Knowledge of Teenagers in Surabaya about COVID-19 and Prevention Behavior

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A B S T R A C T

Introduction: Coronavirus disease (COVID-19) is a newly discovered infectious disease caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), which can affect individuals of all ages. The high positive number of COVID-19 cases in Surabaya and the proportion of teenagers in society is quite large. This study examined the knowledge of teenagers in Surabaya about COVID-19 and prevention behavior.

Methods: This descriptive study used a cross-sectional design and an online questionnaire (Google Forms). The target sample was teenagers aged 10-19 years old who live in Surabaya. A total of 122 respondents were involved (n=122). Sampling was performed using the consecutive sampling method, and the data was processed using the International Business Machines Corporation (IBM) Statistical Package for Social Sciences (SPSS) version 19.0 using univariate and bivariate analysis (p=0.367).

Results: The results showed that most respondents had good knowledge (72.1%) and good behavior (89.3%) regarding COVID-19. No significant relationship was found between knowledge and behavior to prevent COVID-19 among adolescents who live in Surabaya (p=0.367).

Conclusion: This study revealed that most respondents had good knowledge and prevention behavior. Due to a limited number of samples, a larger sample would have provided a more thorough representation of the population and resulted in more accurate outcomes.

Highlights:
1. Most respondents had good knowledge and prevention behavior.
2. No significant relationship was found between knowledge and behavior to prevent COVID-19.

Introduction

Coronavirus disease (COVID-19) is a newly discovered infectious disease caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), which can affect individuals of all ages. The virus was first identified in Wuhan, China, in December 2019. COVID-19 infection has common signs and symptoms, such as acute respiratory distress, fever, cough, and shortness of breath.[1,2] Less common symptoms include a sore throat, headache, chest pain, skin rash or discoloration of the fingers or toes, diarrhea, and eye irritation.[3] The clinical presentation of COVID-19 varies from asymptomatic to critical, with 15% of patients developing severe cases and 5% progressing to critical conditions.[4]

By the end of 2020, 79.2 million people had been confirmed positive for COVID-19, with 1.7 million deaths reported.[5] The number of positive COVID-19 cases in Indonesia in 2021 was 4,262,720, including children and adolescents. COVID-19 in children and adolescents in Indonesia reached 11-12% of all total cases, making it the highest percentage in the world.[6] The first mass vaccination against COVID-19 in Indonesia was officially started on 13 January 2021.[7] Yu, *et al.* (2020) stated that young patients with confirmed COVID-19 tend to be asymptomatic individuals, also known in Indonesia as people without symptoms.[8] Another survey also stated that patients under 20 years old had an 81.9% chance of not having symptoms.[9]

The World Health Organization (WHO) defines 'teenagers' as individuals aged 10 to 19 years old.[10] According to the Central Bureau of Statistics of Surabaya, the number of teenagers in Surabaya is 419,316.[11] Positive cases of COVID-19 in children and adolescents in Indonesia have continued to rise, reaching 11-12% and are the highest in the world.[6] The highest proportion was in the age group of 7 to 12 years old (28.02%), followed by the age group of 13 to 15 years old (19.92%), and the last age group of 16 to 18 years old (25.23%).[6] Conversely, the exact number of COVID-19 cases among teenagers in Surabaya has not yet been reported. Adolescence is a period of transition from childhood to adulthood, during which adolescents experience emotional instability. This instability affects how they deal with various situations, including the COVID-19 pandemic.[6,12]

A previous study showed that most teenagers had a high level of knowledge about COVID-19.[13] The high level of teenagers' knowledge is probably supported by several factors, one of which is age. Those still young tend to have a strong curiosity and a good understanding of new information.[13] Teenagers and adolescents also have access to the internet and social media networks as a source of information about COVID-19. Understanding COVID-19 is crucial to prevent an increase in the number of cases.[14] This high knowledge is supposed to be accompanied by good adherence and preventive behavior. Nevertheless, the study by Anggreni, *et al.* (2020) obtained the opposite result.[15] Their results showed that a high level of compliance did not accompany a high level of knowledge about COVID-19 in adolescents.[15] Surveys in America and England showed that teenagers only knew about COVID-19 with average scores, and most could only answer half the questions correctly.[16] Different results were obtained from surveys performed on young people in Jordan, which showed that young people had a fairly good understanding of COVID-19.[16]

