

Social media use, knowledge, attitudes, and risky sexual behavior of HIV transmission: A survey among boarding school adolescent students in Indonesia



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Abstract

Background: Social media has many positive and negative influences on individuals, especially for adolescents related to HIV. However, little is known about how social media impacts HIV-related outcomes among adolescents in boarding schools.

Objective: This study aims to investigate the social media use, knowledge, attitudes, and sexual behavior at risk of HIV transmission and their relationship with the demographic characteristics of adolescent students at boarding schools.

Methods: This study was school-based and used a cross-sectional design. The questionnaires were used to assess social network site usage, knowledge, attitudes, and risky behavior. Cluster random sampling involved students ($n = 214$) from three boarding schools in Cirebon City, West Java, Indonesia, in 2022. Chi-square tests and Cramer's V were used to explore correlations between social and demographic factors.

Results: A considerable number of adolescent students exhibited high social media addiction (58.4%), with the majority possessing limited knowledge of HIV transmission (54.7%). Additionally, nearly half displayed a negative attitude towards preventing HIV transmission (47.2%), while only a small fraction engaged in risky behavior (2.8%). Bivariate analysis revealed that social media use was moderately associated with the type of social media application ($\phi_c = 0.246, p < 0.05$). Knowledge of HIV transmission exhibited a moderate correlation with age ($\phi_c = 0.331, p < 0.05$), education level ($\phi_c = 0.240, p < 0.001$), and exposure to information ($\phi_c = 0.269, p < 0.001$). Similarly, attitudes toward HIV prevention demonstrated moderate associations with age ($\phi_c = 0.341, p = 0.001$), education level ($\phi_c = 0.317, p < 0.001$), and exposure to information ($\phi_c = 0.266, p < 0.001$). Furthermore, risky sexual behavior exhibited a strong association with exposure to pornographic content ($\phi_c = 0.730, p < 0.001$).

Conclusion: The study found a high prevalence of social media usage among adolescents, coupled with low knowledge about HIV, negative attitudes, and risky behavior. Significant relationships were observed between social media use, knowledge, attitudes, and risky sexual behavior related to HIV transmission and demographic characteristics. This study emphasizes the vital role of nurses and healthcare professionals in implementing targeted educational interventions in boarding schools to address gaps in HIV risk knowledge influenced by social media, ultimately improving strategies for adolescents' sexual health.

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Keywords

adolescent; attitudes; health knowledge; practices; HIV infection; Indonesia; sexual behavior; social media; sexual health; students

Background

The Internet, now a fundamental necessity, serves as an essential information hub for all. In 2020, Indonesian adolescents constituted the largest user group ([Indonesian Internet Service Providers Association, 2020](#)). This stage of

life, termed adolescence, bridges childhood and adulthood ([World Health Organization, 2014](#)). Marked by identity crises, emotional instability, heightened curiosity, inclination to explore, and susceptibility to peer influence, adolescents seek self-discovery ([Rageliene, 2016](#)). Rapid technological advancements have spurred adolescents' curiosity, driving

them to explore and embrace evolving social dynamics. The internet and social media seamlessly offer them fresh avenues for social exploration (Fronika, 2019).

As technology continues to reshape communication and interactions, it is imperative to understand how these online platforms are leveraged by adolescents to build connections, share information, and foster relationships (Haddock et al., 2022; Reid Chassiakos et al., 2016). Previous studies recognized the potential dichotomy within online social networking technologies: they may amplify and alleviate risky sexual behaviors (Chiu & Young, 2015; Holloway et al., 2014; Masrom et al., 2021; Samad et al., 2019). Social media has the potential to offer a platform for discussions on sexual health and prevention strategies, thereby contributing to a reduction in risky behaviors. The Internet and social media use extends beyond interpersonal interaction and entertainment. The accessible information for adolescents is broad and encompasses health-related subjects such as Human Immunodeficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS) and its prevention (Taggart et al., 2015; Tso et al., 2016). Additionally, social media is a valuable platform for health education, showcasing a positive aspect of internet engagement (Chandran, 2016). However, this influence is multifaceted. While it connects and educates, it also creates avenues for risky behaviors, especially in impressionable adolescent populations. Thus, understanding and managing these dual aspects of social media is crucial.

