adolescents' perceptions and attitudes toward STI prevention. All questionnaire responses were coded and entered into a database for subsequent statistical analysis.

Data collection technique

Data collection was conducted in August 2025 after obtaining ethical and administrative approval from the Bachelor of Nursing Study Program, Universitas Batam (Ethical Approval No.179/LPPM-UNIBA/PI-EC/VII/2025), and official permission from the principal of SMK Negeri 5 Batam. Prior to data collection, the researcher coordinated with the school administration to determine the schedule and procedures for questionnaire administration.

Eligible students who met the inclusion criteria were informed about the objectives, procedures, benefits, and voluntary nature of the study. Written informed consent was obtained from all participants before data collection commenced. Respondents then completed a structured self-administered questionnaire designed to assess their knowledge of sexually transmitted infections (STIs) and attitudes toward STI prevention. The researcher remained available during the data collection process to provide clarification when necessary without influencing participants' responses. Knowledge level was assessed using a structured questionnaire. Each correct answer was assigned a score of 1, while an incorrect answer was assigned a score of 0. The total knowledge score was converted into a percentage using the formula: $(\text{total correct answers} / \text{maximum possible score}) \times 100\%$. Based on the criteria described by Swarjana tahun 2022, knowledge levels were categorized as high (80-100%), moderate (60-79%), and low (<60%).

After all questionnaires were completed, the responses were checked for completeness and consistency. The collected data were coded, entered into a computerized database, and cleaned prior to statistical analysis to ensure data accuracy and quality.

Data analysis

The collected data were entered, coded, and analyzed using the Statistical Package for the Social Sciences (SPSS) version 30. Descriptive (univariate) analysis was performed to summarize distribution of knowledge and attitudes toward sexually transmitted infection (STI) prevention. The results are presented as frequencies and percentages. Bivariate analysis was conducted using the chi-square test to examine the association between knowledge level and attitudes toward STI prevention. A p-value of < 0.05 was considered statistically significant.

RESULT

The results of the study on the relationship between knowledge level and adolescents' attitudes about the prevention of Sexually Transmitted Infections (STIs) at SMK Negeri 5 Batam City in 2025. The overview of univariate analysis is presented in the form of a frequency table.

Table 1 shows that more than half of the respondents (51.5%) had a high level of knowledge regarding STI prevention, while 48.5% had a moderate level of knowledge. None of the respondents were categorized as having a low level of knowledge. These findings suggest that adolescents at SMK Negeri 5 Batam generally possessed adequate knowledge regarding STI prevention.

Table 1. Frequency Distribution of Adolescent Knowledge Levels on Prevention of Sexually Transmitted Infections (STIs)

Knowledge Level	Frequency	Percentage (%)
High	51	51.5
Moderate	48	48.5
Low	0	0.00
Total	99	100

Table 2 presents the distribution of respondents' attitudes toward the prevention of sexually transmitted infections (STIs). Of the 99 respondents, 61 students (61.6%) demonstrated a positive attitude toward STI prevention, whereas 38 students (38.4%) exhibited a negative attitude. These findings indicate that the majority of adolescents at SMK Negeri 5 Batam had a positive attitude toward STI prevention.

Table 2. Frequency Distribution of Adolescent Attitudes on the Prevention of Sexually Transmitted Infections (STIs)

Attitude	Frequency	Percentage (%)
Positive	61	61.6
Negatives	38	38.4
Total	99	100

Table 3 presents the relationship between adolescents' knowledge level and their attitudes toward the prevention of sexually transmitted infections (STIs). Among respondents with a high level of knowledge, 37 respondents (37.4%) demonstrated positive attitudes, whereas 14 respondents (14.1%) exhibited negative attitudes. In contrast, among respondents with a moderate level of knowledge, an equal proportion of respondents (24 respondents; 24.2%) demonstrated positive and negative attitudes. The Chi-square test showed a statistically significant association between knowledge level and adolescents' attitudes toward STI prevention ($p = 0.021$), indicating that adolescents' knowledge level was significantly related to their attitudes toward STI prevention.

