

# The Role of Social Media, Health Literacy, and Parental Communication in Risky Sexual Behavior among Adolescents in Surakarta, Central Java, Indonesia

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## ABSTRACT

**Background:** Risk-taking sexual behavior among adolescents continues to increase, especially in Indonesia, and causes serious health problems such as unwanted pregnancies and sexually transmitted diseases. In 2023, there were 402 cases of HIV in Surakarta, Central Java, Indonesia, with 2.91% of them being adolescents. This study aims to examine the relationship between the role of social media, health literacy, and parental communication with risky sexual behavior among adolescents, both directly and indirectly.

**Subjects and Method:** A cross-sectional study conducted from August to September 2025 on 200 high school/vocational school students in Surakarta, selected using multistage random sampling. The independent variables included the role of social media, health literacy, and parental communication; the dependent variable was risky sexual behavior. Data were collected through a structured questionnaire and analyzed univariate, bivariate (chi-square), and multivariate using path analysis.

**Results:** The results of the analysis show that negative social media use can increase risky sexual behavior ( $b = 0.87$ ; 95% CI=0.24 to 1.51;  $p = 0.007$ ), high health literacy can reduce risky sexual behavior ( $b = -1.70$ ; 95% CI=-2.38 to -1.02;  $p < 0.001$ ), and good parental communication can reduce risky sexual behavior ( $b = -0.76$ ; 95% CI=-1.34 to -0.19;  $p = 0.009$ ). The path analysis model shows good fit (AIC= 502.38, BIC= 522.17).

**Conclusion:** The role of social media increases the risk of risky sexual behavior in adolescents, while health literacy and parental communication act as protective factors. This study shows that strengthening health literacy and parental involvement has important implications for efforts to prevent risky sexual behavior in adolescents.


**Keywords:** Social media, literacy, parental communication, and sexual behavior.

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## BACKGROUND

Risky sexual activities among adolescents around the world continue to increase over time, especially in developing countries (Jing et al., 2023). Research data conducted in Malaysia shows that the prevalence of sexual involvement among adolescents is 7.3%, and 87.3% of them do not use condoms during sexual intercourse, 16.6% have multiple sexual partners, and 31.7% have had sexual intercourse before the age of 14 (Lodz et al., 2019). Indonesia shows similar results, with 59% of women and 74% of men reporting that they first had sex between the ages of 15 and 19 (Coordinating Ministry for Human Development and Cultural Affairs of the Republic of Indonesia, 2021). Risky sexual behaviors engaged in by adolescents include kissing, necking, petting, and sexual intercourse (Rahadi & Indarjo., 2017). This can trigger negative impacts such as unwanted pregnancies in adolescent girls, early marriage, unsafe abortions, birth defects, postpartum hemorrhage, maternal and infant mortality, and the transmission of sexually transmitted diseases such as HIV /AIDS (WHO, 2024b).

Based on WHO data, an estimated 21 million girls aged 15-19 in developing countries experience pregnancy each year, and 12 million of them give birth as teenagers (WHO, 2024b). Risk-taking sexual behavior also contributes to HIV cases among adolescents worldwide, with 1.4 million cases among children aged 0-14 and 39.4 million among those aged >15 (WHO, 2025). HIV cases in Indonesia have also increased from 3.88% (2022) to 5.53% (2023) (Ministry of Health of the Republic of Indonesia, 2023b; 2024). Central Java Province has the highest number of People living with HIV/ (PLWH) in Indonesia, with the fourth highest age group being adolescents, specifically those aged 15-19

years (Ministry of Health of the Republic of Indonesia, 2023a).

One of the cities in Central Java Province with a high number of HIV cases is Surakarta City. The number of HIV cases in Surakarta City in 2023 was 402, and around 2.91% were adolescents (Ministry of Health of the Republic of Indonesia, 2023b). Based on data from the Surakarta City Health Office in 2024, the highest number of adolescent reproductive health problems were HIV cases at the Purwodiningratan Community Health Center with 24 cases, teenage pregnancies were most prevalent at the Penumping Community Health Center with 7 cases, and there were 2 cases of STIs at the Ngoresan Community Health Center (Surakarta City Health Office, 2024).

