



Correlation between access to health information and health literacy among adolescents in Aceh, Indonesia

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ABSTRACT

The development of digital technology has brought about significant changes in how adolescents access health information; however, the main challenge remains their ability to evaluate and utilize information effectively. This study aims to examine the relationship between access to health information and levels of health literacy among adolescents in Aceh Tamiang. The study employs a descriptive correlational design with a quantitative approach, involving 88 students from SMA Negeri 4 Kejuruan Muda, selected via stratified random sampling. Data were collected via a health information access questionnaire and the Indonesian version of the Health Literacy Survey (Q16). Bivariate analysis using Spearman's Rho test revealed a very strong positive relationship between health information access and adolescents' health literacy levels ($r = 0.802$, $p < 0.05$). The majority of respondents had moderate access to information (60.2%), whilst health literacy levels were predominantly in the adequate category (43.2%); however, the majority of adolescents had inadequate literacy. This study indicates that good access to health information is a key factor in the development of health literacy in line with the European health literacy model. However, access to information without critical literacy skills risks increasing exposure to misinformation. These findings contribute to the development of comprehensive, context-specific health literacy interventions grounded in access to information and serve as a reference for the design of policies and health literacy education programs for adolescents in rural areas of Indonesia.

Keywords: Access to Information, Adolescents, Health Literacy

1. Introduction

The development of digital technology has changed how adolescents obtain, access, and use health information. Adolescents are a very active age group in exploring and using information online and through social media, including in health-related areas. However, the ease of access to health information does not align with adolescents' ability to assess the accuracy and suitability of the information they obtain. There are barriers to adolescents' ability to distinguish accurate from misinformation, increasing the risk of exposure to misinformation and leading to unhealthy health behaviors (Okumu et al., 2025). Information literacy, the ability to recognize needs, access, evaluate, and use information effectively, is important in the formation of good health literacy in adolescents (Kayalkar & Dmello, 2024).

Massive digital transformation puts adolescents in an increasingly vulnerable position to misinformation, especially from social media and the internet (Salerno et al., 2025). Easier access to information should be an opportunity to improve adolescent health knowledge and behavior. However, some studies have found that greater access to health information is not always directly associated with increased health literacy or healthy behaviors (Kayalkar & Dmello, 2024; Lee et al., 2021; Roux et al., 2024). For example, a study in 11 European countries in the *Health Literacy Survey-European Union (HLS-EU)* shows that about 47% of adolescents still have low levels of health literacy, making them vulnerable to exposure to health misinformation (Coman et al., 2022). In Indonesia, the results of the *Program for International Student Assessment (PISA)* in 2024 put

Indonesian adolescent literacy at the bottom, with 65% of adolescents considered to have limited health literacy skills (Rajah et al., 2019).

An imbalance between ease of access and the critical ability to evaluate and utilize health information. Adolescents in rural areas, such as Aceh Tamiang, face challenges including limited digital infrastructure, limited access to reliable information sources, and minimal support from families and schools. Some studies show that although rural adolescents are increasingly using the internet and social media to search for health information, their health literacy levels still lag behind those of urban adolescents ((Nayoan & Haninuna, 2022, Jasmianti et al., 2023).

Low adolescent health literacy is not only due to limited knowledge but also to adolescents' limited ability to access and evaluate health information effectively (Khanal et al., 2023). This condition makes adolescents a very vulnerable group in irrational and high-risk health decision-making, with the prevalence of smoking among adolescents and the high rate of anemia among adolescent girls in Aceh. Adolescent health problems in Aceh are supported by social phenomena such as early marriage, often used as a family economic solution. Low health literacy in adolescents causes adolescents to have risky behaviors, seek medical attention too late, and increase the prevalence of non-communicable diseases (Roiefah & Pertiwi, 2021). Therefore, strengthening adolescents' health literacy is essential to improve healthy decision-making skills and protect the younger generation from future health risks.

Various interventions have been carried out to improve adolescent health literacy. Research by Kayalkar & Dmello (2024) found that integrating health education into the school curriculum and optimizing digital platforms for school education by involving teachers and medical personnel are important. Development of online-based health education programs to expand access to accurate information (Chereka et al., 2025). However, the intervention's effectiveness has not fully reached adolescents in rural areas such as Aceh Tamiang due to limited access to and sources of health information.

Several studies have identified a relationship between access to health information and adolescent health literacy levels. The *Model Health Literacy Survey Europe* (HLS-EU) shows that access to information is the main factor in the development of health literacy (Coman et al., 2022). Research by Sutha et al., (2026) shows that greater ease of access to information is associated with higher levels of health literacy among adolescents. This is according to research by Khanal et al. (2023), which shows that access to structured health information through education and digital platforms is key to improving health literacy. Therefore, integrating access to information with strengthening literacy capacity is important for shaping adaptive adolescent health behavior.

