Digital Health Literacy Related to COVID-19 and Social Media Use among High School Students

ABSTRACT

Background and Objectives: The COVID-19 pandemic raises a concern about the urgent issue of low levels of digital health literacy (DHL). Adequate DHL may mitigate the negative impacts of proliferating misinformation. This study was aimed at examining the COVID-19 related DHL levels and social media use as digital health information sources among high school students in East Java, Indonesia. The differences in DHL levels across sociodemographic factors, medical history, and social media preferences were also analyzed.

Materials and Methods: This was a cross-sectional study, conducted in 2021, and enrolled high school students aged 15-18. The subjects were selected for convenience, with a minimum sample size of 384. An online questionnaire was shared through a survey platform. The sociodemographic variables and medical history were collected. The DHL measuring items were adapted from the validated DHL instrument developed in the COVID-19 context. Data were analyzed with SPSS 17.0.

Results: We collected 432 responses. More than half of respondents (56.5%) have adequate DHL. Although 81.7 percent of respondents reported that searching for online information was easy, only 53.5 percent reported ease in appraising the reliability aspect. Fathers' education varied by DHL. Students whose fathers hold post-graduate degrees showed a significantly higher level of DHL than those of lower educational backgrounds. Students experiencing COVID-19 infection of their own or close relatives showed higher total DHL and information search scores. Instagram and TikTok were the most frequently chosen social media as digital health information sources, but no significant difference in DHL across the preference for social media.

Conclusion: Even though the information can be obtained easily, there are still difficulties in evaluating its reliability. Considering the proportion of respondents with inadequate DHL, stakeholders in the health and education sectors need to develop DHL-promoting strategies for adolescents. Improvement in evaluating reliability should be the target of focus.

Paper Type: Research Article

Keywords: COVID-19, digital health literacy, health education, health information, adolescence

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Introduction

Digital health literacy (DHL) or eHealth literacy is a developed notion of health literacy (HL) which is "people's capability to find, understand, appraise, and apply health information as a basis for their judgment and decision-making regarding healthcare, disease prevention, and health promotion in order to optimize quality of life" (1). This definition applies to DHL, on the occasion that the information is from an electronic source (2). The COVID-19 pandemic along with the problem of the infodemic should raise a concern about the urgency of tackling the issue of low HL and DHL levels (3). In general, low HL was associated with higher rates of hospitalizations and emergency care admissions. It was also accountable for the lower adoption of preventive measures such as disease screening and vaccines, poorer ability to take medications properly, and poorer ability to interpret health messages and labels. Particularly among the elderly, low HL was documented to be associated with poorer general health status and higher mortality rates (4). In the context of the COVID-19 pandemic, whereby the key to curbing the disease is public compliance with preventive behavior and uptake of the vaccine, adequate HL of the people may secure the implementation of these approaches nationwide (5, 6).

It has been common sense that worldwide internet usage has tremendously increased during the COVID-19 pandemic, a concurrent phenomenon of the accelerated digital revolution as a consequence of "lockdown" implementation (7). It would not appear without negative impacts, one of which is the flooded information, either valid or invalid, that spreads with almost no spatial and temporal limits, creating the so-called infodemic (8). Regarding COVID-19-related online misinformation, a study documented its impact on the individual preference to adopt misinformed behaviors, instead of WHO-recommended prevention behaviors. Interestingly, the effects of misinformation exposure were affected by individuals' DHL, calling for effective efforts to improve DHL (9). Adequate DHL would not merely improve attitude and behavior in terms of disease management and control, the DHL level also positively influences the psychological conditions of individuals amid the COVID-19 pandemic that produces an alarming rise in mental problems (10, 11). Several variables may affect DHL, including sociodemographic factors, health status, internet access, and behavior in seeking online information sources (12, 13).