The internet and social media have revealed that adolescents employ these platforms to spread sexually suggestive images or information (Vandenbosch et al., 2015). Adolescence is a pivotal developmental stage in which individuals form more intimate relationships, driven by a natural curiosity about sex and intensified by hormonal changes (Fortenberry, 2013). This period of life sees adolescents increasingly interested in understanding and exploring their sexual and relational dynamics. Social media offers ease of use and an illusion of anonymity through disguised user identities, allowing adolescents to access information discreetly and comfortably (Gonzalez Ortega et al., 2015). One category of content pertaining to sexual activity is pornography. Exposure to pornography can trigger risky sexual behaviors in adolescents (Peter & Valkenburg, 2016). Risky sexual behavior encompasses activities that yield adverse consequences, such as sexually transmitted diseases (STDs), unwanted pregnancies, and abortions (Peter & Valkenburg, 2016). Examples of such behavior include kissing, fondling, petting, oral sex, and unprotected intercourse (Omoteso, 2006; Van de Bongardt et al., 2015).

In the contemporary landscape of Indonesia, where societal norms and religious values are deeply intertwined, the issue of HIV transmission and risky sexual behavior among adolescents has gained increasing attention (Fauk et al., 2021). The prevalence of HIV and sexually transmitted infections (STIs) among young individuals remains a significant concern. HIV and STIs are not only medical challenges but also encompass social, cultural, and psychological dimensions that demand comprehensive investigation. According to research conducted at a high school in a rural city in Indonesia, out of 221 students, it was found that as many as 7.1% had had oral sex, and as many as 4.1% had had premarital sex (Lisnawati & Lestari, 2015).

Based on the results of the 2012 Indonesian Demographic and Health Survey (IDHS), it was found that 4.5% of male adolescents and 0.7% of female adolescents had premarital sex (Ministry of Health Data and Information Center, 2017). Premarital sexual behavior that does not use protection and often changes partners can enhance STI, particularly HIV (Ngoc Do et al., 2020). Therefore, it is crucial to exert control over HIV transmission by improving knowledge, attitudes, and behaviors related to it (Thanavanh et al., 2013). Augmenting HIV awareness can serve as a potential means to foster positive attitudes and skills to secure behaviors within the community. Consequently, comprehending the community's grasp of HIV knowledge, attitudes, and behaviors holds paramount significance in strategizing effective control and prevention measures for HIV transmission prevention (Thanavanh et al., 2013).

Given the massive use of the Internet and social media among Indonesian youth, exploring the nexus between social media use, knowledge about HIV, attitudes toward sexual health, and engagement in risky sexual behaviors has become a timely and relevant endeavor. By probing into the dynamics of how adolescents navigate these virtual networks within the context of boarding schools, this study aims to uncover potential associations between online interactions and risky sexual behaviors. In addition, by exploring these dual possibilities, the research endeavors to provide a nuanced understanding of how these platforms can impact the sexual health landscape of adolescent students. As Indonesian society continues to evolve in the digital age, understanding the intricate relationships between social media, sexual knowledge, attitudes, and behaviors becomes academically intriguing and paramount for public health interventions. This study sheds light on this multifaceted phenomenon, aiming to inform policies, interventions, and educational initiatives that can guide Indonesian adolescents towards healthier sexual behaviors and attitudes while respecting their cultural and religious values. Drawing parallels from studies involving homeless adolescents in different contexts (Young & Rice, 2011), where technological advancements have shaped sexual behaviors and health-seeking patterns, this study acknowledges the potential role of social media in shaping attitudes and behaviors among adolescents in Islamic boarding schools.

The increasing integration of the internet and social media into the daily lives of Indonesian teenagers poses both benefits and challenges for nursing and public health interventions, particularly in the field of sexual health education and the prevention of risky behaviors. This study emphasizes the importance of nursing by highlighting the immediate requirement for nurses and healthcare professionals to utilize digital platforms to distribute vital health information and interact with young populations in a culturally sensitive manner. This study seeks to address a crucial gap in the current literature by examining the impact of social media on adolescents' understanding, attitudes, and behaviors related to HIV and sexually transmitted infections (STIs). It acknowledges the critical role that nurses play in promoting health and preventing diseases. This study also emphasizes Indonesian teenagers in boarding school environments, a demographic that has received limited attention in this context.

The study presents a conceptual framework that combines elements of the Health Belief Model and social cognitive theory, providing a holistic perspective to analyze the relationship between social media usage and sexual health practices. This study aims to generate evidence-based insights by formulating research questions that focus on the influence of social media on the sexual health knowledge and behaviors of adolescents. The findings of this study could guide nursing interventions, policy development, and educational strategies to reduce HIV/STI transmission among Indonesian youth. This study fills a notable void in nursing research concerning adolescent sexual health and the utilization of digital technologies for health education. It offers fresh insights into the field and emphasizes the significance of adjusting nursing practices to align them with the demands of the digital era. This research aims to investigate the social media use, knowledge, attitudes, and sexual behavior at risk of HIV transmission and their relationship with the demographic characteristics of adolescent students at boarding schools in Cirebon, Indonesia.

