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Original Research Article

The relationship between knowledge and willingness COVID-19 vaccination among adolescence, in Samarinda, Indonesia

Sitti M. Arif[1]*, Dian A. Fitriani[2], Sagena N. Carisma[3]

[1]Department of Dermato-Venereology, Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Makassar, Indonesia
[2]Department of Public Health, Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Makassar, Indonesia
[3]Bachelor of Medicine Program, Medicine Study Program, Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Makassar, Indonesia

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***Correspondence:**
Dr. Sitti M. Arif,
E-mail: sitimusafirah@med.unismuh.ac.id

ABSTRACT

Background: In 2020, infections caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) are still a pandemic, including in Indonesia. Numerous efforts have been made to reduce morbidity and mortality rates caused by the virus, including vaccination. The existence of a vaccine for COVID-19 in the Indonesian community faces pros and cons. The achievement rate of vaccination, in general, is still not as expected. To accelerate vaccination, the government through the Ministry of Health has issued a circular on the acceleration of COVID-19 vaccination for children from 12-17 years old. The study aims to assess the relationship between the level of knowledge and willingness to vaccinate against COVID-19 in adolescents from 12-17 years old in Sambutan Village, Samarinda city, Indonesia.
Methods: This study is observational analytic with a cross-sectional design. We took samples through online questionnaires distributed to adolescents aged 12-17 years old, in Sambutan village, Samarinda city from September to December 2021.
Results: The sample was 179 people, consisting of 86 people (48.04%) male and 93 people (51.96%) female. Based on the knowledge level, 144 (80.4%) have good knowledge and 35 (19.6%) have less knowledge about vaccination. As for the willingness to vaccinate, 150 (83.8%) people are willing, and 29 (16.2%) are unwilling to be vaccinated. The analysis test, obtained $p<0.001$, indicating that there is a relationship between the level of knowledge and willingness to vaccinate.
Conclusions: The better adolescents comprehend vaccination, then their willingness to be vaccinated is higher.

Keywords: Knowledge, Vaccination, COVID-19, Adolescence

INTRODUCTION

At the end of 2019, the world of health was shocked by the news of an unusual case of pneumonia centered in Wuhan, Hubei Province, China.[1-3] Within a month (26 January), the agents underlying the disease had been identified and a novel coronavirus named COVID-19.[4] Due to the increase the cases in China and other countries of the world, on 30 January 2020, the World Health Organization (WHO) emergency committee declared a global health emergency.[4,5] By July 2021, the cumulative number of confirmed COVID-19 cases worldwide had reached nearly 180 million, and the death toll had exceeded 4 million.[3]

The WHO stated COVID-19 as a global health emergency, on 30 January 2020, known as pandemic status.[3,6] The pandemic affected almost 80 million people positive cases

in the world.[3,6,7] To prevent the transmission of person to person and the spread of COVID-19, control procedures include social distancing, hand hygiene, the use of face masks, and personal protective equipment.[4,8] However, the reality is that the prevention of the spread of COVID-19 does not reduce the incidence of the disease, perhaps due to the knowledge level and obedience of the people who followed the steps of protection.[8] Vaccines protect vaccinated people and reduce the spread of the disease in a population.[4,9,10]

The rapid progress of vaccines to stop coronavirus disease 2019 (COVID-19) is urgent globally and there seems to be an agreement and disagreement. However, it is a regulation and medical decisions are based on benefits: risk calculation.[10]

The development of the COVID-19 vaccine has been rapidly done in the history of vaccine development. COVID-19 is the first disease in which a hundred institutions and companies are engaged in research to produce effective vaccines from a variety of parallel established platforms.[11] At the end of 2020, more than 60 vaccine types had been clinically trial tested. Some of the mRNA (Pfizer- BioNTech, Moderna), adenovirus recombinant vector virus (Astra Zeneca, Cansino, Gamaleya, Johnson Pharm), and inactive vaccine (Sinopharm, Sinovac), have proven to make the fastest progress.[11-13] In the year 2020-2021, the COVID-19 vaccine existence has still become pro and contra in the Indonesian population. At that time, various specific groups of society were still doubtful about the efficacy and effectiveness of the COVID-19 vaccine despite the news of the side effects of the vaccine. Also, conspiracy issues or halalness ingredient aspects of vaccines becoming more and more dubious in the community.[12,14] Eventually, the Indonesian Ulama Council declared a halal label for vaccines circulating in Indonesia.[12,14,15]

When the COVID-19 vaccine was available, some countries targeted the elderly group, adolescents, and children group as a target vaccination to reduce the spread of COVID-19.[2,9,16,17] On the other hand, some countries made non-mandatory the COVID-19 vaccination, so high levels of public agreement and understanding will be required to make these actions successful.[11]