The increased engagement with social media during the COVID-19 pandemic might contribute to its utilization as the primary source of health information (14). In this sense, social media can be perceived as a two-sided coin with positive and negative impacts it poses on the public health sector, especially on efforts to put this pandemic away (15). Social media platforms provide huge spaces for COVID-19 misinformation and disinformation, enabling them to spread and proliferate (16). Consequently, increased vaccine hesitancy, decreased vaccination rates, and increased preventable deaths become serious problems, prolonging this pandemic (16, 17). We were interested in studying DHL and the use of social media as digital health information sources for

Indonesian people during the COVID-19 pandemic.

The high school students were the population of our interest. They are adolescents within the transitioning phase into adulthood, an important period for laying the foundations of good health (18). They are under a developmental phase of physical, intellectual, and psychosocial transformation along with increasing independence. They largely learn about themselves and their environment and develop health behaviors that they carry into adulthood (19). On the other hand, the high schoolers were potentially given structured education to improve their DHL level as part of the school curriculum (20). During COVID-19 pandemic, their engagement with social media was high, particularly during school closure, raising a concern about high exposure to online misinformation (21). A study on Australian adolescents (aged 12-17 years), carried out during the period of COVID-19-related public restriction in 2020, showed that their DHL skills were in part satisfactory since their ability to find e-health information was favorable. However, their critical health literacy needs improving (19). According to a study by Dadaczynski et. al. (2021), DHL level was associated with several sociodemographic factors. They also found that the use of social media was associated with lower DHL levels in the domain of evaluating the reliability of e-health information (22). There were scarce studies examining DHL levels in high school students in Indonesia, thus was aimed at this study. We proposed that students' DHL levels are varied among sociodemographic factors, medical history, and preference for certain social media. We examined the COVID-19-related DHL level and social media use as digital health information sources among high school students in East Java. The differences in DHL levels across sociodemographic factors, medical history, and social media platforms chosen as health information sources were also analyzed.

Materıals and Method

Study Design and Data Collection

This was a cross-sectional study enrolling high school students aged 15-18, from five high schools in the cities of Surabaya and Sidoarjo, East Java, Indonesia. We included students from public and private schools situated in East Java province, which were registered in basic education data, Ministry of Education, Culture, Research and Technology. We excluded students from vocational schools, as our concern to homogeneity of the sample. The schools were selected for convenience. This was conducted in the first and second week of August 2021, within the period of school closure as one of the government policies for controlling the second surge of COVID-19 cases. The school principals were asked to give consent for the students to be recruited after being given information about the study objectives, study protocol, and the questionnaires.

An online questionnaire was shared by a teacher in each school. It was developed and distributed in accordance with the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) principles (23), using an online survey platform https://app.surveyplanet.com/. The students participated voluntarily, and anonymity was ensured. Respondents were provided with an explanation of the objectives of the

questionnaire and the information for consent on the first page of the survey. They were required to click the BEGIN button as a sign of consent before they proceeded to the survey. The minimum sample size was 384 respondents, which was determined according to http://www.raosoft.com/samplesize.html with a 5% margin of error, 95% confidence level, and 771,585 for the total population of high school students in East Java province (https://dapo.kemdikbud.go.id/pd/1/050000). This study was granted approval from the ethics committee, Faculty of Medicine, Universitas Airlangga (No 136/EC/KEPK/FKUA/2021). This is part of the study project covering health literacy, digital health literacy, perception, attitude, behavior, and healthy lifestyle of high school students during the COVID-19 pandemic in Indonesia (24).

Survey Instrument

The sociodemographic variables collected included age, gender, parental education, and socio-economic levels. The respondents were also asked about the presence of COVID-19-related comorbidities, and whether they and/or their close relatives had experienced COVID-19 infection. The DHL measuring items were adapted from those of the validated digital health literacy instrument (DHLI) developed by Rosalie and Drossaert (25), which was later developed into COVID-19-related DHLI by Dadaczynski and colleagues (22). We revised some wording according to the recommendations provided by Park & Kwon (26). The questions were translated into the Indonesian language. We took 3 of 7 domains of questions of DHLI, measuring information searching (IS), evaluating reliability (ER), and determining relevance (DR) subscales since they were the most important and relevant ones according to this study objective and study population. Each subscale was measured through three items to be answered on a 4-point scale (1, very difficult; 4, very easy). The DHL scale and subscales were scored as the average value of responses, in which a value of ≥3 was considered an adequate DHL level. The reliability measurement on the survey items showed a Cronbach's Alpha value of 0.870 for total DHL, 0.848 for information searching, 0.700 for evaluating reliability, and 0.636 for determining relevance. All items were valid according to face and construct validities. In addition, we asked student respondents about the social media platforms that they predominantly used as health information sources. We included Instagram, Facebook, Twitter, and TikTok as they are the most popular social media platforms in Indonesia.