Physical distancing has altered community activities and behavior for people of all ages, from children to adults.[17] A study in Bengkulu reported the behavior of adolescents during the COVID-19 pandemic.[18] The results were that out of 32 respondents, 17 of them (53.1%) had positive attitudes towards COVID-19.[18] On the contrary, a preliminary study performed in Kudus found that 60% of adolescents showed poor behavior to prevent the transmission of COVID-19.[19] This effect stems from various stressors, including the rising death toll from COVID-19 transmission, the spread of misinformation, restrictions on outdoor activities, and other factors.[20] A study conducted in Palangkaraya found a correlation between the level of knowledge and COVID-19 prevention behaviors within the community served by the health center.[21]

During the COVID-19 pandemic, protective measures like resilience and increased social support are crucial in facilitating lifestyle changes.[22] The knowledge and attitudes of most Indonesians are expected to influence their compliance with personal protective measures, ultimately leading to specific clinical outcomes.[23] This study examined the knowledge of teenagers in Surabaya about COVID-19 and prevention behavior.

Methods

This descriptive study used the cross-sectional design method from June to October 2021 in Surabaya. This study had received an ethical clearance agreement (no. 184/EC/KEPK/FKUA/2021) and applied strict health protocols.

The dependent variable was the behavior of preventing COVID-19 by teenagers living in Surabaya and individuals aged 10-19 years old (adolescents). The independent variable was the youth's knowledge and perceptions of COVID-19 in Surabaya. The study population was teenagers living in Surabaya. The total sample was the entire population that met the inclusion and exclusion criteria based on the cross-sectional formula.[24]

$$n = \frac{Nz^2pq}{d^2(N-1)+z^2pq}$$

n = minimum sample size
q = 1- p = 0.5
z = Z1- α/2 = value on the standard normal distribution, which is equal to the level significance of α (for α = 0.05, it is 1.96)
p = proportion price in the population. If unknown, then p = 0.5
d = tolerable (absolute) error = 0.1
N = total population = 419,316

The total number of teenagers in Surabaya aged 10-19 years old is 419,316. Therefore, the total sample was estimated to be 96 and rounded to 100 respondents.

Sampling in this study was performed by consecutive sampling, with the following inclusion criteria: a) aged 10-19 years old; b) lives in Surabaya; c) willing to be included in the study. The exclusion criteria in this study were teenagers with severe diseases that required long-term treatment. The instruments used to obtain data in this study were: 1) Respondents' knowledge questionnaire about COVID-19; 2) Respondents' COVID-19 prevention behavior questionnaire; 3) Respondents' personal data questionnaire.

Data was collected by distributing questionnaire links via WhatsApp, Twitter, and Instagram. The questionnaire was made using Google Forms.[25] It contained the explanation before consent for the respondents, the inclusion and exclusion criteria, and the confirmation of their consent to participate in this study.

Knowledge

The knowledge of the sample was measured using 10 questions containing general knowledge about COVID-19, with a maximum score of 13. After that, the results obtained were categorized into good, moderate, and poor knowledge, defined as follows: a) "Good", if the sample answered most or all questions correctly (sample response score >75%); b) "Average", if the sample answered only part of the questions correctly (sample response score 40%-75%); c) "Poor", if the sample correctly answered a small part of the questions (sample response score <40%).

Prevention Behavior

Prevention behavior against COVID-19 was measured using a Likert scale.[26] The options were "routine", "sometimes", "rarely", and "never". The questions in the questionnaire showed behaviors regarding COVID-19 prevention behavior, 7 of which were appropriate behaviors, namely: (1) wearing a mask, (2) washing hands, (3) using disinfectants, (4) staying at home when sick, (5) covering your mouth when coughing/sneezing, (6) avoiding touching your eyes, nose, and mouth with unwashed hands, and (7) avoiding direct contact with sick people. Six other responses represented behaviors that should not be performed to prevent the transmission of COVID-19. Each answer indicated how often the behavior was performed, i.e. "routine" means doing the activity every time, "sometimes" means doing the activity 2-3 times each time, "rarely" means doing the activity once at a time, and "never" means never doing the activity.