Vaccine hesitance and rejection have been observed worldwide, including among Indonesia's people. In November 2020, the WHO, the Ministry of Health of the Republic of Indonesia, and the United Nations Children's Fund (UNICEF) released a report. The results found that 64.8% of the 112,888 Indonesians polled were willing to be vaccinated, 7.6% refused all vaccines, and 27.6% were undecided.[18]

In Indonesia, the General Directorate of Prevention and Control Disease, the Ministry of Health, issued a circular for the acceleration of COVID-19 vaccination for all head of health provincial and districts, on circular letter no HK.02.02 /I/1727/2021 concerning phase 3 vaccination for vulnerable people, general public, and children aged 12-17 years.[19] It is according to advice from the advisory committee of the Indonesian Technical Advisory Group on immunization (ITAGI) and approval of the use of the COVID-19 vaccine produced by PT. Biopharmaceuticals (Sinovac) for the 12- 12-year-old age group of BPOM dated 27 June 2021, then vaccination can be given to children aged 12-17 years.[20] The circular letter is based on several considerations, such as the increase of positivity confirmation of COVID-19 in children and adolescents, i.e. until July 2021, the positivity confirmation cases of the child are 2.780.803, and case fatality rate in the children group is 0.18%.[21]

For an adolescent group, COVID-19 confirmation was also increasing, it is according to the statement of the Head of the data department and IT task force of COVID-19, Dewi Nur Aisyah at pers conference at the time. In September 2021, the spread of COVID-19 cases in the age of school children was 12,83 percent or about 351.336 cases from all of the positivity confirmation cases in Indonesia. While the child from 7-12 years old showed positive confirmation of COVID-19 in approximately 101.049 cases, adolescents from 16-18 years old had about 87.385 positive confirmation, and adolescents with 13-15 years old COVID-19 positivity was 68.370 cases.[21]

The objective of the study is to assess the relationship between the level of knowledge and willingness to vaccinate against COVID-19 in adolescents from 12-17 years old. The location of the study is in Sambutan Village, Samarinda City. Sambutan village was chosen as the study location considering that it has a very significant population development until 2020 compared to several other villages and has the highest population in Samarinda city. Another consideration is the existence of a group of young mosque activists in the village who are quite active in conducting and assisting the government in preventing the spread of COVID-19 cases, including inviting the community to vaccinate against COVID-19.

METHODS

This study is observational analytic with a cross-sectional design. The sample was taken based on primary data from adolescents aged 12-17 years who lived in the Sambutan village, which was recorded by the Sambutan primary health center data, Samarinda City, and were willing to be respondents in the study. The population in this study is adolescents aged 12-17 years is 2.905 (2021 data). The number of samples was determined based on the Lemeshow formula, with the number of samples being minimal: 92.997 persons.

An online questionnaire was made and developed available through Google form and distributed to adolescents aged 12-17 years old, in Sambutan Village, Samarinda City from September to December 2021. The questionnaire was made based on a literature review and

guidelines from the Ministry of Health, Indonesia about COVID-19, containing 15 questions about knowledge of COVID-19 and the vaccine.

The study was fully free and unpaid, and no private data were collected from any subjects. Besides, the study informed subjects about the study's objectives and the ethical guarantee of confidentiality and namelessness stated in the informed consent. Also, they have the right to withdraw at any time. The permission from the institutional ethics committee from the Faculty of Medicine and Health Sciences with number 004/UM.PKE/X/43/2021, on October 2021, was approved before starting this study.

Demographic characteristics

The overview population consists of age, gender, and level of education. The population in this study was adolescents aged 12-17 years who lived in Sambutan Village, Samarinda City, and a total of 179 respondents participated in this study.

Inclusion and exclusion criteria

Adolescents aged 12 to 17 residing in Sambutan Village were eligible for inclusion in the study if they volunteered to participate. Exclusion criteria encompassed adolescents whose parents or guardians withheld consent for their participation or those who demonstrated non-cooperative.

Knowledge level of COVID-19

The knowledge level of COVID-19 was measured through the scale of closed-ended questions in the questionnaire, which tested the validities. The respondent was asked to respond if they answered "correctly", they got 2 points, and if they answered the "incorrectly" question, they got 1 point. And if they answer "I don't know", then get 0 points. Then the measuring result scored high level: if more than 23 (76-100%) score and low level: if below 23 (<75%) score. The questions here are adapted from the questionnaire of Mohammed et al.[22]

Willingness to be vaccinated against COVID-19 vaccine

The willingness to be vaccinated was measured through the scale of open-response questions towards people's level of willingness to be vaccinated against COVID-19, that had been tested the validities. The answer to the questionnaire is only a "willing" or "unwilling" answer. This questionnaire is measured by 1 question adopted from a research questionnaire conducted by Bunchuay in 2021 with an unknown Cronbach alpha value.[23]

The results of the validity and reliability test of the knowledge and willingness instruments, using the calculated value >r table (the value of r table=0.444) and the Cronbach alfa value, concluded that the two research instruments were valid and reliable.