Statistical Analysis

Descriptive statistical analyses were carried out, and response rates were presented as percentages on the categorical variables. The differences in both DHL and DHL subscales across sociodemographic factors, medical history, and social media platforms chosen as digital health information sources were analyzed with the Kruskal–Wallis H and Mann–Whitney U tests using SPSS 17.0 (SPSS Corp., USA). The statistical results were significantly different when the p-value was <0.05.

Results

Characteristics of Respondents

Four hundred and thirty-two respondents completed the questionnaire. The response

rate was 100%. All responses were valid for use in the final analysis. Most of the respondents were female (n=267). The median age was 17 years. The majority of respondents reported an average level of economic status. Only a small proportion (4.6%) reported having COVID-19-related comorbidities, while 30.1 % reported having their own or close family experience of getting COVID-19 infection. The distribution of sociodemographic factors and medical history in total respondents and according to DHL level is presented in Table 1.

Table 1. Characteristics of Respondents

Characteristics	N (%)	Adequate DHL level N (%)	Inadequate DHL level N (%)
Age (Median, IQR)	17 (15-17)		
15 years-old	131 (30.3%)	83 (63.3%)	48 (36.7%)
16 years-old	71 (16.4%)	39 (54.9%)	32 (45.1%)
17 years-old	194 (44.9%)	104 (53.6%)	90 (46.4%)
18 years-old	36 (8.3%)	18 (50.0%)	18 (50.0%)
Gender			
Male	165 (38.2%)	96 (58.2%)	69 (41.8%)
Female	267 (61.8%)	148 (55.4%)	119 (44.6%)
Subjective Economic Status			
Below average	41 (9.5%)	26 (63.4%)	15 (36.6%)
Average	370 (85.6%)	204 (55.1%)	166 (44.9%)
Above average	21 (4.9%)	14 (66.7%)	7 (33.3%)
Father's educational background			
Primary school	24 (5.6%)	13 (54.2%)	11 (45.8%)
Junior high school	22 (5.1%)	12 (54.6%)	10 (45.4%)
Senior high school	171 (39.6%)	89 (52.0%)	82 (48.0%)
Bachelor degree	176 (40.7%)	102 (58.0%)	74 (42.0%)
Master/doctoral degree	39 (9%)	28 (71.8%)	11 (28.2%)
Mother's educational background			
Primary school	19 (4.4%)	8 (42.1%)	11 (57.9%)
Junior high school	30 (6.9%)	18 (60.0%)	12 (40.0%)
Senior high school	188 (43.5%)	97 (51.6%)	91 (48.4%)
Bachelor degree	168 (38.9%)	105 (62.5%)	63 (37.5%)
Master/doctoral degree	27 (6.3%)	16 (59.3%)	11 (40.7%)
Having comorbidities			
Yes	20 (4.6%)	9 (45.0%)	11 (55.0%)
No	412 (95.4%)	235 (57.0%)	177 (43.0%)
Having a COVID-19 infection history			
Yes	130 (30.1%)	83 (63.8%)	47 (36.2%)
No	302 (69.9%)	161 (53.3%)	141 (46.7%)

COVID-19 Related DHL

The median COVID-19 related DHL was 3.00; IQR, 2.78-3.22. The median values for information search, evaluating reliability, and determining relevance subscales were 3.00, IQR 3.00-3.33; 3.00, IQR 2.67-3.00; and 3.00, IQR 3.0-3.33, respectively. Most respondents showed adequate levels of DHL and DHL subscales (≥3). Nevertheless, the proportion of respondents (44.5%) with inadequate DHL levels should be considered an issue to tackle. The highest proportion of inadequate levels was in the aspect of evaluating reliability (46.5%) (Table 2).

