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Research Article

High School Students' Health Literacy Related to the COVID-19 Pandemic in Indonesia

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Abstract.
The global crisis due to COVID-19 demanded changes in people's behavior to adapt to the pandemic. One factor that determined behaviors was literacy skills, especially in the health sector. A study related to the COVID-19 pandemic was carried out on high school students to assess students' health literacy and determine related factors. Data collection was carried out from December 2021 to February 2022 by dividing urban areas, developing districts, and remote regions. The Health Literacy Questionnaire (HLQ) was adapted to suit the conditions of the COVID-19 pandemic. The data was interpreted as descriptive-narrative. Differences in literacy ability and the relationship with influencing factors were analyzed using ordinal regression and SEM-AMOS analysis. Limited health literacy was found in students from remote areas. A significant relationship was found between health literacy and class interest based on the ordinal regression test results. In contrast, health literacy was not related to gender, grade level, infected experience, and domicile. It was found that the ability to navigate health system information had a significant effect on students' understanding of health literacy. Health literacy, which was low and unequal, is expected to improve strategic and sustainable education programs through science learning and physical health.

Keywords: Health Literacy, COVID-19, Indonesia

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1. INTRODUCTION

The global crisis due to the corona-virus disease (COVID-19) demands a rapid and significant change in people's understanding and behavior to limit the transmission of SARS-CoV2 [1]. Education is one sector that is undergoing a massive transformation in the face of a pandemic situation. This is reflected in the preparation of school programs that accommodate comprehensive learning with a practical approach to increasing awareness of the importance of health [2]. Education about healthy living behavior is essential to level significantly for school students because cognitive development and

non-cognitive skills are being built at that age. In this regard, the ability to understand healthy living behavior cannot be separated from the ability to be literate in the health sector.

Health literacy is part of the skills process that is understood as a source of empowerment for individuals related to education [3–5]. In addition, literacy is an essential component of good health communication and navigation [6]. Literacy skills usually experience significant development in students, especially in high school. This is indicated by the significant relationship meaningful health literacy and healthy living behavior in adolescents [7]. Therefore, understanding the factors related to literacy, healthy lifestyle, health stare critically promoting the importance of maintaining health for adolescents [8]. In addition, several studies have found that health literacy abilities vary in each generation because it is influenced by demographic and social variables [9, 10].

Adolescence is a period of intense change during life, with drastic changes in physiological and psychological growth, affecting individuals' lifestyle profiles and health behavior, thereby affecting health in adulthood [11]. The relationship between health literacy and the impact of the COVID-19 pandemic on today's youth needs special attention as part of education program. In addition, recent research shows a decline in the physical and mental health of school students' physical and mental health -isolation and distance learning policies during the COVID-19 pandemic [12]. Several studies have shown that male students tend to be more mentally resilient than female students in dealing with the COVID-19 pandemic [13, 14]. This may be because male students have a higher perception perceive subjective well-being more pandemic [15].

The decline in physical and mental health is thought to be due to the lack of interaction of students with the health system, the infrequent use of available health services, and the inability to make informed decisions regarding health in everyday life. Therefore, this study aims to explain the profile and factors that influence the health literacy of high school students in healthy behavior according to the age terms of students. It is important to recognize the relevance and contextualization of health literacy. Students are empowered to interact with health, social and educational systems for themselves and society as [16]. In addition, this information can be used as a basis for developing adaptive education programs in dealing with pandemic conditions.

2. RESEARCH method

This study is a quantitative research: observational exploratory. A total of 295 students in grades 9-12 high school were involved as respondents selected by random sampling.

The selection of research loci was based on the assumption of the level of regional progress so that fives and regencies were selected, namely: Semarang City and Malang which represented urban areas; Sragen and Pati districts represent developing areas; and Flores Timur which represents remote area

Data collection was carried out using the Google Form platform between December 2021 and February 28, 2022. The research variable is the health literacy of high school students related to the COVID-19 pandemic. The measuring instrument uses a health literacy questionnaire (HLQ) developed by Osborne et al. (2013) [17], modified as needed to suit the conditions of the COVID-19 pandemic and changed to Indonesian (Table 1).

Table 1: Observational aspects that play a role in determining numeracy literacy skills.

Aspect/Indicators	Descriptor	Code
Health care support	4	A
Adequacy of health information	4	B
Efforts to maintain health during the COVID-19 pandemic	5	C
Social support for health	5	D
Ability to assess the quality of health information	5	E
Ability to engage actively with healthcare providers	5	F
Ability to navigate healthcare providers	5	G
Ability to find the correct health information	4	H
Understand health information well to act	5	I

The data obtained is then cleared through tabulation, reduction and grouping stages according to the validity of the respondent's information and literacy skills. The data are then grouped based on nine aspects of health literacy observations. Scores on aspects are factors the achievement criteria presented in Table 2.

