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Determinants of HIV/AIDS knowledge among early adolescents in junior high school: A cross-sectional study

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ABSTRACT

HIV/AIDS infection remains a crucial global public health issue, with a significant increase in cases every year in Indoneia, and adolescents occupy vulnerable positions. Limited knowledge related and the burden of social stigma hinders the effectiveness of intervention programs. This study aims to find out in depth the level of knowledge of junior high school adolescents about HIV/AIDS. This descriptive quantitative research uses a cross-sectional design with purposive sampling technique. The sample consisted of 52 grade IX students of SMP 1 Sawan. The results showed that the majority of respondents were 15 years old (55.8%) and female (67.3%). The level of adolescent knowledge about HIV/AIDS is mostly in the moderate category (65.4%), with the lowest score being 60, the highest score being 83.3, the mean being 68.3, and the median being 70. This indicates that there is still a need to provide information related to HIV/AIDS. The topic of HIV transmission has the highest proportion of wrong answers, followed by the signs and symptoms of HIV/AIDS. It is recommended that schools, parents, and the government work together in efforts to improve comprehensive and sustainable education, including strengthening Pelayanan Kesehatan Peduli Remaja (PKPR).

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1. Introduction

Human Immunodeficiency Virus (HIV) infection and Acquired Immunodeficiency Syndrome (AIDS) remain a crucial global public health issue, including in Indonesia. Recent data from the Ministry of Health of the Republic of Indonesia shows a significant increase in HIV cases every year, with the adolescent age group occupying a vulnerable position to transmission. In 2024 (January-June period) the highest cases will be in the 25-49 year old age group (63%), followed by the 20-24 year old age group (19%), and the ≥50 year old age group (10%). Based on gender, the percentage of HIV found in men is 71% and in women is 29% (Direktorat Pencegahan dan Pengendalian Penyakit Menular Langsung, 2024).

Worldwide, estimated 40.8 million (37.0-45.6 million) people, live with HIV/AIDS, according to data from the World Health Organization (2024). Three point four three percent, or 1.4 million children (0-14 years old), are living with HIV (World Health Organization, 2025). Around one million adolescents aged 15–19 were living with HIV worldwide, representing about 3% of all people living with HIV and 12% of new adult infections. The vast majority (84%) lived in sub-Saharan Africa, with Asia and Latin America having the highest numbers outside this region. Globally, adolescent girls accounted for about 71% of

new HIV infections among 15–19-year-olds, and in sub-Saharan Africa, they were nearly six times more likely to be newly infected than boys. In contrast, more adolescent boys than girls acquire HIV in regions such as East Asia and the Pacific, Latin America and the Caribbean, South Asia, and the Middle East and North Africa. These regional and gender differences highlight the need for HIV interventions tailored to local epidemic patterns and risk behaviors (UNICEF, 2025).

Limited knowledge related to the mechanisms of transmission, prevention, and the burden of social stigma inherent in HIV/AIDS substantially hinders the effectiveness of existing intervention programs. Early intervention among adolescents to improve understanding of HIV transmission is critical because insufficient knowledge may place them at a persistently high risk of new infections and, if infected at a young age, result in many more years during which they may unknowingly transmit HIV to others (UNICEF, 2025). Therefore, comprehensive health education from an early age, especially targeting the adolescent population, is one of the strategies to achieve the elimination of HIV/AIDS transmission and the mitigation of its socio-economic impact.

Adolescents are a vulnerable group due to behavioral transitions that affect physical, cognitive, and psychosocial development. In addition, during adolescence, there is a development of sexual identity, where, when information about sexual health is inaccurate and incomplete from school, parents, and elsewhere, adolescents turn to other sources of information, such as peers, the internet, and the media. Teens who feel embarrassed to ask their parents or adults (fear of judgment or stigma) prefer to look for information on the internet because the internet doesn't require in-person interaction (Adekola & Ikhile, 2025).

But for adolescents in remote areas without internet access, information related to sexual health behaviors is obtained from the local community by looking at customs/culture. Social norms are unwritten or informal social rules that determine how people ought to behave in certain situations (Ahmed et al., 2024). Teens who don't get information from the right sources may not have enough understanding of healthy relationships, consent, boundaries, including sexual behavior (Sri Sumaryani & Heni Purwaningsih, 2024).