Methods

Study Design

This study was school-based and used a cross-sectional design.

Samples/Participants

This study was conducted at three boarding schools in Cirebon with different numbers of students. Therefore, the cluster random sampling technique was used to determine the number of samples in each school with inclusion criteria: 1) students aged 12-20 years who are registered at the boarding school; 2) students who have mobile phones connected to the internet and social media. Students who meet the inclusion criteria and are willing to be respondents can become samples. From these schools ($n = 3$), all the students were recruited ($n = 460$), and by calculating using the Slovin formula, the number of samples was 214 students. The total sample was 214, consisting of 23 people from School A, 116 from School B, and 75 from School C (Sugiyono, 2015).

Instruments

An anonymous, self-reported questionnaire was used. This questionnaire also included sections to gather demographic information such as age, gender, education level, the specific boarding school attended, ownership and use of personal cell phones, types of social media platforms owned, used by the students, frequency of social media usage in a week, access to pornography, and exposure to HIV-related information. These demographic characteristics were analyzed to understand their correlation with the dependent variables, including the social media use knowledge, attitude, and risky behavior of HIV transmission among adolescents. All questionnaires in this study have received permission from the original authors.

The use of social media was observed using the Social Network Site, a standard questionnaire developed by Fadillah and Widyatuti (2020), with an r-count validity test value of 0.347 to 0.749 and a Cronbach Alpha reliability value of 0.827. The Social Network Site questionnaire consists of 14 items on

a 4-point Likert scale with the interpretation of low addiction with a <median score and high addiction with a median score.

The knowledge on HIV transmission was developed by James et al. (2022), with a validity test value of 0.563 to 0.757 and a Cronbach Alpha reliability value of 0.885. This questionnaire contains 13 items measured by the Guttman scale, consisting of Yes and No answers. By interpretation, 1) low knowledge: 7; 2) moderate knowledge: 8-10, and high knowledge 11.

The attitude towards HIV prevention questionnaire was developed by Uddin (2010), with a validity test value of 0.509 to 0.634 and a Cronbach Alpha reliability value of 0.885. This questionnaire contains 20 items using a Likert scale of 0-3. With the interpretation of a positive attitude (\geq mean) and a negative attitude ($<$ mean score). In the knowledge of HIV transmission and the attitude towards HIV prevention questionnaire, the translation process uses the forward and backward method to translate from English to Indonesian. The risky sexual behavior questionnaire was developed by Marni and Ratnasari (2019), with a validity test value of 0.398 to 0.889 and a Cronbach Alpha reliability value of 0.710. This questionnaire consists of 5 items using the Guttman scale consisting of Yes and No answers, with the interpretation of risky behavior score $<$ median and behavior not risky median score.

Data Collection

Data were collected by the researchers between April and June 2022 among adolescents in Cirebon, West Java Province, Indonesia, using the validated questionnaires. There were no research assistants to help out the data collection process.

Data Analysis

Data analysis was performed using IBM SPSS Statistics 25 and Microsoft Excel at 95% confidence interval (CI) for univariate and bivariate levels. This study estimated the dependent variable (the social media use, knowledge, attitude, and risky behavior of HIV transmission among adolescents) in frequency and percentage. The factors associated with social media use, knowledge, attitude, and risky behavior of HIV transmission among adolescents were assessed using logistic regression analysis. This study presented continuous data (such as age) showing the mean and corresponding standard deviation (SD). Categorical data were summarized using frequencies and percentages. Furthermore, this study examined the relationship between dependent variables and participant characteristics through bivariate analysis. A significance level of $p < 0.05$ following the bivariate analysis was considered statistically significant.

Ethical Considerations

This study adheres to ethical standards at all stages of the research process. All participants were duly informed about the study's objectives. Informed consent was obtained at participants' understanding that their anonymized responses might be used for publication. To safeguard participants' privacy and dignity, stringent measures were taken to ensure confidentiality and anonymity. An ethical review board granted approval for the study, signifying its alignment with ethical guidelines and legal requirements. Ethical approval was given

from the Research Ethics Committee of Universitas Padjadjaran with letter number 486/UN6.KEP/EC/2022.