Table 2: Criteria for achievement of aspects of numeracy literacy indicators.

Score	Level
> 2.3	High
1.30 – 2.30	Moderate
≤ 1.30	Low

The data is then interpreted descriptive-narrative. Differences in literacy ability and the relationship with the factors that are thought to be influential were carried out using ordinal regression analysis at the 95% confidence level and sig. Values 0.050. Statistical analysis was carried out using the SPSS 25 and AMOS 22 applications.

3. result and discussion

Students dominated respondents involved in this study from developing districts with the percentage reaching more than 70% (Table 3). The identification of demographic backgrounds and experience facing a pandemic shows that most respondents have never been exposed to SARS-CoV-2 or experienced COVID-19.

Health literacy studies in high school students show health literacy levels from low, medium, and high (Table 4). The results of the sample identification which were divided into three research loci, namely urban, developing districts, and remote areas, showed varying levels of argumentation literacy. It was found that health literacy was found in the high category in all regions in the aspect of high school students getting sufficient health information, students were able to be actively involved with health service providers, we're able to find appropriate health information, and were able to understand health information well. The essence of health literacy is seeking health information [18]. A high level of health literacy is associated with more frequent health information-seeking behavior [19]. This shows that high school students easily and quickly access health information from various sources. High school students can feel easy access to information related to COVID-19 through social media, news, and government counseling in various regions in Indonesia.

High school students in various regions can understand COVID-19 information because of the abundance of information provided. However, health literacy scores low on health care support, especially in developing districts. In addition, the achievement value of this aspect in other areas is relatively low even though it is in the moderate criteria. This indicates that high school students may not be accustomed to accessing and utilizing available health services independently during the COVID-19 pandemic. Low health literacy is associated with poor health conditions and suboptimal use of health services [20, 21].

Maintaining health during the COVID-19 pandemic and social health support is still at a moderate level in various regions. The lack of awareness of healthy behavior during the COVID-19 pandemic both by oneself and the surrounding environment is the whys aspect is not achieved at a high level. Differences in knowledge, attitudes, and behaviors related to COVID-19 health outcomes inequalities [22]. The influence of the social environment on public health is significant, as shown in many studies [23, 24]. The social setting will form habits in healthy behavior.

The aspect of the ability to assess health information is moderate in developing districts, but this figure is relatively high the moderate level when compared to other

Table 3: Number and percentage of respondents based on socio-demographics.

Socio-demographics	Urban		Developing District		Remote Area	
	Freq.	%	Freq.	%	Freq.	%
N	38	15.32	176	70.97	34	13.71
						.
Gender						
Male	14	5.65	31	12.50	6	2.42
Female	24	9.68	145	58.47	28	11.29
Grade						
X	16	6.45	63	25.40	5	2.02
XI	22	8.87	57	22.98	18	7.26
XII	0	0.00	56	22.58	11	4.44
Class interest						
Bahasa	0	0.00	9	3.63	0	0.00
IPA	34	13.71	119	47.98	33	13.31
IPS	1	0.40	33	13.31	1	0.40
						.
Parent's job						
Laborer	5	2.02	19	7.66	0	0.00
Lecturer	2	0.81	0	0.00	0	0.00
Teacher	2	0.81	8	3.23	2	0.81
General employees	12	4.84	41	16.53	2	0.81
Government employees	5	2.02	18	7.26	11	4.44
Farmer	1	0.40	16	6.45	13	5.24
Health workers	0	0.00	1	0.40	1	0.40
Self-employed	11	4.44	71	28.63	4	1.61
Fisher	0	0.00	2	0.81	1	0.40
	.					
Been a COVID-19 Patient						
Yes	4	1.61	13	5.24	1	0.40
No	34	13.71	163	65.73	33	13.31
		.				
Closest People Become Patients COVID-19						
Yes	14	5.65	41	16.53	6	2.42
No	24	9.68	135	54.44	28	11.29

regions. This means that students can distinguish health information between that can be trusted and which is results study indicate that health literacy is said to be a prevention effort in dealing with hoax information [25]. The ability to navigate health

care providers is moderate in remote areas. The use online health services tend be maximized in remote areas. People in remote areas prefer to go directly to the nearest public health service.

Table 4: Achievement of numeracy literacy indicators based on school location/origin.