Table 3. The Relationship between Knowledge Level and Adolescents' Attitudes on the Prevention of Sexually Transmitted Infections (STIs)

Knowledge Level	Attitude				Total		<i>p-value</i>
	Negative		Positive		n	%	
	n	%	n	%			
High	14	14.1	37	37.4	51	51.5	0.021
Moderate	24	24.2	24	24.2	48	48.5	
Total	38	38.4	61	61.6	99	100	

DISCUSSION

The present study found that 51.5% of respondents had a high level of knowledge regarding the prevention of sexually transmitted infections (STIs), while 48.5% demonstrated a moderate level of knowledge, with no respondents classified as having low knowledge. These findings indicate that most adolescents have acquired adequate information regarding STI transmission, risk factors, symptoms, and preventive measures. Nevertheless, the proportion of respondents with only moderate knowledge suggests that reproductive health literacy among adolescents remains suboptimal and requires continuous improvement through structured health education.

Knowledge constitutes the cognitive domain that underlies the formation of health attitudes and behaviors. According to Hayden, 2019, knowledge obtained through education, experience, and information exposure enables individuals to understand health risks and serves as the foundation for behavioral change. Adolescents with adequate knowledge are generally better equipped to recognize risky sexual behaviors and the importance of STI prevention.

The findings are consistent with previous studies conducted in Indonesia. Sulastri & Astuti, 2020 reported that adolescents with better knowledge demonstrated significantly better preventive behavior toward sexually transmitted infections. Likewise, (Amin et al., 2021) found that higher knowledge levels were associated with more positive attitudes toward STI prevention. Similarly, Fageeh et al., 2022 reported a significant relationship between adolescents' knowledge and attitudes toward sexually transmitted infections. These studies consistently indicate that improving reproductive health knowledge remains an essential strategy for reducing adolescents' vulnerability to sexually transmitted infections.

This study also showed that 61.6% of respondents demonstrated positive attitudes, whereas 38.4% exhibited negative attitudes toward STI prevention. This finding suggests that positive attitudes were more prevalent among adolescents at SMK Negeri 5 Batam. Positive attitudes are important because they encourage adolescents to avoid risky sexual behaviors, seek reliable reproductive health information, and participate in preventive health services. According to Azwar, 2015 attitudes are influenced not only by knowledge but also by personal experiences, emotions, family values, peer groups, social norms, cultural beliefs, and media exposure. Consequently, knowledge alone may not be sufficient to produce positive attitudes if these external influences are unfavorable.

The bivariate analysis revealed a statistically significant relationship between knowledge level and adolescents' attitudes toward STI prevention ($p = 0.021$). Among respondents with a high level of knowledge, 37 respondents (72.5%) demonstrated positive attitudes, whereas 14 respondents (27.5%) still exhibited negative attitudes. Conversely, respondents with moderate knowledge showed an equal distribution between positive and negative

attitudes. These findings indicate that adolescents with better knowledge were more likely to demonstrate positive attitudes toward STI prevention.

An interesting finding in this study is that approximately one-quarter of adolescents with high knowledge still exhibited negative attitudes toward STI prevention. This result suggests that knowledge does not automatically translate into positive attitudes. Several factors may explain this phenomenon. Adolescents may understand the mechanisms of STI transmission and prevention but remain influenced by peer pressure, cultural norms, misconceptions regarding sexual behavior, perceived invulnerability, or low perceived susceptibility to STI infection. According to the Health Belief Model (HBM), preventive attitudes are determined not only by knowledge but also by perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action (Hayden, 2019). Therefore, adolescents who perceive themselves as being at low risk may maintain negative attitudes toward STI prevention despite possessing adequate knowledge.