Factors that can increase risky sexual behavior in adolescents, based on previous studies, are grouped into four categories, namely interpersonal factors, environmental factors, family factors, and individual factors. Individual factors have a significant influence on a person's behavior, including biological responses, lack of information and literacy, lack of religious understanding, attitudes, self-esteem, motivation, and social media use (Hastuti et al., 2023). Several previous studies have stated that social media influences adolescents' knowledge about reproductive health reproduksi (Salifu and Abubakari, 2023; Purwati et al, 2023). However, the strong flow of information through social media makes information difficult to control and tends to shape unhealthy sexual behavior. This is because, based on previous research, the highest percentage of information accessed by adolescents is pornography in the United States (87%), Australia (84%), Sweden (98%), Italy (99%), and Indonesia (51.7%) (Alexandraki et al., 2018) Therefore, the use of social media has both positive and

negative impacts on adolescent reproductive health.

The use of social media is also related to the level of digital literacy (Mulyanti et al., 2024). Health literacy is a person's ability to collect, study, weigh, and utilize health information and services so that they can make appropriate decisions regarding their health (Schrauben & Wiebe., 2017). Low health literacy is a source of global public health problems. Based on a systematic review, approximately 48%, 64.8%, and 67.5% of adolescents in European, Sub-Saharan African, and South Asian countries have low health literacy (Baccolini et al., 2021; McClintock et al., 2017; Rajah et al., 2019). Therefore, limited health literacy is associated with sexual decision-making and reproductive health outcomes among adolescents (Batu et al., 2024).

Parental communication also plays a role in adolescent reproductive health (Uzayisenga et al., 2025). This is because parents are the source of information and the people closest to adolescents. However, in practice, many parents still do not communicate about reproductive health and sexuality with adolescents. Previous studies have stated that parents face several obstacles, such as considering the topic taboo, lack of knowledge, and lack of confidence in providing reproductive health information (Hasanah & Setiyabudi., 2020). A systematic review of parent-adolescent communication states that parental openness in conveying reproductive health information can influence adolescents' behavior to discuss reproductive health and prevent them from engaging in risky sexual behavior (Agyei et al., 2025). Meanwhile, several previous studies state that the role of parents has no significant relationship with premarital sexual behavior in adolescents (Marfu'ah et al., 2023; Appulembang et al., 2019). Therefore, further research is

needed on the role of parental communication in risky sexual behavior.

Based on the results of a preliminary study conducted on 15 adolescents in Surakarta, 67% of adolescents started dating at the age of 15 or when they were in the first year of high school, and some even admitted to starting dating at the age of 10. The risky behaviors engaged in by these adolescents included holding hands, kissing the neck, and discussing sexual issues with their partners. The preliminary study also found that they use social media only for entertainment, and adolescents admitted to having seen information about reproductive health, but some of them found it difficult to understand and practice this information. In addition, all adolescents in this preliminary study stated that they were not open with their parents and did not have good communication, including about reproductive health and sexuality. Based on the above issues, the researcher will conduct research on the role of social media, health literacy, and parental communication on risky sexual behavior among adolescents in Surakarta.

## SUBJECTS AND METHOD

### 1. Study Design

This study was designed quantitatively using a cross-sectional design. This study was conducted in senior high schools/vocational schools in Surakarta, Central Java, Indonesia, in July-August 2025.

### 2. Population and Sample

The study population was adolescents aged 15-19 years old. The exact size of the population was not known. The sampling technique used in this study was multistage random sampling, and the sample size was 200 respondents, obtained based on Murti's (2018) formula and adjusted according to Roscoe's theory.