Aspects/Indicators	Urban		Developing District		Remote Area	
	Score	Level	Score	Level	Score	Level
Health care support	1.371	Moderate	1.174	Low	1.471	Moderate
Adequacy of health information	2.471	High	2.371	High	2.559	High
Efforts to maintain health during the COVID-19 pandemic	1.588	Moderate	1.728	Moderate	2.176	Moderate
Social support for health	2.021	Moderate	1.743	Moderate	2.000	Moderate
Ability to assess the quality of health information	2.308	High	2.169	Moderate	2.353	High
Ability to engage actively with healthcare providers	2.563	High	2.509	High	2.618	High
Ability to navigate health-care providers	2.308	High	2.400	High	2.235	Moderate
Ability to find the correct health information	2.642	High	2.450	High	2.353	High
Understand health information well to act	2.838	High	2.670	High	2.676	High

Health literacy in the sample can be attributed to several factors. To find out this, an ordinal logistic regression analysis was carried out. Regression model taking into account factors with $p < 0.05$, Model 1 (Table 5) was reviewed using five independent variables – gender, grade level, class specialization, experience of being a COVID-19 patient, closest people to infected students, and domicile. The complete model containing all the predictors was statistically significant, indicating that the model could distinguish between respondents with moderate, high, and very high health levels. The R2 index for the specified model ranges from 0.099 (Cox and Snell) to 0.124 (Nagelkerke). Based on the results of the analysis found a significant relationship between the level of health literacy and class specialization of high school students. Students majoring in science are 1,043 times more likely to have a high level of health literacy than those majoring in language and social studies. There was no significant relationship between health literacy and gender, grade level, the experience of being a COVID-19 patient, infected person, and domicile.

Regression models help determine the characteristics of related factors and identify populations that can be the correct targets for educational programs to increase students' understanding of health-related subject topics. Of the six factors (gender, class

level, class specialization, experience being a COVID-19 patient, having a close person who is a COVID-19 patient, and domicile) only the class interest factor has a relationship with the health literacy level of high school students. This shows that subjects in the science specialization teach more about health literacy than subjects in other majors such as language and social studies. Health education is interdisciplinary, so access to health literacy education should be applied in various subject areas [26].

Access to quality health education can be seen as a determinant of educational success, as healthy students support academic success [26]. Based on this, it is essential to improve student health literacy through education in schools on non-science subjects. To develop health education programs that can be accessed equally in various regions, health educators in the community will be optimally positioned in the program development and implementation strategy [27]. Such strategies include behavioral health theory to select content, simple language communication techniques to address limited health literacy, and health service delivery strategies designed to reach those most in need of information but are often difficult to achieve.

Female students have higher health literacy because they have stronger school motivation, higher verbal intelligence, greater awareness, or more vital self-discipline [28]. Women are more likely to perceive COVID-19 as a severe health problem, agree with restricting public policy actions, and comply with them. However, this study shows the opposite; that is, male and female students have the same health literacy. The equal level of understanding is due to the rapid flow of health information related to COVID-19 during the two years of the pandemic. Health literacy is also not associated with the experience of having been infected, having a direct relationship with people who have been infected, and domicile. This is reflected in the effort to maintain health during the COVID-19 pandemic, which tends to be moderate in various regions.

The indicators of health literacy were analyzed by SEM (Structural Equation Modeling). The results of the analysis in Figure 1 show that health care support, adequacy of health information, social support for health, and a good understanding of health information significantly affect students' efforts to maintain fitness during the COVID-19 pandemic. The indicator of the adequacy of health information that has the most influence (0.34) on students' efforts to maintain health. The ability to assess the quality of health information has a significant effect (0.61) on the ability to engage actively with health care providers. The ability to determine the quality of health information, the ability to find the correct health information, the ability to navigate health services, and active involvement with health care providers affect the understanding of health information that is good for action. Finding the right health information has the greatest effect on

TABLE 5: Health literacy ordinal regression model.

	Estimate	Std. Error	Wald	df	Sig.	Exp.	95% Confidence Interval	
							Lower Bound	Upper Bound
Gender								
Male	.171	.436	.155	1	.694	2.002	-.682	1.025
Female	0[a]	.	.	0	.		.	.
Grade								
X	-.084	.477	.031	1	.860	2.363	-1.019	.851
XI	-.022	.491	.002	1	.965	2.625	-.984	.940
XII	0[a]	.	.	0	.		.	.
Class interests								
Bahasa	2.018	.994	4.120	1	.042	1.043	.069	3.967
IPA	.727	.553	1.725	1	.189	1.208	-.358	1.811
IPS	0[a]	.	.	0	.		.	.
Been a COVID-19 Patient								
No	1.203	.889	1.830	1	.176	1.192	-.540	2.945
Yes	0[a]	.	.	0	.		.	.
Closest People Become Patients COVID-19								
No	.181	.506	.128	1	.721	2.056	-.812	1.173
Yes	0[a]	.	.	0	.		.	.
Domicile								
Urban	.950	.738	1.656	1	.198	1.219	-.497	2.396
Developing District	-.346	.549	.398	1	.528	1.696	-1.422	.730
Remote Area	0[a]	.	.	0	.		.	.