Data analysis

Data collection for this study was conducted from September to December 2021. Data was obtained from filling out questionnaires distributed through Google Forms regarding the level of knowledge about COVID-19 vaccination and willingness to carry out COVID-19 vaccinations. The data was collected from 179 respondents and was then arranged in a master table using the Microsoft excel program. From the main table, the data is then transferred and processed using the statistical package for the social sciences (SPSS) program on the computer device and then presented in the form of a frequency table or cross table

All data collected was processed using the SPSS program and the Pearson correlation method. The correlation between the values obtained from the questions was calculated to determine the significance of the data. If the Pearson correlation obtained had a significance value below 0.05 or significance <0.05. However, if the correlation of the score of each question item with the total score had a significance level above 0.05 or significance >0.05, the data obtained was considered not significance.

RESULTS

Subject characteristics are depicted in Table 1, including, gender, age, and education level. The level of subject assessment based on the questionnaire answers is shown in Table 2.

Table 1: Demographic characteristics.

Category	Total	%
Gender		
Men	86	48.04
Women	93	51.96
Age (years)		
12	21	11.73
13	16	8.94
14	20	11.17
15	21	11,73
16	23	12.85
17	78	43.58
Education		
Primary school	22	12.3
Junior high school	44	24.6
Senior high school	113	63,1

According to respondent's knowledge and willingness, we can see Tables 3 and 4. Table 3 shows that there are 2 criteria for knowledge level; 35 people (19.6%) have low-level knowledge and that have 144 (80.4%) samples with high-level knowledge of COVID-19 vaccination. Table 4 suggests that there are 2 criteria for willingness, i.e. 150 people (83.8%) were willing to vaccinate against COVID-19, and 29 people (16.2%) who unwilling to vaccinate against COVID-19.

Table 2: Distribution of respondent's knowledge (based on knowledge item answers).

No.	Knowledge item	Respondent's answers					
		True		Wrong		I don't know	
		n	%	n	%	n	%
1	Fever is one of the symptoms of COVID-19	179	100	0	0	0	0
2	Shortness of breath is one of the symptoms of COVID-19	171	95.5	7	3.9	1	0.6
3[R]	Chest pain is one of the symptoms of COVID-19	91	50.8	70	39.1	18	10.1
4	Anosmia is one of the symptoms of COVID-19	165	92.2	10	5.6	4	2.2
5[R]	If water and soap are not available, using hand sanitizer should contain at least 55% alcohol to kill the COVID-19 virus	68	38	97	54.2	14	7.8
6[R]	The COVID-19 vaccine is a medicine	104	58.1	67	37.4	8	4.5
7	COVID-19 vaccinated is safe and effective	126	70.4	36	20.1	17	9.5
8[R]	COVID-19 vaccinated aims to stop symptoms COVID-19	72	40.2	93	52	14	7.8
9	COVID-19 vaccination can protect your body against COVID-19 diseases	164	91.6	10	5.6	5	2.8
10	Children aged 12-17 years could get COVID-19 vaccinated	166	92.7	2	1.1	11	6.1
11[R]	People who have a severe and uncontrolled congenital disease can get the COVID-19 vaccine	124	69.3	31	17.3	24	13.4
12[R]	People who have a fever can get the COVID-19 vaccine	143	79.9	28	15.6	8	4.5
13[R]	People who have anosmia can get the COVID-19 vaccine	133	74.3	23	12.8	23	12.8
14[R]	The side effect of the COVID-19 vaccine is anosmia	99	55.3	51	28.5	29	16.2
15	Muslim people can get the COVID-19 vaccine	178	99.4	0	0	1	0.6

R: negative statement or negative question

Table 3: Distribution of level knowledge of subject.

Knowledge level	Sample (n)	Percentage (%)
Low level	35	19.6
High level	144	80.4
Total	179	100

Table 4: Distribution of willingness to COVID-19 vaccination.

Willingness	Sample (n)	Percentage (%)
Willing	150	83.8
Unwilling	29	16.2
Total	179	100

The results were obtained from a total of 35 people who have less knowledge, it was found they were unwilling to vaccinate 17 people (48.5%), and those who were willing to vaccinate 18 people (51.5%). Out of a total of 144 people with good knowledge, they were unwilling to vaccinate 12 people (8.4%). And those willing to vaccinate 132 people (91.6%) (Table 5).

The distribution of willingness to COVID-19 vaccination that shown in Table 5, which reveals the result of the correlation test obtained a significance of p=0.000 value. According to the result of the correlation test, it is obtained sig. (2-tailed) value: p<0.001. So, it can be concluded that there is a correlation between the knowledge level about vaccination to the willingness to vaccinate against COVID-19 in adolescents aged 12-17 years.