Table 2. Median and Frequencies of DHL Scores

Scale / Subscales	N (%)
DHL Total, Median (IQR)	3.00 (2.78-3.22)
Adequate N (%) Inadequate N (%)	244 (56.5 %) 188 (44.5 %)
Information Search, Median (IQR)	3.00 (3.00-3.33)
Adequate N (%) Inadequate N (%)	353 (81.7%) 79 (18.3%)
Evaluating Reliability, Median (IQR)	3.00 (2.67-3.00)
Adequate N (%) Inadequate N (%)	231 (53.5%) 201 (46.5%)
Determining Relevance, Median (IQR)	3.00 (3.00-3.33)
Adequate N (%) Inadequate N (%)	338 (78.2%) 94 (21.8%)

Adequate: DHL level ≥3; inadequate: DHL level<3

The father's education background varied by the subscale of determining relevance, whereby the respondents whose fathers had a master's or doctoral degree demonstrated higher scores than those of others ($p<0.05$, Mann-Whitney U test). The respondents reporting having medical histories of COVID-19 infection themselves and/or their close relatives showed significantly better scores of total DHL and the subscale of information search ($p<0.05$, Mann-Whitney U test) (Table 3).

Social Media Platforms as Digital Health Information Sources

Three hundred and thirty-eight (78%) of respondents reported preferring social media as their digital health information source. These respondents were grouped according to their preferred social media platforms. The highest portion of respondents (33.7%) chose Instagram and TikTok, followed by Instagram only (30.2%).

In addition, respondents choosing Instagram and TikTok indicated the highest percentage of adequate DHL levels (63.2%). Among DHL subscales, evaluating the reliability of the information was the least reported to show adequate scores in all groups (Figure 1). The differences in DHL and DHL subscales among social media groups were analyzed using the Kruskal–Wallis H test. There was no statistically significant difference found in this regard ($p > 0.05$).

Discussion

Infodemic is not a new phenomenon, however, in the context of COVID-19, it is undeniably a pandemic in pandemic (27). Not only impose negative impacts on the physical and mental health of populations and the public health response, but the infodemics also break up the cohesiveness of societies by increasing existing social inequities and stigma (28, 29). Considering it a serious global problem, the World Health Organization (WHO) makes a call for action to create a global movement to promote access to health information and mitigate harm from health misinformation (29).

Infodemics cannot be eliminated but can be managed through certain actions, two of which are promoting an understanding of risk and health expert advice and building resilience to misinformation (30). Digital health literacy is the essential key to executing these actions. This study showed a considerable amount of high school students (44.5%) with inadequate levels of COVID-19 related DHL.

While less than a quarter of them reported that searching for online health information and determining the relevance of that information to their needs were uneasy matters, almost half of them (46,5%) reported that evaluating the reliability of the information they encountered was the uneasy matter.