Note: the upper scribe alphabet indicates the level of significance of the influence of the experimental factors on the health literacy of high school students.

students' understanding of health information (0.51). The ability to find health information also has a large impact on the ability to navigate health services (0.64).

4. CONCLUSION

Limited health literacy is found in students from remote areas. A significant relationship was found between health literacy and class interest based on the ordinal regression test results. In contrast, health literacy was not related to gender, grade level, infected experience, and domicile. It was found. Health care support, adequacy of health information, social support for health, and a good understanding of health information

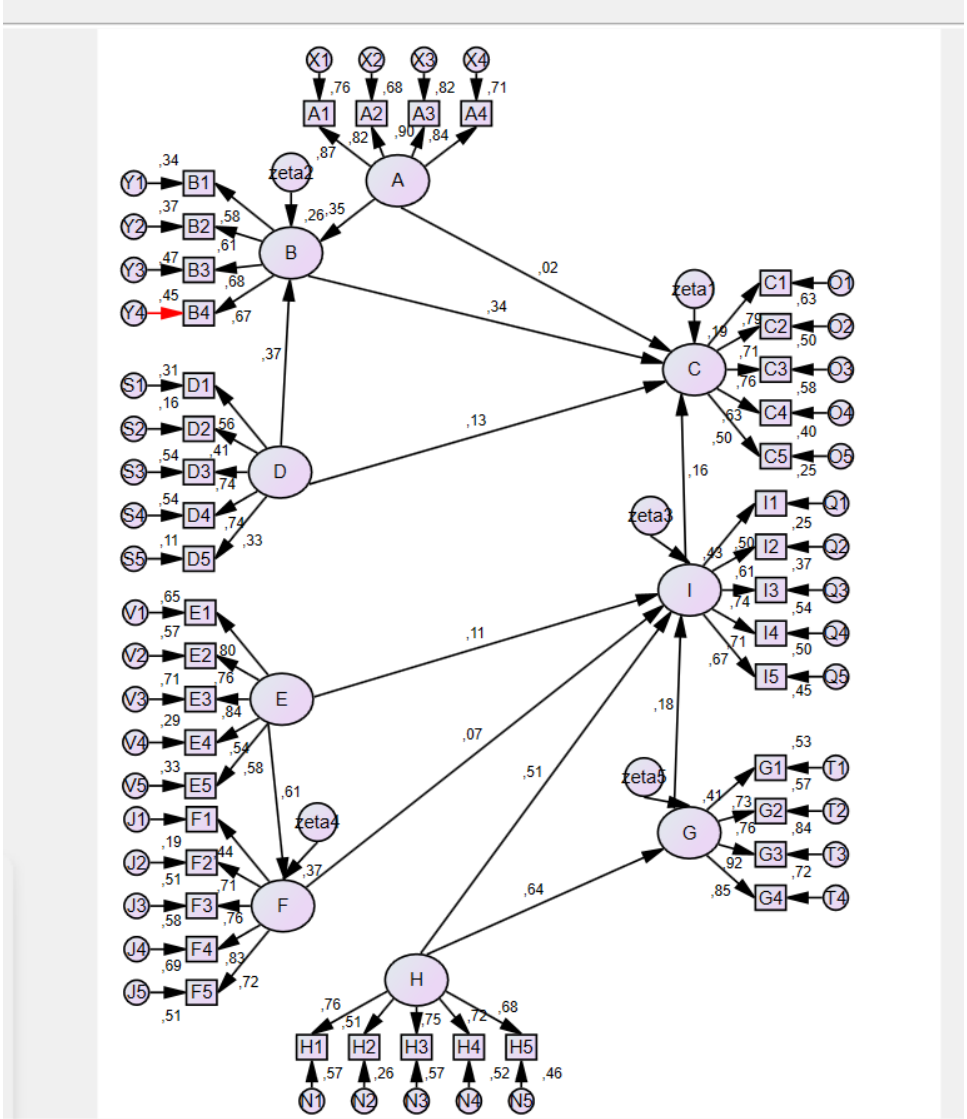

Figure 1: SEM analysis of the relationship between health literacy indicators.

significantly affect students' efforts to maintain fitness during the COVID-19 pandemic. The ability to determine the quality of health information, the ability to find the correct health information, the ability to navigate health services, and active involvement with health care providers affect the understanding of health information that is good for action.

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