Table 5: The correlation between the level of knowledge and willingness to COVID-19 vaccination in adolescents 12-17 years old.

Willingness variables	Un-willing	Willing	Sample	P value
Knowledge low				
n	17	18	35	0.000
%	48,5	51,5	100	
Knowledge high				
n	12	132	144	0.000
%	8,4	91,6	100	
Total				
n	29	150	179	0.000
%	100	100	100	

DISCUSSION

At the beginning of 2021, some people in several countries, including Indonesia, still doubted the COVID-19 vaccine, so the desire and willingness for vaccination were still low. And these circumstances will not change

without an effective campaign and proactive campaign that provides correct and precise information by decision-makers to counter misinformation. The general public should also be given access to information from the appropriate authorized vaccine and their consent based on evidence of vaccine benefits outweighs the potential risks of administering the vaccine.[11]

This study shows that the level of knowledge affects the willingness to vaccinate. The government and health workers should share COVID-19 information. Information on the effectiveness, haleness, and benefits of the vaccine must be more numerous, more precise, and accurate so that people voluntarily come to health services to be vaccinated.

In Sambutan village, Samarinda city, besides various social media, flyers, or banners, the information about the COVID-19 vaccine is obtained from the local government, for example: through religious influences who give messages about vaccination in every other religious or social message. Also, the characteristic of the population in Sambutan village, Samarinda city complies with health protocols, so that increased knowledge of vaccines is achieved well in the community and among adolescents as well. In this study, a small number of respondents have a low level knowledge about the COVID-19 vaccine, and several factors, including age, education level, and whether or not they have ever been exposed to information through fliers or banners throughout the neighborhood, can affect this. Additionally, some factors, such as the potential for co-occurring diseases, a history of chronic illness, allergies to components of vaccines, fear of syringes, or failure to obtain parental or guardian consent as a respondent for adolescents, make some respondents unwilling to receive vaccinations.

The study related to education, in the Netherlands by Euser et al. With 1465 participants aged 12-18 years, as well. The result of the study presented that the majority of participants (73%) indicated getting vaccinated if they would be offered a vaccine. Adolescents with a higher educational level were more often willing to get vaccinated.[24] There are similarities with the study, which is adolescents who have high knowledge of the COVID-19 vaccine, will be willing to be vaccinated. They believed that the vaccine keeps their health, that the vaccines are safe, and that vaccinations help out of the coronavirus crisis.[24,25] In the study about the willingness of children and adolescents to have a COVID-19 vaccination had been done by Fazel et al in England, about 27.910 students from 180 schools participated, and there was 50.1% chose to vaccinate. Interestingly the study, that they are vaccine-hesitant students are more likely to come from socio-economic deficiencies, lack social connection, nor do they have communication with the school-aged community of teenagers, so their knowledge of COVID-19 vaccines is still low.[26] A little different from the adolescent community in the Sambutan village, they have their community in the schools, and information from parents and religious leaders in the area around their neighborhood seriously affects the widespread information about COVID-19 and its vaccines, so adolescents' knowledge of the COVID-19 vaccine is 80.4%.

The government regulations requiring vaccinations for youngsters between the ages of 12 and 17 are one of the factors that most influence the relationship between high-level knowledge and willingness to vaccinate. Before studying at school or going into the mall, a stringent examination is conducted using barcode scanners from “Peduli Lidungi”.

Statistically, this study’s result shows a correlation between the level of knowledge and willingness to vaccinate against COVID-19 in adolescents from 12-17 years old in Sambutan village, Samarinda city ($p<0.001$). Regarding about correlation between knowledge and willingness to vaccinate, a similar study was done by Wirunpan in Bangkok, Thailand, with 136 adolescents as a participant. The result of the study is that a moderate level of knowledge of COVID-19 has a lack of willingness to get vaccinated (about 73.3%). The adolescents come to information about COVID-19 from their parents or guardians, which is not as complete as the information from the country's COVID-19 control center in Thailand.[25]

The study, the community-based study, about the willingness of older adolescents and young adults to receive the COVID-19 vaccine, was done by Afifi et al in Canada. There are 1411 participants involved in the study with the result that 65.4% are willing to get a COVID-19 vaccine. And the willingness to be vaccinated did not differ based on age, gender, or mental health conditions, but differed for other sociodemographic characteristics, physical health conditions, knowledge regarding COVID-19, practicing social/physical distancing, and adversity history. The most common reasons for unwillingness to a vaccine were safety, knowledge, and effectiveness.[2]

CONCLUSION

So, the conclusion is the better adolescents comprehend vaccination, the higher their willingness to be vaccinated. And the limitation of this study is not assessing other variables that might have influenced this study.

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