Table 3. Comparison of DHL Scores among Groups of Each Sociodemographic Factor

Characteristic	DHL Total		Information search		Evaluating reliability		Determining relevance	
	Median (IQR)	p-value	Median (IQR)	p-value	Median (IQR)	p-value	Median (IQR)	p-value
Age								
15	3.00 (2.78-3.22)	0.426	3.00 (3.00-3.33)	0.307	3.00 (2.67-3.00)	0.814	3.00 (3.00-3.33)	0.211
16	3.00 (2.67-3.11)		3.00 (3.00-3.00)		3.00 (2.33-3.00)		3.00 (2.67-3.00)	
17	3.00 (2.78-3.33)		3.00 (3.00-3.66)		3.00 (2.67-3.33)		3.00 (3.00-3.33)	
18	2.94 (2.69-3.11)		3.00 (3.00-3.00)		2.83 (2.67-3.00)		3.00 (2.67-3.00)	
Gender								
Male	3.00 (2.78-3.33)	0.189	3.00 (3.00-3.33)	0.168	3.00 (2.67-3.33)	0.134	3.00 (3.00-3.33)	0.092
Female	3.00 (2.78-3.11)		3.00 (3.00-3.33)		3.00 (2.67-3.00)		3.00 (3.00-3.00)	
Subjective economic status								
Below average	3.00 (2.78-3.22)	0.488	3.00 (3.00-3.33)	0.752	3.00 (2.67-3.33)	0.155	3.00 (2.67-3.33)	0.853
Average	3.00 (2.78-3.22)		3.00 (3.00-3.33)		3.00 (2.33-3.00)		3.00 (3.00-3.33)	
Above average	3.00 (2.83-3.22)		3.00 (3.00-3.33)		3.00 (2.67-3.00)		3.00 (3.00-3.50)	
Father's Educational Background								
Primary school	3.00 (2.78-3.30)	0.114	3.00 (3.00-3.58)	0.164	2.83 (2.33-3.33)	0.144	3.00 (2.67-3.25)	0.016*
Junior high School	3.00 (2.67-3.13)		3.00 (2.67-3.00)		3.00 (2.67-3.00)		3.00 (2.67-3.33)	
Senior high school	3.00 (2.78-3.11)		3.00 (3.00-3.33)		2.66 (2.33-3.00)		3.00 (3.00-3.00)	
Bachelor degree	3.00 (2.78-3.22)		3.00 (3.00-3.33)		3.00 (2.33-3.33)		3.00 (3.00-3.25)	
Master/doctoral degree	3.00 (2.89-3.77)		3.00 (3.00-3.66)		3.00 (2.67-3.66)		3.00 (3.00-4.00)	
Mother's Educational Background								
Primary school	2.88 (2.78-3.22)	0.138	3.00 (3.00-3.33)	0.425	2.66 (2.33-3.33)	0.135	3.00 (2.67-3.33)	0.290
Junior high School	3.00 (2.75-3.22)		3.00 (2.92-3.66)		3.00 (2.58-3.08)		3.00 (2.92-3.00)	
Senior high school	3.00 (2.78-3.11)		3.00 (3.00-3.33)		2.66 (2.33-3.00)		3.00 (3.00-3.33)	
Bachelor degree	3.00 (2.89-3.33)		3.00 (3.00-3.33)		3.00 (2.67-3.33)		3.00 (3.00-3.33)	
Master/doctoral degree	3.00 (2.67-3.33)		3.00 (3.00-3.33)		3.00 (2.67-3.33)		3.00 (3.00-3.66)	
Having comorbidities								
Yes	2.88 (2.78-3.00)	0. 308	3.00 (3.00-3.33)	0.813	2.66 (2.33-3.00)	0.309	3.00 (2.67-3.00)	0.138
No	3.00 (2.78-3.22)		3.00 (3.00-3.33)		3.00 (2.67-3.00)		3.00 (3.00-3.33)	
Having a COVID-19 infection history								
Yes	3.00 (2.86-3.33)	0.031*	3.00 (3.00-3.66)	0.005*	3.00 (2.67-3.33)	0.226	3.00 (3.00-3.33)	0.322
No	3.00 (2.78-3.11)		3.00 (3.00-3.33)		3.00 (2.58-3.00)		3.00 (3.00-3.08)	

* p-value < 0.05.