Some previous studies still provide limited comprehensive information on access to health information from both digital and traditional sources, thereby limiting the extent of health literacy in rural areas such as Aceh Tamiang. In addition, the challenges faced by adolescents in the Aceh Tamiang area differ from those in urban areas, particularly in terms of digital infrastructure, culture, and family and school support. Most previous research has focused only on aspects of knowledge or behavior, without examining the relationship between digital information access and health literacy levels in rural Indonesia. Therefore, this study aims to determine the relationship between access to health information and adolescent health literacy in Aceh Tamiang. This research is expected to contribute to the development of more effective health literacy interventions that better meet the needs of adolescents in rural areas of Indonesia.

2. Methods

2.1. Research design

This study uses a correlational descriptive design with a quantitative approach. The study aims to investigate the correlation between access to health information and the level of health literacy among adolescents in Aceh Tamiang. The study variables consist of two variables: the independent variable 'access to health information' and the dependent variable 'health literacy'.

2.2. Setting and samples

The research population is all students of SMA Negeri 4 Kejuruan Muda, Aceh Tamiang, totaling 693 students. A sample of 88 students was selected using the proportionate stratified random sampling technique, ensuring representation for each grade level. The inclusion criteria include students who can use smartphones and are willing to serve as respondents. Data collection was carried out in September-November 2025.

2.3. Measurement and data collection

Data were collected using questionnaire. Demographic data questionnaire to collect demographic information about respondents, namely their name (initials), gender, age, and class. Health information access

questionnaire from Santosa et al. (2012), cit. Oktarini & Prima (2021) and the Indonesian version of the Health Literacy Survey-European Union Q16 (HLS-EU-Q16) instrument.

Access to health information was assessed using four indicators: types of media (items 1–3), types of health information (items 4–6), frequency of media use (items 7–8), and sources of information (items 9–10). Responses were scored from 1 (lowest frequency) to 5 (highest frequency), corresponding to ‘never’, ‘rarely’, ‘sometimes’, ‘often’, and ‘very often’. The mean item score (possible range 1.00-5.00) was used for categorization. To create three ordered categories of equal width across the scale range, scores were classified as low (1.00-2.33), moderate (2.34-3.66), or high (3.67-5.00), corresponding approximately to total scores of 10-23, 24-36, and 37-50, respectively. Content validity was assessed by an expert and yielded a content validity index (CVI) of 1.00. In a pilot test involving 30 students outside the study sample, Cronbach's alpha was 0.784.

Health literacy was measured using the Indonesian HLS-EU-Q16, which comprises 16 items across four dimensions: accessing information (items 1-5), understanding information (items 6-10), appraising information (items 11-13), and applying information (items 14-16). Each item had four response options: difficult, fairly difficult, easy, and very easy. In accordance with the HLS-EU-Q16 scoring procedure, difficult and fairly difficult responses were scored 0, whereas easy and very easy responses were scored 1, producing a total score of 0-16. Scores were categorized as inadequate (0-8), problematic (9-12), or sufficient (13-16). Previous Indonesian validation showed corrected item-total correlations of 0.432-0.640, all above 0.30. In the 30-student pilot test, Cronbach's alpha was 0.812.

Data collection from respondents was carried out after the researcher had obtained permission from the Headteacher of State Vocational Secondary School No. 4 Kejuruan Muda; the researcher coordinated with teachers to identify the sample in accordance with the predetermined inclusion and exclusion criteria. Teachers assisted in collecting students from each year group (X, XI, XII) in accordance with the quotas that the researcher had calculated proportionally. The students were then gathered in a room, where the researcher explained the purpose and objectives of the study, before giving the respondents the opportunity to ask questions. After the respondents have understood and agreed, they are asked to sign a consent form and then complete the questionnaire. During the completion of the questionnaire, the researcher remains on site to supervise and answer questions if necessary, but does not assist directly. After the questionnaires have been completed, the researcher immediately checks them to ensure all questions have been answered in full before leaving the location.

2.4. Data analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) for Windows, version 26. Descriptive statistics, including frequencies, percentages, ranges, means, and standard deviations, were calculated to describe participants' demographic characteristics and health information access score and health literacy score.