### 3. Study Instruments

The research question was developed using the PICO (Population, Intervention, Comparison, Outcome, Study Design) framework. The study population was mothers or parents who received a health education intervention related to SHK. The comparison involved a group without exposure to specific risk factors.

### 4. Operational Definition of Variables

**Risky Sexual Behavior** is a question about respondents have engaged in with the opposite sex include holding hands, kissing cheeks, hugging, kissing the neck, kissing lips, touching sensitive areas such as breasts and genitals, and having sexual intercourse.

**The role of social media** is a question about the types of social media, tools for accessing social media, the purpose of using social media, whether it be for informational, educational, satirical, critical, or entertainment purposes on social media, as well as assessing how intensely respondents use social media.

**Health literacy** is a respondent's statement about their ability to find information related to health, including the ability to find, understand, assess, and apply health information, so that they are able to make decisions or behaviors related to health, such as disease prevention, health promotion, and health care.

**Parental communication** refers to questions about interactions, including the frequency and duration of discussions, the quality of responses, adolescents' sense of security, openness of information, and parents' actions and expressions when discussing reproductive health topics, including the dangers of promiscuity and sexually transmitted diseases.

### 5. Study Instruments

The instrument used in this study was a structured questionnaire that had been evaluated for validity and reliability. Item validity was assessed using the product-moment correlation method, and all items demonstrated acceptable validity with correlation coefficients greater than 0.36. The reliability of the instrument was examined using Cronbach's Alpha, which yielded values exceeding 0.70, indicating good internal consistency.

### 6. Data Analysis

Data analysis in this study was performed using STATA version 13. Univariate analysis was performed to describe the characteristics of respondents, including frequency distribution and percentage of each variable. Bivariate analysis was performed using the chi-square test with a significance level of 95% confidence interval (CI)  $p > 0.005$ . In addition, multivariate analysis was performed using path analysis to determine the magnitude of the influence of one variable on another variable, both directly and indirectly. The path analysis proceeded in steps including model specification, model identification, model fit, parameter estimate, and model re-specification.

### 7. Research Ethics

Ethical considerations such as informed consent, anonymity, and confidentiality were strictly adhered to throughout the research process. Ethical approval for this study was granted by the Research Ethics Committee of Dr. Moewardi Hospital, Surakarta, Indonesia, on July 24, 2024, with approval number 1.639/VII/HR-EC/2025.

## RESULTS

### 1. Sample Characteristics

Based on the characteristics of the respondents, the majority of respondents

were aged 15-16 years, 118 student (59%), and most were male, 120 students (60%). Respondents stated that they had obtained health information, 190 student (95%), and the most common source of health information was the internet, 68 student (34%). Respondents searched for sexual and reproductive health information 1-2 times a week, 50 student (25%). The platform used to search for health information was social

media 121 student (60.5%). Most respondents in this study did not search for sources of information other than the internet 84 student (42%). Additionally, 163 (81.5%) students did not participate in peer counseling. Information regarding the availability of peer counseling services or the reasons for non-participation was not collected. The detailed characteristics of respondents are presented in Table 1.

**Table 1. Univariate Results of Respondent Characteristics**

Variable	Category	n	%
Age	15-16 years	118	59
	17-18 years	82	47
Gender	Male	120	60
	Female	80	40
Getting health information	Yes	190	95
	No	10	5
Health Information Sources	Internet	68	34
	School	54	27
	Friends	51	25.5
	Family	9	4.5
	Healthcare Workers	8	4
	None	10	5
Searching for information within a week	<1 time	139	69.5
	1-2 times	50	25
	3-4 times	6	3
	>4 times	5	2.5
Platform for finding health information	Social media (Instagram, Facebook, TikTok, etc.)	121	60.5
	Website	59	29.5
	None	20	10
Looking for sources of information other than the internet	None	84	42
	>2 Sources	54	27
	Parents	29	14.5
	Healthcare Workers	14	7
	Friends	13	6.5
Attending peer counsellors	Teachers	6	3
	No	163	81.5
	Yes	37	18.5

Based on the univariate results, it also shows that the average social media role score is 14.66, with a minimum score of 10 and a maximum score of 22. The average health literacy score is 82.96, with a minimum score of 65 and a maximum score of 98. The parent communication variable

showed an average score of 81.43, with a minimum score of 46 and a maximum score of 99. The average risky sexual behavior score was 15.36, with a minimum score of 6 and a maximum score of 19. These results can be seen in Table 2.

