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Research Article

**Correlation Between Education and Age to the Perception of COVID-19 Vaccination**

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ABSTRACT

Background: COVID-19, a pneumonia-like disease, started to spread at the end of 2019 and became a pandemic globally. Vaccination is one of the programs to reduce the severity of particular conditions, including COVID-19. However, in Indonesia, the response to COVID-19 vaccination remains low. This study aimed to assess the correlation between age and educational background to the perception of COVID-19 in Yogyakarta City, Indonesia.

Method: This cross-sectional study was conducted from August to September 2021 at several vaccination centers in Yogyakarta City of Yogyakarta province. Total sampling was used to recruit participants during the mass vaccination period. Data were analyzed using univariate and bivariate analysis.

Results: 1,068 participants joined this study, with an age average of 29.8. Most respondents graduated from senior high school 528 (49.4%). Bivariate analysis showed a significant correlation between education and knowledge about Adverse Events Following Immunization ($p=0.01$).

Conclusion: Perception of the adverse event following immunization was significantly associated with education.

Keywords: COVID-19; Age; Education; COVID-19 Vaccine

INTRODUCTION

At the end of 2019, the pneumonia-like disease spread in Wuhan, China, later known as COVID-19. This disease is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The manifestation of COVID-19 varies, ranging from an asymptomatic symptom to acute respiratory distress syndrome and multi-organ dysfunction (1). COVID-19



is one of the health problems in Indonesia and even globally. The second wave of COVID-19 in Indonesia, in June 2021, reported a 381% increase in COVID-19 cases from 25,396 to 26,067. Then, in August 2021, active patients in Indonesia were 3,979,456, with total mortality of 126,372 (2). It was estimated that this peak occurred after the long holidays when health protocols and physical distancing do not apply correctly among mobile people. The cases mainly increased in Jakarta, West Java, Central Java, and Yogyakarta.

The common severe risk factors of COVID-19 are older and medical comorbidities like hypertension, diabetes, and cancer (3). The Indonesian government took an essential vaccination program to prevent fatality from developing herd immunity in society. The government targeted 208,265,720 people who had been vaccinated. This program was started on January 13, 2021, beginning with the priority population, such as health workers, the elderly, and public servants (4). Based on the government official data, on 1 January 2022, as many as 165,779,292 residents received the first dose and 114,044,659 second doses.

Yogyakarta is the third province in Indonesia with 98.85% and 89.53% of COVID-19 vaccination coverage for first and second doses, respectively. Yogyakarta became one of the top 10 provinces with low active cases on December 31, 2021. During that time, only found 102 active cases; this number was relatively fewer than DKI Jakarta, West Java, and Central Java (5). A study from the WHO in collaboration with the Indonesia Ministry of Health revealed that 74% of the respondents reported knowledge about the government's intention to deploy COVID-19 vaccines. About 65% of the respondents expressed their willingness to receive COVID-19 vaccination if provided by the Indonesian government, 27% reported hesitancy, and 8% refused to accept the COVID-19 vaccine (6).

Referring to the health belief model, individual health behavior is determined by the threat of illness or disease with the belief of recommended health behavior (7). Health behavior can also be predicted by intentions to do an action. Intention refers to the need to perform a behavior, social norms, and the control that people perceive (8). Other factors related to willingness to get vaccinated recommended by the government (9) are age, gender, location (urban/rural), level of education, income, perceived risk of being infected with COVID-19 in the future, perceived severity of infection, having previous vaccination experience after age 18, having higher knowledge about COVID-19 and vaccination were significantly associated with the acceptance of COVID-19 vaccines (10).

In the digital era, information about COVID-19 spreads rapidly through social media. Unfortunately, not all information spread on social media is accurate. Even though this information will significantly affect a person's response to a government program, including the COVID-19 vaccination (11), this leads to misinformation and conspiracy theories against vaccination. Previous research reported that people exposed to anti-vaccine conspiracy theories showed less intention to vaccinate than those in the anti-conspiracy condition (12).

Although the vaccination rate in Yogyakarta was relatively high, some groups still refused to receive the COVID-19 vaccine. Considering all backgrounds, this study aimed to assess the correlation between age and education to the perception of COVID-19 in Yogyakarta.

METHOD

This cross-sectional approach was conducted during mass COVID-19 vaccination from 1 August to 1 September 2021 in several vaccination spots in Yogyakarta City. The population of this study was everyone who came to the vaccination spot during the mentioned period. Total sampling was employed to recruit the participants. A questionnaire was used to collect the pre-tested data before using Cronbach Alpha 0.68. The questionnaire was installed on the Google Form platform, and the link was shared with the respondent via barcode. The respondents used their smartphones to access the questionnaire. If the respondent came without a smartphone, the researcher provided them with a smartphone. Written informed consent was received before the participant filled out the questionnaire—deceptive and chi-square tests were used to analyze the data.