2.5. Ethical consideration

This study has obtained ethical approval from the Ethics Committee of the Faculty of Nursing, University of North Sumatra, with number 1302/KEPK/USU/2025. The research procedure is carried out in compliance with the principles of anonymity and data confidentiality. All respondents are provided with complete information regarding their rights and obligations during the research process, as well as a guarantee that personal data will not be disseminated. The questionnaire-filling process is carried out directly at the school with the researcher's assistance. Each respondent is explained the research's purpose and procedures and is asked to sign *an informed consent form before completing* the questionnaire to ensure voluntary participation and maintain the validity of the collected data. Data analysis was carried out using univariate analysis to describe the characteristics of respondents and the variables of access to health information and health literacy, and bivariate analysis using Spearman's Rho to examine the relationship between the two variables.

3. Results

3.1. Demographic characteristics

Most respondents were female (54 students, 61.4%). Participants aged 15 and 16 years each accounted for 29 respondents (33.0%), and grade XII was the largest class group (30 students, 34.1%). This is shown in Table 1.

Table 1. Frequency and Percentage of Demographic Data Characteristics in Students of SMA 4 Kejuruan Muda Aceh Tamiang (n=88)

Characteristics	n	%
Gender		
Man	34	38,6
Woman	54	61,4
Age		
15	29	33,0
16	29	33,0
17	27	30,7
18	3	3,4
Class		
X	29	33,0
XI	29	33,0
XII	30	34,1

3.2. Access health information

Most respondents had access to health information in the medium category (53 people, 60.2%), while those in the low category numbered 28 people (31.8%). This shows that although most adolescents have access to health information, some still do not use the available sources optimally. This is shown in Table 2.

Table 2. Distribution of Frequency and Percentage of Health Information Access Categories in Students of SMA 4 Kejuruan Muda Aceh Tamiang (n=88)

Categories	n	%
Low	38	31,8
Medium	53	60,2
Height	7	8,0

3.3. Health literacy

Most respondents have health literacy in the Sufficient category, and 31 people (35.2%) are in the *Inadequate* category. This table shows that most adolescents have not reached the ideal literacy level. This is shown in Table 3.

Table 3. Frequency and Percentage of Health Literacy in Students of SMA 4 Kejuruan Muda in Aceh Tamiang (n=88)

Categories	n	%
Inadequate HL	31	35,2
Problematic HL	19	21,6
Sufficient HL	38	43,2

3.4. Correlation between access to health information and health literacy

Based on the results of the Spearman's Rho *correlation test*, a correlation coefficient value (r) of 0.802 was obtained. This shows a strong and one-way relationship between access to health information and adolescent health literacy. This means that the better the access to health information, the higher the level of health literacy in adolescents. The statistical test also showed a p -value of < 0.05 , indicating that the research hypothesis was accepted. This indicates that, among 88 respondents, any increase in variable X will be followed by a significant increase in variable Y, as shown in Table 4.

Table 4. Frequency and Percentage of Correlation Between Access to Health Information and Health Literacy Level in Students of SMA 4 Kejuruan Muda Aceh Tamiang (n=88)

Variable	Coefficient of Tolerance	Sig. (2-tailed)	Remarks
Access health information with health literacy	0,802	0,000	Positive, Strong Relationships

4. Discussion

This study shows a correlation between access to health information and health literacy among adolescents in Aceh Tamiang. This research aligns with Coman et al., (2022) who state that access to information is a prerequisite for the development of health literacy. This study is also consistent with the research of Khanal et al., (2023) and Kayalkar & Dmello (2024) which emphasizes the importance of structured access and education through digital platforms in shaping adaptive adolescent health behaviors. This is supported by Lee et al. (2021) who state that health literacy and access to digital devices are simultaneously predictors of online health information search behavior; individuals with higher literacy levels and greater device access tend to be more active and selective in their search for and application of online health information.

This research by Seidl et al. (2025) stated that the process of health literacy in children and adolescents is not only linear but also multidimensional, involving active searching, passive acceptance, processing, and complex decision-making. The social environment, culture, education system, and family dynamics are very influential in this process. In this study, the characteristics of Aceh Tamiang, a rural area with limited access to digital infrastructure, also shape adolescent access to health care and literacy patterns. This is in accordance with the research by Nagy-Pénzes et al. (2022) that school-based health interventions in rural areas can improve adolescents' knowledge and some healthy behaviors, but that their long-term effectiveness is strongly influenced by social environment support, the involvement of various school actors, and the need for comprehensive and holistic strategies.

Aceh Tamiang adolescents tend to feel confident in their ability to search for health information online, but in reality, their critical assessment of the quality and relevance of the information still needs improvement. Research by Taba et al. (2022) states that adolescents often use general searches taught in schools, but do not always understand their critical implications in health contexts. This aligns with research by Meherali et al. (2021), which found that adolescents' preferences for information in developing countries are often easily accessible but not necessarily valid, thereby increasing the risk of exposure to misinformation.