Results

Characteristics of the Respondents

Among the school students who participated, 54.2% were female and 45.8% male. Most respondents fall within the early adolescent bracket, specifically aged 12 to 15, with a mean age of 14.86 (SD 1.71). Regarding education, 50% of respondents were at the senior high school level. Moreover,

considering the year of admission to Islamic boarding schools, nearly half of the respondents joined in 2021.

The usage patterns of social media among adolescents revealed several characteristics. A majority of adolescents (83.2%) refrain from carrying mobile phones to boarding schools, while a significant portion (74.3%) own personal cell phones. As for social media applications, a small fraction of students (22.5%) indicated WhatsApp ownership, with a considerable 55.6% of students favoring WhatsApp for their social media interactions. Detailed characteristics of the respondents can be seen in [Table 1](#).

Table 1 Characteristics of the respondents (n = 214)

Characteristics	Frequency (f)	Percentage (%)
Age (years)	Mean 14.86	SD 1.71
12-15	132	61.7
16-20	82	38.3
Sex		
Male	98	45.8
Female	116	54.2
Education		
Senior high school	107	50
Junior high school	104	48.6
Graduated from senior high school	3	1.4
Boarding School		
School A	24	11.2
School B	118	55.1
School C	72	33.6
Students who bring cell phones to boarding schools		
Yes	36	16.8
No	178	83.2
Students who have personal cell phones		
Yes	159	74.3
No	55	25.7
Platform social media used		
WhatsApp	119	55.6
Instagram	21	9.8
Twitter	1	0.5
Facebook	22	10.3
Tiktok	37	17.3
YouTube	11	5.1
Telegram	3	1.4
Social media usage in a week		
Everyday	160	74.8
5-6 days	3	1.4
3-4 days	3	1.4
1-2 days	2	0.9
Only when needed	46	21.4
Accessing pornography		
Yes	11	5.1
No	203	94.9
Ever get information about HIV		
Yes	100	46.7
No	114	53.3

Social Media Use, Knowledge, Attitude, and Risk of Sexual Behavior Related to HIV Transmission

Among the 214 adolescents, most of them were highly dependent on social media (58.4%), while approximately half demonstrated a lower degree of dependence (41.6%). Regarding adolescents' knowledge of HIV transmission, 214 respondents unveiled that a considerable portion held a moderate level of knowledge (54.7%). Nearly half had low

knowledge, and a small number were at a high level of knowledge. In terms of the attitudes toward HIV transmission, 101 adolescents (47.2%) showed a negative attitude, and 113 (52.8%) adolescents showed a positive attitude towards preventing HIV transmission. Moreover, 208 adolescents (97.2%) showed non-risk behavior, and as many as 6 (2.8%) adolescents showed risky behavior. Most adolescents are in non-risk behavior (see [Table 2](#)).

Table 2 Level of knowledge, attitudes, and sexual behavior at risk of HIV transmission ($n = 214$)

Variable	Frequency (f)	Percentage (%)
Level of social media use		
Low addiction (score <36)	89	41.6
High addiction (score ≥ 36)	125	58.4
Level of HIV transmission knowledge		
Low (score ≤ 7)	74	34.6
Moderate (score 8-10)	117	54.7
High (score ≥ 11)	23	10.7
Attitudes towards HIV prevention		
Negative (score <32.86)	101	47.2
Positive (score ≥ 32.86)	113	52.8
Risky sexual behavior of HIV transmission		
No risky sexual behavior (score <10)	208	97.2
Risky sexual behavior (score ≥ 10)	6	2.8

Relationships between the Social Media Use, Knowledge, Attitudes, and Risky Sexual Behavior of HIV Transmission

According to Cramer's v value, a statistically moderate relationship exists between social media use and the type of social media application ($\phi_c = 0.246$). However, weak relationships were observed with demographic characteristics variables, such as education level ($\phi_c = 0.117$), weekly social media usage ($\phi_c = 0.122$), and access to pornography ($\phi_c = 0.104$). Additionally, the variable knowledge about HIV transmission demonstrates a moderate relationship with demographic characteristics such as age ($\phi_c = 0.331$), education level ($\phi_c = 0.240$), and exposure to information ($\phi_c = 0.269$). Weak relationships were found between knowledge about HIV transmission, weekly social media usage ($\phi_c = 0.158$), and the type of social media used ($\phi_c = 0.159$).