The adolescence phase, characterized by identity exploration and increased curiosity, intrinsically increases susceptibility to risky behaviors. The formal education environment at the junior high school (SMP) level serves as a strategic platform for the provision of appropriate reproductive health and HIV/AIDS information. Nevertheless, empirical studies in the past decade have consistently shown that adolescents' levels of knowledge about HIV/AIDS are still diverse and often suboptimal, particularly about specific aspects such as non-sexual transmission or the availability of antiretroviral therapy (ARV). This difference in knowledge has the potential to trigger the adoption of risky behaviors and hinder adolescents' capacity to make health-related decisions that are in accordance with actual science and are responsible (Aryani, Widiyono and Anitasari, 2021; Kumalasary, 2021).

Health knowledge supports the formation of a good attitude towards things that can improve health. Knowledge is also related to reproduction-related health behaviors. Knowledge of health will also support the formation of independent healthy behaviors. Gustiawan et al. (2021) stated that there is a relationship between knowledge and reproductive health behaviors in adolescents, where health behaviors that do not deviate are formed more from good knowledge than from poor knowledge (Gustiawan, Mutmainnah and Kamariyah, 2021).

The impact of this low knowledge is not only limited to increasing the probability of transmission, but also significantly exacerbating stigma and discrimination against People with HIV/AIDS (ODHA). Adolescents with inadequate understanding tend to develop negative perceptions and irrational fears, which can ultimately prevent them from accessing information, undergoing examinations, or providing support to infected peers. Thus, a comprehensive evaluation of the current level of knowledge of junior high school adolescents is essential. The data of this research will facilitate the design of more targeted and adaptive educational programs, so as to be able to optimize the effectiveness of the intervention.

The government has implemented a program, Pelayanan Kesehatan Peduli Remaja (PKPR), since 2003, focusing on promoting, preventing, curing, and rehabilitating adolescent health services at

the Puskesmas level. One of the 10 interventions is reproductive health services including sexually transmitted infections/STIs, HIV/AIDS and services related to sexuality and puberty. Research conducted by Aziza, et al (2025) which analyzed the implementation of PKPR at the Andalas Health Center, found that there was an increase in knowledge in adolescents, but this increase in knowledge has not been followed by a comprehensive change in behavior. Some teenagers still consider that PKPR activities are limited to counseling events, not yet a routine necessity (Lativa aziza et al., 2025).

Based on this urgency, this study aims to find out in depth the level of knowledge of junior high school adolescents about HIV/AIDS, including transmission, prevention, management, and its implications. The findings of this study are expected to present an actual picture of HIV/AIDS literacy in the junior high school adolescent population in Sawan Village. Furthermore, this empirical data will serve as a strong scientific foundation for the development of more effective, relevant, and evidence-based health education interventions, including providing an overview of what knowledge is still lacking in adolescents, so that the implementation of counseling related to reproductive health, especially on the topic of HIV/AIDS, is not only a routine counseling but focuses on emphasizing which topics are still needed by adolescents themselves. Through an accurate understanding, prevention programs (including PKPR) can be tailored to meet the specific needs of adolescents, thereby empowering them as agents of change in HIV/AIDS prevention efforts in their respective areas.

2. Methods

This research is a quantitative study with a descriptive design and a cross-sectional approach. This study aims to describe the phenomenon that occurs regarding adolescents' knowledge of HIV/AIDS. The sampling technique uses purposive sampling. The sample in this study consists of grade IX students from SMP 1 Sawan, comprising 52 respondents. Inclusion criterion are aged between 10 and 14 who were present during the research. Adolescents who were critically ill or had mental disabilities were excluded from the study.

Data collection used a knowledge questionnaire of 30 questions, which included the definition, causes, symptoms, transmission, prevention, examination, and myths of HIV/AIDS. The questionnaire used is a questionnaire that has been validated and reliable. Knowledge data was interpreted at a good (76%-100%), sufficient (56%-75%), and poor (<56%) scale. The statistical test used is only a univariate test that produces a variable frequency distribution of knowledge.

3. Results and Discussion

Respondent Characteristics Results

The characteristics of the study respondents were described based on age and gender, with the following data:

Table 1.
Frequency Distribution of Respondent Characteristic

Characteristic		Frequency (f)	Percentage (%)
Age	14 Years	21	40.4 %
	15 Years	29	55.8 %
	16 years	2	3.8 %
Gender	Male	17	32.7 %
	Female	35	67.3 %
Total		52	100 %

From the table, it can be seen from the 52 respondents that most of the respondents are 15 years old, namely 29 respondents (55.8%), 14 years old as many as 21 respondents (40.4%), and 16 years old as many as 2 respondents (3.8%). The majority of respondents were female as many as 35 respondents (67.3%), and male, as many as 17 respondents (32.7%).