Meanwhile, research by Lewis et al. (2024) and Suttor et al. (2023) offers important insights into the dynamics of digital and social media use in adolescent health literacy. Research by Lewis et al., (2024) emphasizes that co-designing digital literacy programs with adolescents can increase relevance and engagement, while Suttor et al. (2023) state that adolescents are not only actively seeking health information through search engines, but also incidentally receiving exposure to information on social media such as TikTok, which can bring educational benefits and the risk of misinformation.

The results show that most adolescents have not reached an optimal level of health literacy, despite good access to information. This aligns with the results of Nagy-Pénzes et al. (2022) It shows that improving health knowledge through school interventions can indeed have a positive impact on health behaviors (e.g., decreasing unhealthy food consumption and increasing physical activity). Still, behavior change does not occur only with the addition of knowledge or access to information. Therefore, it is necessary to integrate the dimensions of motivation, cognitive skills, and social environmental factors to produce sustainable change.

This research makes a significant contribution to the discourse on health literacy in Indonesia, particularly for rural and adolescent groups that have been underrepresented in the global literature. Therefore, adequate access to health information is directly proportional to the level of adolescent health literacy, this study supports the need for access-based interventions and digital empowerment as the main strategy to improve health literacy, Research by Ishikawa et al. (2025) and Meherali et al. (2021) stated that the importance of strengthening digital health literacy among the younger generation, especially students and adolescents, is in response to the increasing use of the internet and social media as a source of health information.

The results of this study strengthen the urgency of policies that integrate digital literacy and health education into the school curriculum. This aligns with the research by Lewis et al. (2024) which found that students, teachers, and health workers need to be encouraged to ensure that educational content aligns with adolescents' real needs in the field. In addition, strengthening the role of families and communities as social learning environments will strengthen the transfer of contextual health literacy values and skills (Seidl et al., 2025).

This study also emphasizes that health literacy challenges among adolescents are not only caused by limited knowledge but also by structural barriers to accessing information, the quality of resources, and low critical assessment skills. This aligns with the findings of Suttor et al., (2023), who found that although adolescents are highly receptive to online information, they still need assistance and critical literacy education to distinguish accurate information.

The results of this research can serve as a reference for local governments, education offices, and health offices in designing inclusive, context-specific digital access-based health literacy improvement programs.

The implementation of digital literacy and health training in schools can adopt an approach that emphasizes strengthening students' critical assessment of online information, active student involvement in developing educational content, and cross-sectoral collaboration among educational institutions, health, and local communities.

In addition, the development of a youth-friendly, locally needs-based health information platform is urgently needed. Research by Lewis et al. (2024) and Taba et al., (2022) recommends an educational intervention model that combines interactive digital media, quizzes, and simulations based on real scenarios, so as to increase engagement and *self-efficacy* of adolescents in accessing, understanding, and applying health information. This is in accordance with studies by Ishikawa et al. (2025). It shows the importance of providing reliable, accessible, and verifiable online health information resources to adolescents. Therefore, it is important to strengthen teachers' and health workers' capacity to deliver digital literacy education, as well as to develop partnerships with digital platforms and local communities to sustain the intervention's impact. Family involvement as the primary source of social support must also be optimized through an educational approach that empowers parents as adolescent learning partners.

This study has several limitations, including the fact that a correlational design cannot establish a cause-and-effect relationship between the variables; both variables were measured using a self-administered questionnaire, which is subject to bias in terms of memory and social desirability; and respondents were recruited from a single upper secondary school only, meaning these findings cannot be generalised to adolescents in other schools, other regions, or adolescents without personal digital access. Further testing should be conducted on a larger and more diverse sample, involving more than one school.

5. Conclusion

This study shows that greater access to health information is significantly associated with higher levels of health literacy among adolescents in Aceh Tamiang. The majority of adolescents have moderate access to health information, and their health literacy is mostly in the adequate category. However, there are still a large number of adolescents with problematic and inadequate health literacy, especially in the dimension of evaluation and application of health information. The relationship between the two variables is very strong and meaningful, showing the importance of increasing access and health literacy simultaneously. In practical terms, the findings of this study provide guidelines for health literacy education interventions based on comprehensive, contextual, and inclusive information access. Local governments, educational institutions, and healthcare workers in rural areas are advised to integrate digital literacy and health literacy training into the secondary school curriculum, develop a youth-friendly, easily accessible digital health platform featuring verified content, engage families and local communities as active partners in health literacy education, and facilitate training for teachers and healthcare workers to become effective agents of digital and health literacy within schools and the wider community, so that young people in rural areas can be protected from exposure to misinformation and can make more rational and healthy decisions regarding their health.

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