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RESEARCH ARTICLE

Adolescent knowledge in COVID-19 prevention based on Centres for Disease Control guideline

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Abstract

Background: Adolescents are vulnerable to the transmission of COVID-19. Teenagers have a lower knowledge of health protocols than the other age groups. This situation can lead to a continuous increase in the number of COVID-19 cases although the application of health protocols following CDC guidelines is already in place globally. **Objective:** The aim of this study was to determine adolescents' knowledge about COVID-19 preventive measures according to CDC guidelines. **Method:** This study is a cross-sectional study with the snowball sampling method. It was conducted by distributing digital questionnaires in October 2021 to adolescents aged 12-18 years. Furthermore, a descriptive analysis related to knowledge and its differences was done based on the characteristics of adolescents. **Result:** About 80% of adolescents had good knowledge about COVID-19 preventive measures according to CDC guidelines. However, most of the adolescents did not have sufficient knowledge about proper handwashing, proper use and care of masks, and social distancing. **Conclusion:** Adolescent knowledge about the application of health protocols according to CDC guidelines needs to be improved. Educational interventions are needed to educate adolescents about health protocols against COVID-19.

Introduction

Coronavirus Disease 2019, or COVID-19, is a new type of infection caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS COV-2) known as the novel coronavirus (Singhal, 2020). In October 2021, the number of COVID-19 positive cases decreased in Indonesia, as did in several regions of the world (Ministry of Health Indonesia, 2021; WHO, 2021a). The coverage of the COVID-19 vaccination has begun to increase, and some government policies are more loosely implemented. Public facilities are back in operation according to the regional security level

(Minister of the Interior of the Republic of Indonesia, 2021). However, there is a potential risk of transmission of new variants of COVID-19. Previous studies have shown that the incidence of COVID-19 in adolescents has increased, possibly due to the high transmission rate of the virus (Romain, Schneiderman, & Geliebter, 2021). The highest COVID-19 transmission rate was found in students (Leidman *et al.*, 2021).

The Centre for Disease Control (CDC) and Prevention and the Centre of Global Health in the US have published some health guidelines to strengthen epidemiological and laboratory surveillance, including

preventive measures against COVID-19 transmission, such as handwashing, social distancing, and others. To reduce the chance of increased cases, it is necessary to identify the level of adolescent knowledge about preventive measures. This study aimed to determine adolescent knowledge about health protocols according to CDC guidelines.

Methods

Design

The design of this study is a cross-sectional study. Primary data were collected from the respondents' answers through a snowball sampling.

Setting

The ethics committee board approved all procedures numbered 45/LB/2021. The participating adolescent received written information about the study. The informed consent was signed for this study and permission from their parents to participate in this study was obtained. This study was conducted in October 2021. Questionnaires' validity and reliability test were analysed before they were distributed to the respondents. The questionnaires were circulated on social media and in direct digital messages. The data collection took place in two weeks.

Participants

The respondents met the criteria: (1) Indonesian students aged 12-18 years, (2) who voluntarily completed a survey. While the exclusion criteria for the respondents were those who (i) did not get parental permission to take part in the study. (ii) had limitations in filling out Google forms, thus making data incomplete. The entire population who read the information was encouraged to forward the information to other potential respondents.

Variables

The questionnaires consist of respondents' identity, i.e., gender, age, education level, region, and experience of in-person meeting at school between 2019-2021. In addition, the questionnaires have 11 questions about the spread of COVID-19, hand washing, a guide to use masks, sneezing, disinfect personal items, and monitor COVID-19 symptoms.

Data measurement

Each correct question is worth four points, and thus the maximum score is 44. All of the questions are

multiple-choice with two correct answers; The possible score for each question is 0, 2, and 4.

The mean score and primary deviation of the points are categorised into five categories: very low (0-11), low (12-18), moderate (19-26), high (27-33), and very high (34-44). Knowledgeable respondents are respondents in high and very high categories. Correct answers, calculated from two right choices, are presented in percentages. The questions on the knowledge variable are illustrated in a curve, and the results are presented descriptively. In addition, the difference score and gender and in-person meeting experience used Mann-Whitney Test. Next, the correlation between the score and origin of the region and level of education used non-parametric tests using Kruskal-Wallis and Spearman were used in score and age analysis

Results

Participants

The validity and reliability of the questionnaires were conducted to 30 people with the same characteristics as the respondents analysed. The results showed that the questionnaires are valid and reliable. The validity of each question showed $R > Y$, and the R table was 0.361. The value of R for each question was consecutively 0.75; 0.68; 0.409; 0.620; 0.516; 0.728; 0.581; 0.585; 0.542; 0.652; and 0.610. In addition, the questionnaires had strong reliability, with Cronbach's alpha value of > 0.361 ($\alpha = 0.876$).