Regarding attitudes towards HIV prevention, there is a moderate relationship with age ($\phi_c = 0.341$), education level ($\phi_c = 0.317$), and HIV-related information ($\phi_c = 0.266$). Weak relationships were observed with weekly social media usage ($\phi_c = 0.138$) and the type of social media used ($\phi_c = 0.153$). Furthermore, a strong relationship exists between risk behavior and access to pornographic content ($\phi_c = 0.730$). Weak relationships were observed with demographic characteristics such as sex ($\phi_c = 0.128$), type of social media used ($\phi_c = 0.139$), and exposure to information about HIV ($\phi_c = 0.102$) (see [Table 3](#)).

Discussion

This study concluded that a substantial majority of adolescents are active users of social media, engaging with it daily. The reasons underlying adolescents' affinity for social media are diverse. One prevalent motivation is the desire to foster social connections ([Endah et al., 2017](#)). Moreover, the multifaceted attributes of social media platforms facilitate a range of activities, such as content sharing, communication (via chat features), content consumption, and participation in online communities tailored to individual interests. These platforms also offer a mobile application ecosystem encompassing gaming and various entertainment functionalities ([Endah et al., 2017](#)). These findings highlight how the internet has seamlessly become a part of adolescents' daily lives.

This research was conducted during the COVID-19 pandemic, during which adolescents accessed social media more frequently than before. This increase in usage can be attributed to the allowance of cell phones in boarding schools

for educational purposes, resulting in adolescents engaging with social media platforms. This trend aligns with findings from [Hudimova \(2021\)](#), which indicated a surge in social media account registrations among teenagers during quarantine periods. Adolescents were drawn to social media to create original content, participate in challenges, and expand their social circles for interaction. As a result, they spend considerable time in front of gadgets, often facing distractions from social networking applications while doing homework or engaging in other activities.

This study found that the majority of adolescents exhibit a notable degree of addiction to social media usage. This observation aligns with the previous research, which emphasizes the high intensity of social media usage among adolescents at an Islamic boarding school in Indonesia, especially in Malang ([Pradana et al., 2020](#)). There is 13% of adolescents who use the internet dedicate 7-9 hours daily to online activities, and 4% of those connected to the internet for more than 9 hours a day are prone to internet addiction. Furthermore, this study found a relationship between the types of social media applications and social media addiction. Distinct categories emerge for social media usage: social purposes, encompassing activities such as posting visuals, exchanging comments, socializing, and communication, and entertainment purposes, including gaming and music consumption. Moreover, a previous study concluded that both the social and entertainment aspects of social media utilization significantly influence addiction tendencies ([Zhao, 2021](#)).

The increasing social media usage among adolescents is recognized to bring positive and negative impacts. Positive aspects encompass using social media to access information about HIV and enhancing understanding, attitudes, and awareness regarding the risks associated with HIV transmission. This study reveals that a significant portion of the respondents falls under the category of having low knowledge, while the majority hold moderate knowledge. This contrasts with other research, wherein 239 adolescents (42.5%) exhibited moderate knowledge, and 203 adolescents (36.1%) had high knowledge ([James et al., 2022](#)). Similarly, another study found that less than half of the adolescents (44.7%) demonstrated sound knowledge of HIV prevention, while 55.3% exhibited insufficient knowledge ([Shamu et al., 2020](#)). Moderate knowledge emerges as a key concept. In the context of this study, knowledge trends appear less favorable, reflecting adolescents' frequent misconceptions concerning HIV transmission.

Table 3 Bivariate analysis of knowledge, attitudes, and sexual behavior at risk of HIV transmission based on demographic characteristics