**Table 2. Results of Univariate Research Variables**

Variables	Mean	SD	Min.	Max.
The Role of Social Media (score)	14.66	2.21	10	22
Health Literacy (score)	82.96	6.36	65	98
Parent Communication (score)	81.43	8.32	46	99
Risky Sexual Behavior (score)	15.36	2.61	6	19

**2. Bivariate Analysis**

Bivariate analysis shows that social media statistically has a significant influence on risky sexual behavior (OR= 2.19; 95% CI= 1.23 to 3.91; p= 0.007). This OR value indicates that adolescents with poor social media use are 2.19 times more likely to engage in risky sexual behavior than individuals with good social media use. Health literacy has a statistically significant effect on risky sexual behavior (OR=0.55, 95% CI=0.31 to 0.98; p=0.045). The OR value of 0.55 indicates that good health

literacy is a protective factor because it can reduce the likelihood of risky sexual behavior by 45% compared to poor health literacy. Parental communication has a statistically significant effect on the occurrence of risky sexual behavior (OR = 4.30, 95% CI = 2.34 to 7.89; p <0.001). This OR value indicates that adolescents with poor parental communication are 4.30 times more likely to engage in risky sexual behavior compared to adolescents with good parental communication. These results can be seen in Table 3

**Table 3. Simple Logistic Regression Analysis of the Role of Social Media, Health Literacy, and Parental Communication on Risky Sexual Behavior among Adolescents in Surakarta**

Independent Variables	OR	95% CI		p
		Lower limit	Upper limit	
Social Media Exposure	2.19	1.23	3.91	0.007
Health Literacy	0.55	0.31	0.98	0.045
Parent Communication	4.30	2.34	7.89	<0.001

**3. Multivariate analysis**

The results of multivariate analysis show that the role of social media is directly and significantly positively related to risky sexual behavior in adolescents (b= 0.87; 95% CI = 0.242 to 1.51; p 0.007). A path coefficient value of 0.87 indicates that every one-unit increase in the role of social media will be followed by an increase of 0.87 units in risky sexual behavior. The results also show that the worse the use of social media among adolescents, the greater their tendency to engage in risky sexual behavior.

Health literacy is directly and significantly negatively related to risky sexual behavior among adolescents (b = -1.70;

95% CI = -2.39 to -1.02; p <0.001). The path coefficient value indicates that every one-unit increase in health literacy will reduce risky sexual behavior by 1.70 units. This means that the higher the health literacy of adolescents, the lower their tendency to engage in risky sexual behavior.

Parental communication is directly and significantly negatively related to risky sexual behavior in adolescents (b = -1.11; 95% CI = -1.79 to -0.43; p = 0.001). The path coefficient value indicates that every one-unit increase in parental communication will reduce risky sexual behavior by 1.11 units. This indicates that the better the communication between parents and

adolescents regarding sexual and reproductive health, the lower the tendency for adolescents to engage in risky sexual behavior.

Based on the results of path analysis, it is also known that parental communication is indirectly and significantly related to risky sexual behavior through health literacy. Parental communication is negatively

and significantly related to health literacy ( $b = -0.76$ ; 95% CI =  $-1.34$  to  $-0.19$ ;  $p = 0.009$ ), indicating that good parental communication is actually associated with lower health literacy. These results can be seen in the following analysis model figure and multivariate table.