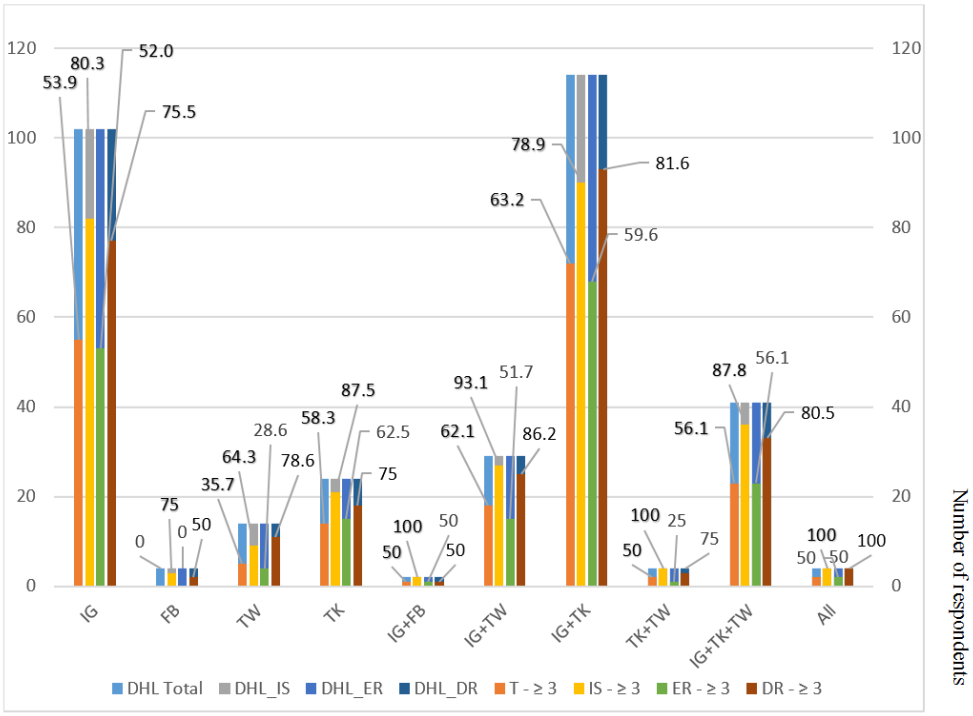

Figure 1. The Frequency of respondents by the social media platforms chosen as digital health information sources and the percentage of respondents with adequate DHL (≥3) in each group (denoted in each column). (IG = Instagram; FB = Facebook; TW = Twitter; TK = TikTok; IS = information search; ER = evaluating reliability; DR = determining relevance)

Our finding was similar to that of the studies by Zakar et al., on Pakistani university students and by Dadaczynski et al., on German university students in the sense that a higher proportion of respondents reported difficulties in evaluating the reliability of information than in other domains of DHL (22, 31). Although our respondents were high school students, a much smaller proportion reported difficulties in searching for information and determining relevance compared to that of the study by Rosario et al., on Portuguese university students in which more than half of their participants were categorized as insufficient for DHL subscales on these domains (13). Our participants aged 15-18, often so-called "generation Z" having been born and grown up in advanced technologies-equipped surroundings, consider the internet to be their primary source of information (32, 33). Their basic skill in digital literacy is likely to contribute to their competence to search and find relevant online health information (34), but not to appraise reliability. Our finding implies the need for actions to improve the DHL of high school students, focusing on the reliability appraisal aspect. This would enable them to sort out overflowing information and extract only valid and reliable information.

DHL improvement can be assumed to be a "vaccine" that builds up an individual's immunity against the overabundance of pathogenic misinformation. As the majority of vaccines are administered in early life to give early protection, so as to DHL should be

developed before adulthood. Adolescence constitutes a unique period in life characterized by greater autonomy and capability in decision-making and responsibility for resuming health behaviors compared to childhood (35, 36). In particular, adolescents at the high school level are within the transition phase to adulthood, which mandates an ongoing maturity process toward readiness to participate in society. Therefore, adolescents are capable and deserve any literacy building, including the COVID-related DHL. In the context of the current pandemic, adolescents often to be underrated for their risks of disease containment. However, numerous studies reported mental health issues in this age group during the COVID-19 pandemic (37), and some suggested an association with internet and social media use (32). Adequate DHL was found to be associated with psychological well-being (10), emphasizing the urgency of DHL improvement.