Characteristics	Social Media Use		φ_c	p	Knowledge			φ_c	p	Attitudes		φ_c	p	Risky Behavior		φ_c	p
	Low addition (n = 89)	High addiction (n = 125)			Low (n = 74)	Moderate (n = 117)	High (n = 23)			Negative (n = 101)	Positive (n = 113)			Risky (n = 6)	No Risky (n = 208)		
	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)							
Sex			0.052	0.443				0.085	0.458			0.024	0.731			0.128	0.061
Male	38 (42.7)	60 (48)			38 (51.4)	51 (43.6)	9 (39.1)			45 (44.6)	53 (46.9)			5 (83.3)	93 (44.7)		
Female	51 (57.3)	65 (52)			36 (48.6)	66 (56.4)	14 (60.9)			56 (55.4)	60 (53.1)			1 (16.7)	115 (55.3)		
Age			0.08	0.242				0.331	<0.001*			0.341	<0.001*			0.017	0.799
12-15	59 (66.3)	73 (58.4)			59 (79.7)	67 (57.3)	6 (26.1)			80 (79.2)	52 (46)			4 (66.7)	128 (61.5)		
16-20	30 (33.7)	52 (41.6)			15 (20.3)	50 (42.7)	17 (73.9)			21 (20.8)	61 (54)			2 (33.3)	80 (38.5)		
Education			0.117	0.231				0.24	<0.001*			0.317	<0.001*			0.02	0.956
Senior high school	47 (52.8)	57 (45.6)			50 (67.6)	51 (43.6)	3 (13)			66 (65.3)	38 (33.6)			3 (50)	101 (48.6)		
Junior high school	42 (47.2)	65 (52)			23 (31.1)	64 (54.7)	20 (87)			34 (33.7)	73 (64.6)			3 (50)	104 (50)		
Graduated from senior high school	0 (0)	3 (2.4)			1 (1.4)	2 (1.7)	0 (0)			1 (1)	2 (1.8)			0 (0)	3 (1.4)		
Social media usage in a week			0.122	0.527				0.158	0.22			0.138	0.395			0.057	0.953
Everyday	64 (71.9)	96 (76.8)			52 (70.3)	88 (75.2)	20 (87)			75 (74.3)	85 (75.2)			4 (66.7)	156 (75)		
5-6 days	1 (1.1)	2 (1.6)			0 (0)	3 (2.6)	0 (0)			2 (2)	1 (0.9)			0 (0)	3 (1.4)		
3-4 days	2 (2.2)	1 (0.8)			1 (1.4)	2 (1.7)	0 (0)			3 (3)	0 (0)			0 (0)	3 (1.4)		
1-2 days	0 (0)	2 (1.6)			0 (0)	1 (0.9)	1 (4.3)			1 (1)	1 (0.9)			0 (0)	2 (1)		
Only when needed	22 (24.7)	24 (19.2)			21 (28.7)	23 (19.7)	2 (8.7)			20 (19.8)	26 (23)			2 (33.3)	44 (21.2)		
Platform social media used			0.246	0.044*				0.159	0.542			0.153	0.545			0.139	0.662
WhatsApp	53 (59.6)	66 (52.8)			47 (63.5)	61 (52.1)	11 (47.8)			54 (53.5)	65 (57.5)			2 (33.3)	117 (56.3)		
Instagram	11 (12.4)	10 (8)			6 (8.1)	12 (10.3)	3 (13)			12 (11.9)	9 (8)			1 (16.7)	20 (9.6)		
Twitter	0 (0)	1 (0.8)			0 (0)	1 (0.9)	0 (0)			1 (1)	0 (0)			0 (0)	1 (0.5)		
Facebook	9 (10.1)	13 (10.4)			9 (12.2)	12 (10.3)	1 (4.3)			13 (12.9)	9 (8)			0 (0)	22 (10.6)		
TikTok	7 (7.9)	30 (24)			9 (12.2)	24 (20.5)	4 (17.4)			15 (14.9)	22 (19.5)			2 (33.3)	35 (16.8)		
YouTube	7 (7.9)	4 (3.2)			2 (2.7)	6 (5.1)	3 (13)			4 (4)	7 (6.2)			1 (16.7)	10 (4.8)		
Snapchat	0 (0)	0 (0)			0 (0)	0 (0)	0 (0)			0 (0)	0 (0)			0 (0)	3 (1.4)		
Telegram	2 (2.2)	1 (0.8)			1 (0.9)	1 (0.9)	1 (4.3)			2 (2)	1 (0.9)			0 (0)	0 (0)		
Accessing pornography			0.104	0.128				0.089	0.427			0.051	0.46			0.73	<0.001*
Yes	7 (7.9)	4 (3.2)			5 (6.8)	4 (3.4)	2 (8.7)			4 (4)	7 (6.2)			6 (100)	5 (2.4)		
No	82 (92.1)	121 (96.8)			69 (93.2)	113 (96.6)	21 (91.3)			97 (96)	106 (93.8)			0 (0)	203 (97.6)		
HIV related information			0.068	0.318				0.269	<0.001*			0.266	<0.001*			0.102	0.134
Yes	38 (42.7)	62 (49.6)			21 (28.4)	65 (55.6)	14 (60.9)			33 (32.7)	67 (59.3)			1 (16.7)	99 (47.6)		
No	51 (57.3)	63 (50.4)			53 (71.6)	52 (44.4)	9 (39.1)			68 (67.3)	46 (40.7)			5 (83.3)	109 (52.4)		

Moreover, this study also found a significant connection between knowledge with age and level of education. The data reveal that higher age groups among adolescents correspond to heightened knowledge about HIV. Similarly, the demographic variable of education strongly influences adolescents' HIV-related knowledge. Those with advanced education levels display more comprehensive and extensive insights (Nurwati & Rusyidi, 2019).