Each response to the question representing appropriate behavior would receive a score of 4 for "routine", 3 for "sometimes", 2 for "rarely", and 1 for "never". Each response to the inappropriate behavior question would receive a score of 1 for "routine", 2 for "sometimes", 3 for "rarely", and 4 for "never". The maximum score for this quiz was 52. In addition, the results would be categorized into good and poor with the following definitions: a) "Good" if the sample response score was ≥75%; b) "Poor" if the sample response score was <75%.

The data obtained were processed in several steps. The first step was editing. In this step, the completeness of the respondent's identity was checked. This was followed by verification to ensure that the answers provided by the respondent adhered to the given instructions. The second step was encoding, where data in sentences or letters were converted into numbers. The third step was entry, where the encoded data were inserted into a computer program using the International Business Machines Corporation (IBM) Statistical Package for Social Sciences (SPSS) software.[27] The last step was cleaning, which was used to check previously entered data to ensure no errors in the data entry. The survey results were presented in tabular form, and data analysis was performed using univariate and bivariate analysis using SPSS version 19.0.[27]

Results
Knowledge

Based on Table 1, out of 122 respondents, the percentage of knowledge scores included in the average category was 1.6% with a total score of 7, 6.6% with a total score of 8, and 19.7% with a total score of 9. Meanwhile, those included in the good category were 26.2% with a total score of 10, 30.3% with a total score of 11, 13.9% with a total score of 12, and 1.6% with a total score of 13.

Table 1. Respondent's knowledge score

Knowledge Score			
Total Score of Respondents Knowledge	Number of Respondents (n)	Percentage (%)	Category of the Total Score
7	2	1.6	
8	8	6.6	Average
9	24	19.7	
10	32	26.2	
11	37	30.3	
12	17	13.9	Good
13	2	1.6	
Total	**122**	**100.0**	

Source: Research data, processed

Based on the level of knowledge of respondents (Table 2), 88 respondents (72.1%) had good knowledge, and 34 respondents (27.9%) had moderate or sufficient knowledge about COVID-19. In this study, no respondents had poor knowledge about COVID-19.

Table 2. Knowledge level of respondents

Knowledge Category		
	Frequency (n)	Percentage (%)
Good	88	72.1
Average	34	27.9
Poor	0	0.0
Total	**122**	**100**

Source: Research data, processed

Prevention Behavior

Based on Table 3, out of a total of 122 respondents, the percentage of prevention behavior against COVID-19 scores that fell into the poor category was 1.6% with a total score of 36, 5.7% with a total score of 37, and 4.1% with a

total score of 38. Meanwhile, those belonging to the good category were 7.4% with a total score of 39, 16.4% with a total score of 40, 13.1% with a total score of 41, 13.1% with a total score of 42, 10.7% with a total score of 43,

11.5% with a total score of 44, 6.6% with a total score of 45, 4.9% with a total score of 46, 3.3% with a total score of 47, 0.8% with a total score of 48, and 0.8% with a total score of 50.

Table 3. Prevention behavior score

Prevention Behavior Score			
Total Score of Respondents Prevention Behavior	Number of Respondents (n)	Percentage (%)	Category of the Total Score
36	2	1.6	
37	7	5.7	Poor
38	5	4.1	
39	9	7.4	
40	20	16.4	
41	16	13.1	
42	16	13.1	
43	13	10.7	
44	14	11.5	Good
45	8	6.6	
46	6	4.9	
47	4	3.3	
48	1	0.8	
50	1	0.8	
Total	**122**	**100.0**	

Source: Research data, processed

Based on Table 4, the prevention behavior against COVID-19 category showed that most respondents comply with government regulations to wear masks (94.9%), wash hands (83.1%), use disinfectants (52.9%), stay at home when sick (72.1%), cover mouth when coughing/sneezing (86.8%), avoid touching eyes, nose, and mouth with unwashed hands (53.7%), and avoid direct contact with people with sickness (72.8%). In total, 89.3% of respondents had good behavior in preventing COVID-19 transmission, and 10.7% had poor behavior in preventing COVID-19 transmission.