The ethical consideration was approved by the research committee of Universitas Islam Indonesia (12/Ka. Kom.Et / 70/ KE/ III/ 2022).

RESULTS

One thousand sixty-eight people participated in this study; all mass vaccination participants agreed to participate. The average participant was 29.8 years old, with a standard deviation of 14.07. In this study, the age ranged from 12 – 25 years old, 537 people (50.3%), 26 – 45 years old, 341 people (31.9%), 46 – 65 years old, 178 (16.7%), and >65 years old, 12 people (1.1%). 24 (2.2%) of participants graduated from elementary school, 108 (10.1%) graduated from junior high school, 528 (49.4%) graduated from senior high school, 355 (33.2%) graduated with a bachelor's degree, 50 (4.7%) graduated with a master's degree, and 2 (0.2%) graduated with a doctoral degree (Table 1).

Table 1. Distribution of Research Sample Characteristics

Variable	Class	n	(%)
Age	12 – 25	537	50.3
	26 – 45	341	31.9
	46 – 65	178	16.7
	>65	12	1.1
Education	Elementary School	24	2.2
	Junior High School	108	10.1
	Senior High School	528	49.4
	Bachelor Degree	355	33.2
	Magister Degree	50	4.7
	Doctoral Degree	2	0.2

Table 2 shows the result of the bivariate analysis. We found a significant correlation between education and knowledge regarding Adverse Events Following Immunization (AEFI) ($p=0.001$). Meanwhile, other dependent variable analyses did not show a significant correlation ($p\text{-value} > 0.05$). A total of 1025 from 1068 participants said that they believed in COVID-19. However, this didn't correlate with the last educational background ($p\text{-value} = 0.821$). Of 1068 participants, only 16 (1.5%) didn't believe in the COVID-19 vaccine. This didn't correlate with the last educational background ($p\text{-value} = 0.667$). Most participants (97%) in our study were motivated to recommend COVID-19 vaccination to other people, and they also stated that they would obey the health protocols even after vaccination (99.7%). Seven hundred fifty-two participants said they did not feel afraid or anxious before vaccination. This condition didn't correlate with educational background ($p=0.403$). We were also looking for the

motivation behind vaccination on each participant; 85.2% of reasons were the personal intention, 5.9% came from an external factor, and the rest were from other intentions (8.9%) such as hajj travel conditions and domestic or international traveling term.

Table 2. The characteristics of respondents to the COVID-19 vaccine perception

Statement	n (%)
Belief in COVID-19	
Yes	1,025 (96)
No	43 (4)
Belief in the COVID-19 vaccine	
Yes	1,052 (98.5)
No	16 (1.5)
Know about AEFI	
Yes	741 (69.4)
No	327 (30.6)
Willingness to recommend the COVID-19 vaccine to others	
Yes	1,036 (97)
No	32 (3)
Willingness to comply with health protocols after vaccinated	
Yes	1,065 (99.7)
No	3 (0.3)
Feeling Before Vaccination	
Afraid	356 (33.3)
Not Afraid	712 (66.7)
Motivation to Take Part in Vaccination Program	
Personal Intention	910 (85.2)
Encouragement from an external factor	63 (5.9)
Other Intention	95 (8.9)

Most respondents believe in COVID-19 (96%). The majority of them believed in the COVID-19 vaccine (98.5%). More than half (69.4%) of respondents reported they know about AEFI. Most respondents (97%) were willing to recommend the COVID-19 vaccine to others. Most (99.7%) said they would comply with health protocols after vaccination. Regarding their feeling before vaccination, the majority of the respondent (66.7%) said they were not afraid. More than 80% of the respondents reported personal intention as their motivation to join the vaccination (Table 2).

Table 3 shows the association between education background and age in the variables measured. It presents a significant association between educational background and knowledge about AEFI with a p -value=0.01. While for age, there was no significant association among the variable measure.

DISCUSSION

The pandemic of COVID-19 caused many impacts on life, increasing the mortality rate and causing difficulties in economic and social aspects. The Indonesian government started the vaccination program in early 2021 for health workers, the elderly, and other public servants. The purpose of the vaccination program was to reach herd immunity and prevent the severity of symptoms. Vaccination has been considered one "self-care" treatment for a long time. But, in this pandemic era, some people's opinions about vaccinations might create hazards for others (13). During the COVID-19 vaccination program, the government found some obstacles, such as the hesitation to participate in this program because society doubts the

safety and side effects of COVID-19 vaccines. Some people avoid getting vaccinated or recommend vaccines to others (14). Various information from many sources is easily accessed today, but not everyone has a good filter on reliable information.