This finding is supported by previous studies. Chabibah et al., 2021 and Rodrigues et al., 2021 reported that although adolescents possessed adequate reproductive health knowledge, negative attitudes toward condom use and STI prevention persisted because of social stigma, embarrassment, misconceptions, and trust in sexual partners. Similarly, research by Sunarsih et al., 2020 found that knowledge alone explained only a portion of adolescents' preventive behavior, whereas peer influence, family communication, and perceived social norms played equally important roles in shaping sexual health attitudes. These findings indicate that interventions focusing exclusively on knowledge improvement may be insufficient to produce sustainable behavioral change.

The present findings can also be explained using the Knowledge–Attitude–Practice (KAP) model, which proposes that knowledge represents the first stage of behavioral change, followed by attitude formation and ultimately preventive practices. However, the transition from knowledge to attitude is influenced by multiple psychosocial and environmental factors. Therefore, improving adolescents' knowledge should be accompanied by interventions that strengthen motivation, risk perception, communication skills, and family and school support systems.

From a public health perspective, these findings have important implications for adolescent reproductive health promotion (Ahi et al., 2025). Although most respondents demonstrated adequate knowledge and positive attitudes, the persistence of negative attitudes among adolescents with high knowledge indicates that reproductive health education should move beyond information delivery alone. Schools should collaborate with healthcare professionals, teachers, parents, and community health centers to implement comprehensive sexuality education that addresses cognitive, affective, and behavioral aspects of STI prevention. Such interventions are expected to strengthen adolescents' risk perception, improve decision-making skills, and encourage consistent adoption of healthy sexual behaviors..

CONCLUSION

This study demonstrated a statistically significant relationship between adolescents' knowledge level and their attitudes toward the prevention of sexually transmitted infections (STIs) among students of SMK Negeri 5 Batam ($p = 0.021$). Most respondents had moderate to high levels of knowledge and positive attitudes toward STI prevention. However, a proportion of adolescents with high knowledge still exhibited negative attitudes, indicating that knowledge alone is insufficient to shape positive attitudes. These findings suggest that psychosocial and environmental factors may also influence adolescents' attitudes toward STI prevention. Therefore, strengthening school-based reproductive health education should not only focus on improving knowledge but also on

fostering positive attitudes through comprehensive and interactive educational approaches.

Novelty and Contribution

This study contributes empirical evidence regarding the relationship between adolescents' knowledge and attitudes toward STI prevention among vocational high school students in Batam, an industrial and border city with high population mobility. Unlike previous studies that primarily examined general senior high school students or adolescents in urban settings, this research highlights that negative attitudes may still be present among adolescents with high knowledge levels. This finding indicates that knowledge alone does not necessarily translate into positive attitudes, emphasizing the need to consider psychosocial and environmental determinants when designing adolescent reproductive health interventions.

Limitation and Future Study

This study has several limitations. First, the cross-sectional design limits the ability to establish causal relationships between knowledge level and attitudes toward STI prevention. Second, the study was conducted in a single vocational high school, which may limit the generalizability of the findings to adolescents in other educational settings or regions. Third, data were collected using self-administered questionnaires, making the responses susceptible to recall bias and social desirability bias, particularly given the sensitive nature of reproductive health issues. Future studies are recommended to include larger and more diverse populations, employ longitudinal or mixed-method designs, and examine additional factors such as parental communication, peer influence, media exposure, self-efficacy, and perceived susceptibility that may influence adolescents' attitudes toward STI prevention.

Implication

The findings of this study have practical implications for schools, healthcare providers, and policymakers. Schools are encouraged to strengthen comprehensive reproductive health education by integrating STI prevention into the school curriculum and extracurricular health promotion activities. Collaboration between schools, community health centers (Puskesmas), parents, and healthcare professionals is essential to provide evidence-based and age-appropriate reproductive health education. Future interventions should not only improve adolescents' knowledge but also address attitudes, risk perception, peer influence, communication skills, and decision-making abilities to promote healthy sexual behaviors and reduce the risk of STI transmission among adolescents.

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