Table 4. Prevention behavior category

Prevention Behavior Category		
	Frequency (n)	Percentage (%)
Good	109	89.3
Poor	13	10.7
Total	**122**	**100**

Source: Research data, processed

Knowledge and Prevention Behavior

Based on Table 5, it is known that the majority of respondents, up to 80 (90.9%) respondents, had good behavior to prevent the transmission of COVID-19 accompanied by a good level of knowledge about COVID-19, whilst up to 29 (85.3%) respondents had good behavior to prevent transmission of COVID-19 with an average level of knowledge about COVID-19. On the other hand, up to 8 (9.1%) respondents had poor behavior in preventing transmission of COVID-19, but had a good level of knowledge about COVID-19, while the remaining 5 (14.7%) respondents had poor COVID-19 prevention behaviors with an average level of knowledge about COVID-19. Lastly, none of the 122 respondents had a poor level of knowledge about COVID-19.

Table 5. Bivariate analysis between knowledge and prevention behavior

Knowledge and Prevention Behavior							
Knowledge	Good		Poor		Total		p-value
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	
Good	80	90.9	8	9.1	88	100.0	
Average	29	85.3	5	14.7	34	100.0	0.367
Total	**109**	**89.3**	**13**	**10.7**	**122**	**100.0**	

Source: Research data, processed

Correlation test results using Spearman's test obtained $p=0.367$, with $p>0.05$, meaning there was no significant relationship between the knowledge and COVID-19 prevention behaviors in adolescents living in Surabaya.
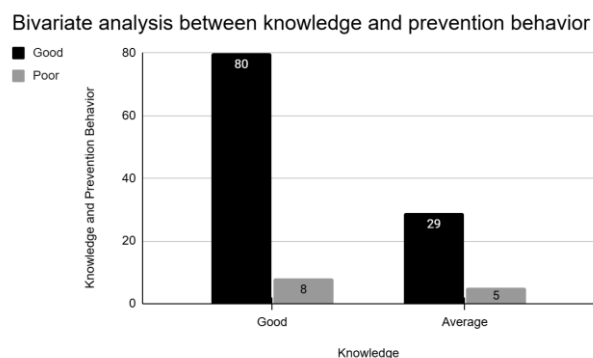
Bivariate analysis between knowledge and prevention behavior

Figure 1. Bivariate analysis between knowledge and prevention behavior

Discussion

Most respondents (72.1%) had good knowledge about COVID-19, which is in line with the study by Mujiburrahman, *et al.* (2020), which showed that none of the respondents had poor knowledge about COVID-19.[14] Another study performed by Mukhlis, *et al.* (2021), which involved 100 respondents, also obtained the same results, where most respondents (85%) had good knowledge about COVID-19.[28]

Knowledge about COVID-19 includes: knowing the existence of the COVID-19 outbreak; the definition of COVID-19 as a contagious respiratory disease; cough, fever, and shortness of breath being the early signs of COVID-19; transmission of COVID-19 through coughing and sneezing; "close contact" is when exposed directly to someone's respiratory fluids; the adult age group has a greater likelihood of contracting COVID-19; someone with other underlying diseases such as high blood pressure and diabetes mellitus will be more easily infected with COVID-19; the most effective way to prevent transmission of COVID-19 is to wear a mask; wash your hands; use disinfectant; stay at home when sick; cover mouth when coughing; avoid touching the eyes, nose, and mouth with unwashed hands; and avoid direct contact with someone infected with COVID-19.

The appropriate way for the government to prevent the spread of COVID-19 is to quarantine all people arriving from abroad for 14 days, cancel all domestic and international flights, measure the body temperature of all people from door to door, close all schools, prohibit all mass gatherings, such as sports competitions, concerts, birthday events, requiring the use of masks when outside the home, and requiring all people to stay at home except when seeking medical treatment or food.