Concern about the widened digital divide during the COVID-19 pandemic has increased (7). Age, gender, education, and socioeconomic status are among the factors creating inequality in access to digital resources and the ability to make good use of them (38). The inequality is likely to implicate in DHL gaps, as in several studies that documented lower DHL levels either for the total DHL or several subscales in females (13, 31). A study by Dadaczynski et al. showed inequalities in DHL across gender, age, and social status groups (22). In contrast to our study, when stratified DHL according to sociodemographic factors, we only found a significant difference in determining relevance across father's education groups, whereby the students whose fathers hold master's or doctoral degrees showed higher scores than those whose fathers were of lower educational backgrounds. We assumed that fathers could have spent more time engaging with their child's education during the work-from-home period, and their high educational background should have contributed to improving students' DHL in determining the relevance of digital health information. Nevertheless, there were no differences in any DHL subscales between students whose fathers hold bachelor's degrees with those whose fathers were of lower educational backgrounds. One plausible explanation is that we only recruited schools in the urban areas of Surabaya and Sidoarjo, the two biggest cities in East Java, with adequate internet access that allows students even of low socioeconomic status to do any internet-based activities. This study was carried out during the implementation of public activities restrictions and regional lock-down by the government to manage the second surge of COVID-19 in Indonesia, thus it was difficult to recruit students from rural areas.

The finding of improved DHL level of total and information search scores in those who reported having COVID-19 infection history either themselves or their close relatives, compared to those who did not can be explained by the analogy to the acquisition of health literacy in patients with certain chronic diseases. This is particularly true in the area of online information search. A diagnosis or even before diagnosis with the presence of indicative symptoms seems to motivate and navigate the individuals for searching health information, greatly from online sources, and

mostly pertaining to treatment of the disease (39). The improved COVID-19-related DHL level in these respondents would expectedly leverage their health-related behavior (40).

The majority of our respondents (78%) reported social media as a digital health information source. This trend could be traced back to the past few years. A 2014-2015 nationwide survey conducted on American teenagers, revealed 10% of them obtained health information mainly from social media, whilst 23% reported partly obtaining it from such sites (41). The use of social media as a primary health information source among adolescents appears to have risen dramatically within a few years, particularly during the COVID-19 reign (21). We then grouped them according to social media platforms of choice. Most of them preferred Instagram and TikTok to be digital health information sources. This is in line with the results of surveys conducted in several countries that the young generation tends to prefer visual platforms like Instagram and TikTok. While Facebook or Twitter is more popular among older generations (27).

Frequent use of certain social media platforms by adolescents implicates their preference for those platforms as health information sources. According to a survey in Indonesia in May 2022, total Instagram users account for 39.2% of the Indonesian population. The adolescent age is the third largest user age group of Instagram, which is 14% of all users (42). Our findings may provide insight to stakeholders in the health sector on the potential use of social media platforms like Instagram and TikTok for health education tailored to the young generation. Health education in the form of photos, infographics, clips, and other visual content appeared to be more favorable for youths (27). In light of misinformation fueled by social media, we recommended the bottom-up and top-down approaches to tackle misinformation (29). Dealing with DHL improvement is one of the bottom-up actions. For the top-down approach, the stakeholders need to build partnerships with social media companies, to provide trustworthy, authoritative health information, and monitor misinformation-related content on social media.

Despite its limitations, such as using an online questionnaire platform, non-random sampling, and that only schools in the urban area were recruited, this study was successful in capturing COVID-19-related DHL and social media as digital health information sources on high school students in Indonesia, using a valid and reliable questionnaire. Further studies on the larger and more representative samples are required. Since this study only measured 3 of the 7 subscales of DHL, the measurement of more comprehensive domains of DHL and analysis of DHL's impact on health attitude and behavior either in the COVID-19 context or other health issues are mandatory.

Conclusions

The proportion of adolescent respondents with inadequate DHL levels in this study was an issue to be concerned. Evaluating the reliability of digital health information was the most problematic domain. The COVID-19 pandemic along with the infodemic should trigger stakeholders in the health and education sectors to develop DHL-promoting strategies and programs for adolescents since they are the key elements that shape the

future world in anticipating and mitigating the next outbreaks. In this regard, the school can be an ideal place for a structured education program to improve DHL. Social media companies should resume responsibility to cleanse up disinformation and misinformation circulating and proliferating throughout their platforms, especially for their adolescent users, one of their greatest segments of consumers.

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