Many adolescents in this study hold misconceptions due to a lack of awareness regarding HIV transmission routes. This is attributed to insufficient dissemination of HIV-related information, with two-thirds of Islamic boarding schools confirming a lack of health counseling on reproductive health and HIV. Rectifying these misconceptions is crucial to prevent HIV spread and risky behaviors. Addressing this requires comprehensive health education on HIV, including discussions about transmission routes. The scarcity of HIV-related information underscores the vital role of health education in enhancing knowledge, as shown in numerous studies.

This study found that while some hold positive attitudes, a significant number still harbor negative perceptions. Similarly, a previous study observed that 57.5% to 96.9% of 128 adolescents held a positive attitude toward preventing HIV transmission (Dzah et al., 2019; Tiranda et al., 2018). The adolescents had negative attitudes towards HIV transmission because there was still a social stigma towards HIV, which tended to be negative (Arifin et al., 2022). They think that they are at a vulnerable stage of the risk of HIV transmission because of their tendency to experiment sexually.

Furthermore, respondents still believe that HIV is a disease of a curse or punishment from God, and they also believe that people affected by HIV, generally occur in the adolescent who is not obedient to religious rules and lacks moral commitment, such as drug abuse, homosexual behavior, sexual behavior outside marriage, these things are a major way of transmission of HIV (Janahi et al., 2018). The negative attitude based on demographics is still quite a number of adolescents who have never been exposed to information related to HIV. Moreover, this study found a relationship between attitudes toward HIV transmission prevention with age, level of education, and information exposure. Notably, higher education levels facilitate convenient access to information, logical thinking patterns, and better comprehension of HIV transmission prevention measures. Education is potent in preventing HIV transmission (Wana et al., 2019). Concerning information exposure about HIV, it's evident that there is a relationship with attitudes towards preventing HIV transmission. This aligns with previous studies that show that higher exposure to HIV information on social media impacts attitudes toward HIV (Kite et al., 2018).

The study indicates that while the majority of adolescents exhibit non-risky behavior, a small fraction still engage in risky behavior related to HIV transmission. Active usage of social media, coupled with its universal reach and the veil of anonymity, creates a platform where adolescents might misuse it for behaviors linked to HIV risk (Patel et al., 2016). Social media serves as a place for adolescents to connect with familiar and new individuals, often spending hours nurturing friendships. Notably, those who engage in risky behavior are daily social media users, thereby increasing exposure to

explicit content, particularly pornograph (Wana et al., 2019). Continuous exposure to such content can intensify sexual desire, potentially leading to participation in risky sexual behavior (Sanrock, 2016). Importantly, adolescents involved in risky behavior often lack knowledge about HIV, which may drive them toward such actions. This aligns with previous studies that found that adolescents employ the internet and social media to seek sexual information and potential partners (Patel et al., 2016; Rice et al., 2015). Consequently, the rapid surge in social media usage among adolescents may have contributed to a shift in engagement toward certain risky behaviors (Lewycka et al., 2018). The perceived anonymity, limited consequences, and reduced adult supervision in online spaces provide a conducive environment for adolescents to explore and engage in behaviors they might avoid in person (Nesi et al., 2018). Based on these findings, Islamic boarding schools and educational institutions can play a pivotal role by offering health counseling emphasizing responsible social media usage. Additionally, training for parents on guiding their adolescents' social media use can contribute to fostering a safer online environment.

Implications for Nursing Practice

The study's findings highlight the need for proactive measures to address risky behaviors related to HIV transmission among adolescents. By leveraging the power of education, open communication, and responsible social media use, stakeholders can contribute to a healthier and safer environment for adolescents, promoting positive behaviors, knowledge, and attitudes that will impact their well-being. The study reveals that while the majority of adolescents exhibit non-risky behavior, a small but notable fraction engages in risky behaviors related to HIV transmission. This highlights the need for targeted interventions to address this issue among adolescents, particularly those who actively use social media. Considering the universal adoption of social media platforms and the potential for misuse, educators, parents, and policymakers must collaborate on strategies promoting responsible social media usage. The study also sheds light on the crucial role of health education in shaping adolescents' knowledge and attitudes about HIV transmission. The presence of misconceptions and negative attitudes underscores the need for comprehensive and accurate information dissemination in educational settings and through social media platforms. Addressing these gaps can contribute to preventing risky behaviors and reducing the stigma associated with HIV.