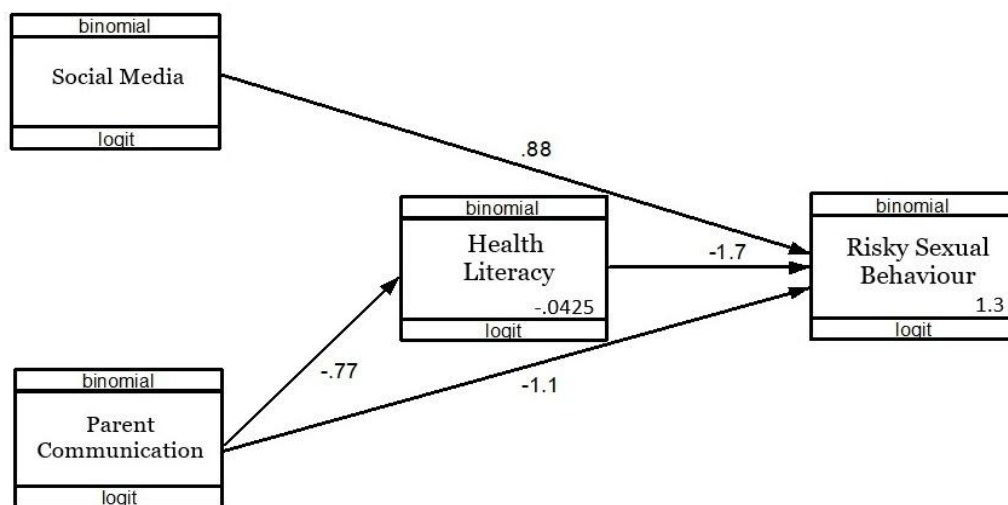


Figure 1. Structural path analysis model with estimates

Table 4. Path Analysis of the Role of Social Media, Health Literacy, Parental Communication, and Risky Sexual Behavior among Adolescents

Dependent Variables	Independent Variables	b	95% CI		p
			Lower Limit	Upper Limit	
<b>Direct effect</b>					
Risky Sexual Behaviour	← Social Media Exposure	0.87	0.24	1.51	0.007
Risky Sexual Behaviour	← Health Literacy	-1.70	-2.39	-1.02	<0.001
Risky Sexual Behaviour	← Parental Communication	-1.11	-1.79	-0.43	0.001
<b>Indirect effect</b>					
Health Literacy	← Parental Communication	-0.76	-1.34	-0.19	0.009
N observation = 200					
Log likelihood = -245.19					
AIC = 502.38					
BIC = 522.17					

## DISCUSSION

### **The Direct Influence of Social Media on Risky Sexual Behavior**

The results of the analysis show that the role of social media is directly and significantly positively related to risky sexual behavior in adolescents. These findings are consistent with previous studies that report a significant influence between social media exposure and risky sexual behavior in adolescents (Vannucci et al., 2020; Wanjohi & Ndirangu., 2025). This relationship can be explained through the mechanisms of social learning and behavioral normalization, whereby repeated exposure to sexual content on social media shapes adolescents' perceptions that certain sexual behaviors are common and socially acceptable. Social media not only serves as a source of information, but also as an observational space that allows adolescents to observe and imitate the attitudes, values, and sexual behaviors displayed by their peers and popular figures. This process is further reinforced by social media algorithms that actively recommend similar content, thereby increasing the intensity and frequency of sexual exposure. Such exposure contributes to increased sexual urges, decreased self-control, and accelerated sexual debut and engagement in unsafe sexual practices (Lin et al., 2020). Additionally, sexual content on social media has been shown to increase adolescents' sexual desire, which ultimately encourages risky sexual behavior (Gonçalves., 2023). Therefore, in order to reduce risky sexual behavior, strategies are needed that can guide adolescents towards healthier and more controlled use of social media.