Frequency Distribution of Respondents' Knowledge Level

Table 2.
Frequency Distribution of Respondent Knowledge Level

Knowledge	Frequency (f)	Percentage (%)	Mean	Median	Min	Max
Good	13	25 %	68,3	70	60	83.3
Sufficient	34	65.4 %				
Poor	5	9.6 %				
Total	52	100 %				

The respondents in this study were grade IX students at SMP Negeri 1 Sawan with an age range of 13-15 years where the age was classified as teenagers. Regulation of the Minister of Health of the Republic of Indonesia Number 25 of 2014 states that adolescents are residents in the age range of 10-18 years. As for the ages of 13-16, called middle adolescents, this stage is distinguished by the emergence of new cognitive capacity. Adolescents begin to gain behavioral maturity, learn to regulate impulsivity, and make an initial assessment of their career goals to be achieved during this period. In addition, acceptance from the opposite sex becomes very important for the individual (Ermis Suryana et al., 2022)

The results of adolescents' knowledge about HIV/AIDS were obtained with the lowest score of 60 and the highest score of 83.3, with a mean of 68.3 and a median of 70. The results of adolescent knowledge, obtained by the majority in the sufficient category (65.4%), this show that information related to HIV/AIDS is still needed. The results of this study are in line with research by Kumalasary (2021) showing that the majority of adolescents have sufficient knowledge, as many as 92 adolescents (64.78%), 36 adolescents (25.36%) have good knowledge (25.36%), and 14 adolescents (9.86%) have insufficient knowledge. In contrast to the research conducted by Aryani, et al. (2021) on students of SMP Muhammadiyah 2 Karanganyar, out of the 65 respondents who were used as a research sample, 34 respondents (52.3%) had less knowledge, 12 people (18.5%) had good knowledge, and 19 people (29.2%) had sufficient knowledge (Aryani et al., 2021).

Previous research findings highlight two main problems related to adolescent reproductive health: the lack of knowledge about reproductive health and the increasing changes in sexual behavior among adolescents. These findings are supported by previous research showing that most respondents have a level of knowledge about adolescent reproductive health in the adequate to moderate category. The same study also revealed that reproductive health knowledge in junior high school students is still relatively low, with a percentage of around 57.58% in male students and 62.85% in female students (Widiyastuti & Hakiki, 2022). The onset of reproductive maturity in adolescence triggers the development of sexual behavior, which is largely influenced by the quality of information obtained. Reliable information promotes positive outcomes, while poor or misleading information can lead to serious problems that threaten adolescents' future well-being. Research conducted by Kairina and Qomaruddin (2025) where there is a meaningful relationship between reproductive health knowledge and free sexual behavior in adolescents. A PR score of 9.53 was obtained, so it can be said that adolescents with low knowledge of reproductive health have a 9.53 times higher risk of sexually free behavior compared to adolescents with good knowledge (Kanita Kairina & Mochammad Bagus Qomaruddin, 2025).

In line with research conducted by Muldaniyah (2021), it shows that there is a relationship between respondents' knowledge and premarital sexual behavior, with a p-value of 0.019, where 58% of well-informed respondents behave in the positive category of premarital sex as much as 46%, for the negative category 12%. Meanwhile, 42% of respondents who were knowledgeable did not behave in the positive category of premarital sex, 18% were positive, and 24% were negative (Muldaniyah, 2021).

The differences between the findings of this study and previous research on adolescents' HIV/AIDS knowledge indicate that knowledge levels can not be generalized and are strongly shaped by contextual factors. Variations in school curricula, quality of health education, access to information,

socio-cultural norms, and the role of parents and peers may explain why some studies report predominantly low knowledge while others, including the present study, identify mostly sufficient knowledge. These differences imply that the conclusions may obscure important knowledge gaps in SMP Sawan I and that HIV/AIDS education interventions should be based on context-specific assessments rather than generalized assumptions.

The results of this study that provide other information besides the level of knowledge, such as which questions have the highest proportion of wrong answers. Of the 30 questions, the topic of HIV transmission was the one with the most wrong answers, followed by the signs of HIV/AIDS. Researchers assume that this is because information related to HIV, which is more commonly caused by sexual intercourse, is still taboo, so it is the cause of the lack of information related to this. This is a limitation of the study because it does not analyze more deeply whether the topic of HIV spread is most often wrong due to adolescent ignorance or because of the misinformation that adolescents receive. Misinformation related to the spread of HIV can occur due to a lack of information that discusses how HIV is transmitted from one to another, namely highest through sexual intercourse, the use of syringes, and from mother to child through pregnancy and childbirth, and when breastfeeding.