Demographic data of respondents in this study stated that most respondents graduated from elementary school. As a result, most of them could understand enough information and knowledge about COVID-19 from their surroundings and schools. Most respondents were old enough to access the internet and social media, which might also affect their sources of information about COVID-19. The majority of respondents (89.3%) had good COVID-19 prevention behavior, which is in line with a previous study, where the majority of respondents, 79.5% out of 384 people, had behaviors included in the good category.[29] Appropriate preventive behaviors include wearing a mask, washing hands, using a disinfectant, staying at home if sick, covering mouth when coughing/sneezing, avoiding touching the eyes, nose, and mouth with unwashed hands, and avoiding direct contact with sick people. Preventive unsuitable behaviors include getting the flu/pneumonia vaccine, using antibiotics, exercising regularly, eating onions regularly, avoiding consuming meat, and being careful when opening packages.

Based on social cognitive theory, it is stated that a person's behavior is influenced by internal and external factors: (1) Internal factors: gender, race, personality, physical character, intelligence, motivation, will, and goals; (2) External factors: education, religion, economic, social and cultural background.[30] Adolescents are still in the egocentric development phase, prioritizing themselves over those around them. Consequently, this may be why they continue to do activities outside their home and often do not follow health protocols given by the governments. Patimah, *et al.* (2021) stated that other factors could also influence a person's behavior, including predisposing, driving, and reinforcing factors.[31]

The correlation test results using the Spearman test obtained p=0.367, where p>0.05. There was no significant relationship between the respondents' knowledge and prevention behavior against COVID-19. This is in line with the study by Rayani, *et al.* (2021), where the results of the study showed p=0.464.[32] Hence, it can be interpreted that there was no significant relationship between knowledge and preventive behavior of the respondents.[32] A significant relationship may be absent because most respondents fell into one category: good behavior. Therefore, the data were not evenly and less representatively distributed. Another thing that could influence the results of this study was that there were still other factors that could influence a person's preventive behavior against COVID-19 in addition to the variables studied, such as the person's level of education, motivation, and emotional state.

This study showed that most respondents had good prevention behavior against COVID-19 and good knowledge about COVID-19. Factors that influence the results of this study include high knowledge, usually accompanied by good prevention behavior against COVID-19. The broad knowledge of adolescents can be influenced by the ease of access to the internet and social networks, as well as information obtained from the environment around them. Understanding knowledge, in general, will be directly proportional to their behavior. If the understanding of COVID-19 is strong, implementing preventive behaviors for COVID-19 will also be more effective. Teenagers' idealistic nature can also be why they tend to want to be the best in the eyes of those around them. Motivation and support from the environment around teenagers, especially the family, can also be a factor in complying with health protocols and setting a good example for them.

In this study, there were several limitations, namely the lack of supervision because the respondents filled out the questionnaire online, giving respondents the opportunity

and possibility of being able to ask other people. Therefore, the respondents' answers might not entirely result from their thoughts and knowledge. Another factor was the possibility of respondents responding inappropriately, as they feared that they might receive sanctions or warnings. Age can also be a factor that influences the responses of respondents. For young people, it is possible that they do not understand the questions that well. This can influence them when choosing or making decisions before doing something. For example, they still perform all preventive behavior, but only because they are forced or ordered to do so by older people.

Strength and Limitations

The strength of this study was its thorough analysis of knowledge and prevention behavior about COVID-19. However, the limitations include a limited number of samples. A larger sample would have provided a more comprehensive representation of the population and resulted in more accurate outcomes.

Conclusion

This study found that most respondents had good knowledge and prevention behavior regarding COVID-19. No significant relationship was found between knowledge and behavior to prevent COVID-19 in adolescents living in Surabaya. Suggestions for further studies include expanding the sample coverage or increasing the number of samples. In addition, consider adding several other variables, such as the relationship with the person's level of education, gender, age, custom, or a particular culture in certain groups or professions, as well as their correlation with other diseases.

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Conflict of Interest

The authors declared there is no conflict of interest.

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Ethical Clearance

This study received ethical clearance from the Ethics Committee for Health Research, Universitas Airlangga, Surabaya (No. 184/EC/KEPK/FKUA/2021) on 13-09-2021.

Authors' Contributions

Designed the study and drafted the manuscript: ADA and NF. Collected data and performed background literature review: ADA. Performed statistical analysis: ADA. Supervised results and discussion: NF, WR, and AK. All authors reviewed and approved the final version of the manuscript.

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