### **The Direct Influence of Health Literacy on Risky Sexual Behavior**

The path analysis results show that health literacy has a direct, negative, and significant effect on risky sexual behavior among

adolescents, which means that the higher the health literacy of adolescents, the lower their tendency to engage in risky sexual behavior. This relationship can be explained through cognitive and decision-making mechanisms, whereby health literacy enables adolescents to understand, evaluate, and critically use health information in a sexual context. Health literacy is not only related to the ability to read health information, but also includes understanding consequences, assessing risks, and the ability to make appropriate decisions (WHO, 2024a). Adolescents with good health literacy tend to have a higher awareness of the risks of sexual behavior, enabling them to delay sexual intercourse and choose safer sexual practices (Rodríguez-García et al., 2025). Conversely, low health literacy can limit adolescents' ability to understand sexual health risks and consequences, ultimately increasing their vulnerability to risky sexual behavior and sexually transmitted infections (Sul et al., 2023). These findings are in line with previous studies showing that improved health literacy plays an important role in reducing risky sexual behavior and its impact on adolescents (Vamos et al., 2020; Kelecha et al., 2024). Thus, health literacy is a protective factor that plays a role in shaping safer sexual knowledge, attitudes, and decision-making in adolescents.

### **The Direct Influence of Parental Communication on Risky Sexual Behavior**

The results of the path analysis show that parental communication is directly, negatively, and significantly related to risky sexual behavior in adolescents, confirming its role as a protective factor. This relationship can be explained through the mechanisms of value regulation and emotional support, whereby open and responsive communication enables parents to instill

sexual health norms and guide adolescents in understanding the boundaries of safe behavior. Conversely, closed, authoritarian, or permissive communication patterns can limit dialogue and increase adolescents' vulnerability to social pressure, thereby contributing to high rates of risky sexual behavior (Agustina et al., 2024; Olivia et al., 2025). Comfortable and non-judgmental family communication creates a sense of security for adolescents to discuss sexuality issues, which ultimately reduces the likelihood of engaging in risky sexual behavior (Nattabi et al., 2023). This mechanism is reinforced by findings that parents who are able to establish warm and supportive communication are more effective in guiding adolescents to deal with environmental and peer influences (Grey et al., 2022). Thus, the quality and consistency of parental communication, including the content of the message, the style of delivery, and openness in discussing sexuality, are key aspects in preventing risky sexual behavior, as demonstrated by the relationship between high-quality family communication and a decrease in risky sexual behavior among adolescents (Coakley et al., 2017). Thus, parental communication plays a role in shaping adolescents' behavioral regulation and self-control in the context of sexual health.

### **The Indirect Influence Of Social Media On Health Literacy**

The results of the study indicate that parental communication is indirectly related to risky sexual behavior through health literacy as a mediator, even though the relationship between parental communication and health literacy is negative. These findings can be explained by the patterns of health information seeking among adolescents, where most respondents rely more on the internet as their main source of information rather than

their families. Dependence on digital sources encourages adolescents to develop health literacy independently, often without parental guidance (Liu et al., 2023), and makes digital devices a higher priority than family interactions in seeking health information (Sasfira & Salas, 2025). Additionally, the internet is perceived as an easier medium for accessing sensitive topics such as sexuality (Silva et al., 2024). In this context, restrictive or avoidant communication patterns among parents may encourage adolescents to seek information from less credible alternative sources, thereby weakening the role of parental communication in the formation of health literacy (Yusuf et al., 2025). Thus, this mediation pathway reflects a shift in the role of adolescent health socialization from the family to digital sources.

### **AUTHOR CONTRIBUTION**

ASB: contributed to the study conception and design, data collection, analysis and interpretation, and manuscript drafting. SM and ISS: contributed to study design, methodology, data interpretation, and critical revision of the manuscript. EBC and AD contributed to critical review and intellectual input. All authors approved the final manuscript and are accountable for all aspects of the work.

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## CONFLICT OF INTEREST

There are no conflicts of interest

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