During the data collection, 279 respondents filled out the questionnaires, but 26 did not have complete data. At last, 253 respondents participated in the study, as seen in Table I. The respondents mainly were primarily women; at the age of 18 years; and high school students. As of October 2020, 80% of the respondents had in-person meetings during the pandemic. Most respondents came from Java, and some came from outside Java, such as Sumatra, Kalimantan, Sulawesi, Bali-Nusa Tenggara, and Papua.

Main results

Figure 1 illustrates that adolescent knowledge about COVID-19 preventive measures still varies. Most respondents had high to very high knowledge, but few had very low to adequate knowledge. About 79.4% of the respondents had good knowledge.

Table I: Respondents' characteristics

Characteristics	Frequency and percentage (n=253)
Gender	
Male	76 (30.0)
Female	177 (70.0)
Age	
12 years old	13 (5.1)
13 years old	19 (7.5)
14 years old	25 (9.9)
15 years old	34 (13.4)
16 years old	52 (20.6)
17 years old	47 (18.6)
18 years old	63 (24.9)
Level of education	
Elementary school	2 (0.8)
Junior high school	63 (24.9)
Senior high school	139 (55.0)
College student	49 (19.3)
Origin of the region	
Java	195 (77.1)
Outside Java	58 (22.9)
Experience with In-person meeting	
Yes	201 (80.0)
No	52 (20.0)

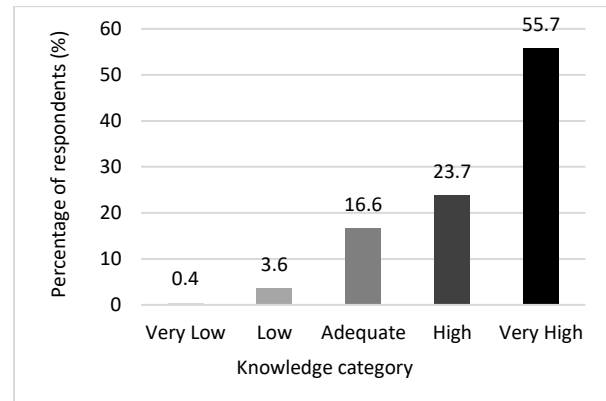
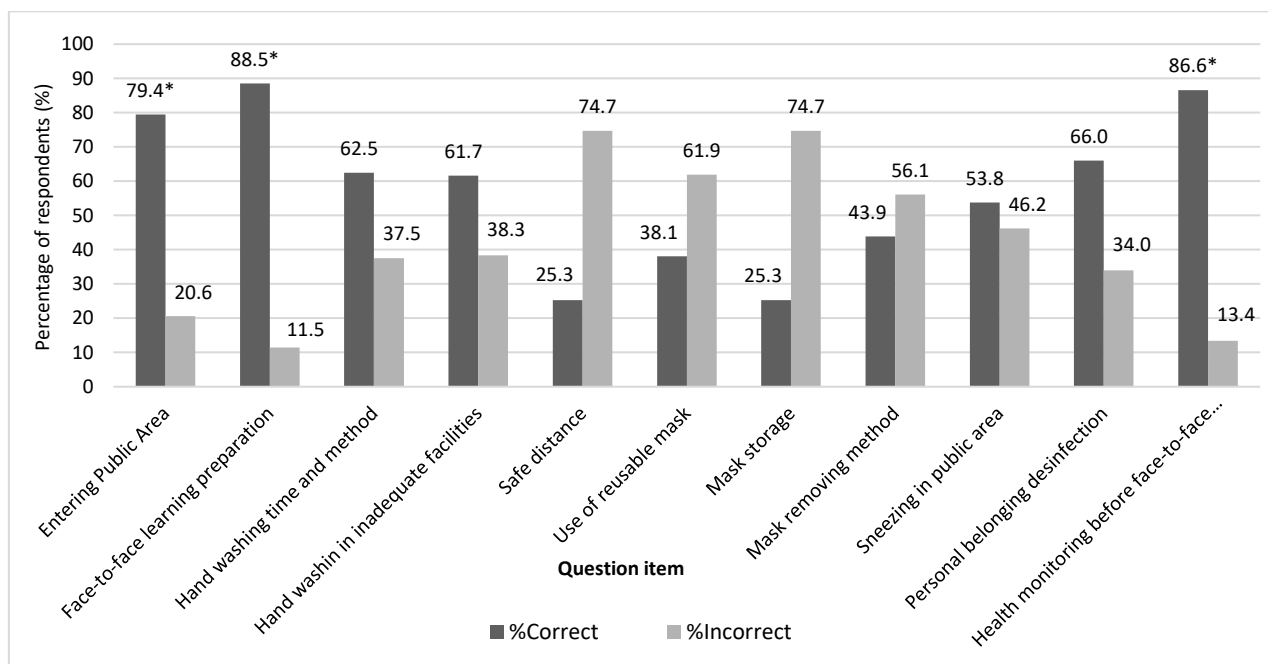