Parents and the community tend to be reluctant to talk about matters related to sexuality, so adolescents get information from peers who may also not have the right knowledge, and they can actually fall into risky sexual behavior. This can be seen in a study conducted by Ginting et al. (2023) that adolescents who have negative peer roles are 4.1 times more likely to engage in risky sexual behavior when compared to adolescents who have positive peer roles (Ade Krisna Ginting et al., 2023). This research is supported by Mulya, et al (2021), found that 20.7% of adolescents participated in dating because of a friend's invitation, as many as 64.6% of adolescents had seen porn sites because of a friend's invitation, 63% had watched porn videos with friends, and 6.9% of friends had persuaded them to have sexual relations with the opposite sex (Prima Mulya et al., 2021).

Knowledge can be influenced by education, occupation, age, interests, experiences, and culture. One of the means of conveying information to individuals or groups is through education. The purpose of education is to provide awareness or enlightenment about knowledge and images of something that has been, is, and will happen. Adolescents who know about HIV/AIDS are better able to prevent HIV transmission. Research conducted by Pratama et al. shows that as many as 91% of adolescents have enough knowledge to take good actions in preventing the spread of HIV/AIDS. The results of this study also show that adolescents who have sufficient knowledge also have the right attitude towards efforts to prevent the transmission of HIV/AIDS positively (Ryoputra Pratama et al., 2025). In line with this research, research conducted by Melania and Mahmudah (2023) showed a significant relationship between adolescents' knowledge levels and attitudes towards HIV/AIDS prevention ($p = 0.001 < 0.05$). Adolescents with good knowledge mostly have positive attitudes, while adolescents with sufficient knowledge and more or less show negative attitudes. These results prove that the better adolescents' knowledge of HIV/AIDS, the more positive their attitude in efforts to prevent HIV/AIDS transmission (Melania & Mahmudah, 2023).

The behavior of biologically evolved adolescents, who are naturally ready to reproduce, will have an impact on two things: first, it results in a proper distribution in place or deviation. Individual deviation, which in this case is adolescents in channeling their potential biological impulses/desires without being based on knowledge, can lead to contracting sexually transmitted diseases, including HIV/AIDS. Adolescents who have broad insight into reproductive health tend to exhibit healthier and more responsible sexual behaviors. Educational approaches through lectures and counseling have been shown to be effective in increasing understanding and forming positive attitudes towards sexual issues, including preventing premarital sexual intercourse and maintaining healthy reproductive organs (Divya Salsabilla Vemala Putri et al., 2025).

3. Conclusion

The characteristics of the respondents in this study were middle adolescents with the majority being 15 years old (55.8%), and female (67.3%). Adolescents' knowledge of HIV/AIDS at SMP 1 Sawan is mostly

sufficient as many as 34 people (65.4%). The most wrong questions are topics related to HIV transmission, so that schools and health facilities can further emphasize the provision of this material. It is hoped that, based on the findings of the research on the determinants of the level of knowledge of junior high school adolescents related to HIV/AIDS, it is recommended that schools, parents, and the government synergize in efforts to improve comprehensive and sustainable education. Schools need to integrate HIV/AIDS materials more deeply into the curriculum and provide information media. Meanwhile, parents are encouraged to build open communication and become a trusted source of information for teenagers. From the government's side, there is a need to strengthen relevant policies, including strengthening Pelayanan Kesehatan Peduli Remaja (PKPR) and integrating HIV/AIDS education into school curricula. Policies should emphasize capacity building of PKPR providers, standardization of adolescent-friendly HIV counseling, and stronger collaboration between health centers and schools. Also, school curricula should include structured, age-appropriate, and evidence-based HIV/AIDS content, with a focus on transmission and prevention, to address the knowledge gaps identified in this study and to strengthen adolescent HIV prevention at the national level.

In order to gain a deeper understanding of the determinants of adolescents' HIV/AIDS knowledge, future research should focus on exploring the combined influence of individual, familial, peer, and socio-cultural factors. In particular, qualitative and mixed-method studies are needed to examine how parental communication, peer norms, exposure to digital media, school-based education quality, and cultural taboos shape adolescents' understanding of HIV transmission and prevention. Longitudinal studies are also recommended to assess how adolescents' knowledge evolves and how changes in knowledge translate into behavioral outcomes. Such evidence will be essential to design more targeted, context-sensitive, and effective educational interventions for HIV/AIDS prevention among adolescents.

This study has several limitations. The cross-sectional design limits causal interpretation and does not capture changes in adolescents' HIV/AIDS knowledge over time. In addition, the analysis was limited to descriptive statistics and did not explore associations between knowledge levels and potential influencing factors.

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