In this study, the nursing implications highlight the role of nurses as educators and service providers. Nurses can offer health education about HIV and its prevention to Islamic boarding school students, providing new insights to help them understand the dangers of HIV and avoid risky behavior for transmission. Collaboration between nurses and schools can facilitate the delivery of health education and the establishment of counseling programs focusing on adolescent health within the school health unit. The management of boarding schools, other educational institutions, and healthcare providers can collaboratively take the lead in providing health counseling sessions emphasizing informed and responsible social media use. Additionally, involving parents in discussions about guiding their adolescents' online

activities can create a safer and more supportive digital environment. By fostering a culture of open dialogue and education, these efforts can play a significant role in reducing risky behaviors and promoting positive attitudes toward HIV transmission prevention.

Further study in this area could explore the effectiveness of specific interventions aimed at enhancing adolescents' knowledge and attitudes regarding HIV transmission and risky behaviors. Longitudinal studies could track changes in behavior and attitudes over time, providing insights into the long-term impact of health education and awareness campaigns. Social media usage and misconceptions about HIV transmission necessitate examination within a complex model. Identifying additional factors beyond demographics—such as cultural influences, family dynamics, and healthcare access—can significantly shape these attitudes. Additionally, investigating the role of social media platforms in shaping adolescents' perceptions and behaviors could lead to more targeted and tailored interventions.

Limitations

Certain limitations should be acknowledged. Firstly, the study's cross-sectional design restricts our ability to establish causality. The data collected at a single point in time prevents us from making definitive conclusions about the direction of influence between variables. Longitudinal research designs could provide a more comprehensive understanding of how these factors evolve over time and potentially impact each other. Secondly, the study's reliance on self-reported data introduces the possibility of response and social desirability bias. Adolescents may provide answers they perceive as socially acceptable rather than reflecting their actual behaviors and attitudes. Additionally, the use of self-reported data may result in underreporting of sensitive behaviors, such as risky sexual behavior, potentially affecting the accuracy of our findings. Furthermore, the study's sample was drawn from Islamic boarding schools in a specific geographical area, limiting the findings' generalizability to a broader population of adolescents. Cultural and regional variations could influence social media use patterns, knowledge levels, attitudes, and risky behaviors related to HIV transmission.

The study did not delve into the context of the information exposure or the specific content accessed through social media platforms. The nature of the information accessed and its impact on adolescents' knowledge and attitudes remain areas for further exploration. Lastly, the measurement of risky sexual behavior was limited to a small set of items, which may not capture the full range of behaviors and nuances related to HIV transmission risk. A more comprehensive assessment could yield a more accurate representation of adolescents' behaviors. Therefore, future studies could address these limitations by employing longitudinal designs, utilizing multiple data collection methods, and expanding the study to a more diverse population to enhance the applicability of the findings.

Conclusion

The study concludes that most adolescents actively use social media, with some engaging in risky behaviors related to HIV transmission. This study found a relationship between knowledge, demographics, and attitudes toward HIV

prevention. The findings emphasize social media's role in shaping behaviors, particularly among at-risk people. However, the study's cross-sectional design and reliance on self-reports are limitations. Future research should consider longitudinal studies and diverse data collection methods. Nonetheless, this research guides interventions by stressing the need for comprehensive health education, positive attitudes, and responsible online engagement among adolescents. This approach can contribute to a safer environment and better HIV prevention.

Declaration of Conflicting Interest

The authors declare that they have no competing interests.

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Authors' Contributions

Regina Cahya Ramadani: Conceptualization, methodology, formal analysis, writing-original draft preparation, and project administration. **Kusman Ibrahim:** Conceptualization, methodology, validation, writing-review and editing, supervision, and funding acquisition. **Ristina Mirwanti:** Methodology, validation, writing-review and editing, supervision, and funding acquisition. **Sidik Maulana:** validation, writing-review and editing, and funding acquisition. **Raifa Jabareen:** validation, writing review, and editing. All authors approved the final version of the article to be published.

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Data Availability

The data contains personal information that our participants consented to be used for research purposes only and not for public disclosure. The data that support the findings of this study are available from the first and corresponding authors upon reasonable request.

Declaration of Use of AI in Scientific Writing

The authors used ChatGPT during the preparation of this work for proofreading. After utilizing the tool, the authors thoroughly reviewed and edited the content as necessary and assumed full responsibility for the publication's content.

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