Figure 1: Adolescent knowledge about COVID-19 preventive measures according to CDC guidelines

The findings showed three of 11 questions could be answered precisely by all respondents, as seen in Figure 2. They understood some protocols in public areas, preparation for in-person meeting, and health monitoring measures learning at schools. However, 25.3-66.0% of the respondents could answer questions about handwashing procedures, social distancing, mask use care, sneezing in public areas, and disinfection of personal items.



* Questions answered correctly by at least 75% of the total respondents; % is the percentage of respondents who get 4 (perfect) and the rate of respondents who get 0 or 2.

Figure 2: The percentage of answers about COVID-19 preventive measures according to CDC guidelines

The data on the scores of the adolescent knowledge against COVID-19 preventive measures were not

normally distributed ($p < 0.001$). The scores were significantly related to age, gender, and level of

education. The more mature the respondents are, the more knowledge they have ($r = 211, p < 0.005$). The female respondents had better understanding than the male respondents. There was no difference between the respondents who had experience of in-person meeting and those who did not (see Table II). Moreover, place of origin significantly correlated with knowledge ($p < 0.005$). Likewise, education level had a important relationship with knowledge ($p < 0.005$).

Table II: Correlation between gender and experience of an in-person meeting with adolescent knowledge against COVID-19 preventive measures

Variable	Z	p-value
Gender*	-3.261	0.001
In-person meeting	-0.867	0.386

Discussion

The adult population has broader knowledge than adolescents regarding maintaining health (Ahmad Al-Mannai et al., 2020). One factor that causes deaths in adolescents is infection. To minimise this incidence, health promotion for youth is prioritised by formulating recommendations and increasing awareness of health issues (WHO, 2021b). Health literacy affects the knowledge and actions of adolescents during the pandemic (Riiser et al., 2020). However, only a third of teenagers can access similar information on the internet or books (Baheiraei et al., 2014). Therefore, health promotion programs for adolescents need to be carried out to increase their knowledge.

Question about the proper duration of hand washing was also incorrectly answered, and this finding was similar to the results of previous research (Al-Wutayd et al., 2021). Perception of hygiene and lack of time (Engdaw, Gebrehiwot, & Andualem, 2019). Therefore, family habits e.g., parental habits of handwashing, likely influences the adolescent's habit as well. Good parental supervision on their children's health behavior will affect the habit practice (Jatrana et al., 2021). The importance of maintaining distance is still barely known due to ignorance about social distancing (Gouin et al., 2021). Many things cause the condition of keeping a safe distance unknown, due to a large number of people in the surrounding environment, the awkward feeling of being alone, and at the age of teenagers they still need the support of others (Coroiu et al., 2020). Barriers to using masks in adolescents may include feeling uncomfortable with foggy glasses, difficulty breathing, humid and warm face, and

unpleasant difficulty breathing, humid and warm face, and unpleasant odour (Chao, 2020). The donning and removing procedure of masks not common for adolescent. Moreover, the ability of handwashing can determine the chance of exposure to COVID-19. About 60% of adolescents did not know that the virus dispersion occurs during the masks' donning and removal process (Garg et al., 2020). Furthermore, COVID-19 transmissions could occur through droplets when a person coughs and sneezes. In some cases, not every person closes their mouth and nose when coughing (Molla & Abegaz, 2021). In this study, half of the respondents did not know what to do when they cough. Furthermore, personal things like handphones are one things that must be disinfected. This current study showed adults, females, and highly educated people had more knowledge. Age and level of education are factors which influence knowledge of COVID-19 preventive measures (AlRasheed et al., 2021). Adolescents in the tourism area in Bali and East Nusa Tenggara had higher knowledge because health programs and health prevention in tourism areas are more frequent than in non-tourism areas. In order to prevent the disease, applying health protocols is important. Thus, promoting detailed information through parental and educational support according to CDC guidelines is needed. This study still has some limitations. The questionnaires used only were presented in closed questions, and thus further exploration is needed. This study were included students only. Further study should explore a qualitative study about the reason of adolescent ignore some health protocols. Next, the knowledge of other population, for instance: young adults and non-student, should explore more.

Conclusion

Based on the result of this study, it can be concluded that adolescent knowledge about COVID-19 preventive measures was good. However, around 20% of the teenage population needs to improve their understanding health protocols such as handwashing procedures and duration, physical distancing, donning, removing, and storing functions of masks, and other daily personal hygiene measures.

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