Table 3. Correlation Between Education Background and Age to the COVID-19 and the Vaccine

Variable	Indicator	p-Value
Educational Background	Belief in COVID-19	0.82
	Belief in COVID-19 Vaccine	0.66
	Know about AEFI	0.01
	Willingness to recommend the COVID-19 vaccine to others	0.09
	Willingness to comply with health protocols after vaccinated	0.13
	Feeling Before Vaccination	0.40
Age	Motivation to Take Part in Vaccination Program	0.64
	Belief in COVID-19	0.93
	Belief in COVID-19 Vaccine	0.72
	Know about AEFI	0.56
	Willingness to recommend the COVID-19 vaccine to others	0.90
	Willingness to comply with health protocols after vaccinated	0.48
	Feeling Before Vaccination	0.324
	Motivation to Take Part in Vaccination Program	0.519

Demographic characteristics such as age and educational experience influenced the quality of human resources. In this study, we assessed the association between education and age to some variables measured related to the perspective of COVID-19. We found that educational background is associated with people's knowledge about AEFI. Adverse Events Following Immunization (AEFI) generally happen to vaccinated people. They might feel pain, mild fever, redness in the injection area, tiredness, headache, muscle ache, or even diarrhea (15). These are normal reactions, but if they cause shortness of breath or any other life-threatening reaction, health workers should be aware of and educate people about this condition after getting vaccinated. However, severe reactions after vaccination, such as cardiovascular events like hypertension, hypotension, tachycardia, and peripheral coldness, were also reported. Myocardial infarction effects after vaccination of COVID-19 were reported in individuals above 75 years old (16). A cross-sectional study about knowledge and perception of AEFI conducted in Nigeria found that the majority of health workers knew about AEFI (92%) and had been trained to treat AEFI (80%) (17).

Our finding shows that education level determines people's knowledge about AEFI; it could be because educated people have access to news media and have a positive cycle to get the correct information. A study on 1,000 participants aged 18 – 74 in Germany found associations between low education level and higher perceived severity and between low education level and lower perceived probability. Highly educated men were more worried about COVID-19 than those with low levels of education. This study also showed no educational differences in perceived susceptibility or fear (18). Another study in Bangladesh about factors associated with COVID-19 vaccines found that participants above 30 years old heard less about this information. This study also found that level of education was significant; respondents with university-level education heard more about COVID-19 vaccines (19).

Another study in Bangladesh shows that more educated people are more knowledgeable about their health (20).

Our study was conducted in early 2021 and targeted the elderly and public servants who are a priority during the vaccination mass. This significant association may be due to convenient access to recently updated information about adverse events related to COVID-19 vaccination. This is also related to our study population, primarily young people with high educational backgrounds (senior high school and bachelor's degrees).

Complying with health protocols is one of the crucial factors in the control of COVID-19 and also the vaccination process. Those who adhere to and understand health protocols will realize the importance of vaccines. In our study, most respondents reported accepted vaccines because of personal intentions. This is also related to variables regarding the relationship of the last level of education with the information received. The better details about vaccines received by the public will tend to do vaccines of their own accord. However, it does not include rules from the government that require doing vaccines as one of the conditions for doing activities. One of the health protocols that need to be considered is masks. Masks are one way to prevent the virus from becoming airborne, based on research conducted in California regarding pandemic simulations. Masks do not have much effect if not combined with other health protocols such as hand washing, maintaining distance, and hand sanitizers in the absence of water (21).

Similar research was reported from Langsa, Aceh; that said the most significant number of respondents in adulthood with high school education level received a value of $p=0.000$, meaning meaningful. In the majority, there is a better level of compliance among adolescents and the elderly. And secondary education and college levels have higher adherence to health protocols: high school (80.6%) and lectures (92.1%). In our study, 1065 people agreed to follow health protocols, and only three refused. This is due to various aspects, such as the role of social media and excellent communication and media delivery, rather than the educator.

The concern level before the COVID-19 vaccine can occur due to several things, such as fear of side effects (49%), waiting for other people to use it until proven safe (35%), and different reasons. In our study, 712 respondents were not afraid (worried, anxious), and the remaining 356 felt concerned. This worry can be caused by scattered hoaxes and information less obtained by respondents (6). There is a lot of fear in people aged 18 – 24 years. This is because, in this age, social media be a favorite information source (22), and much information spreads under uncontrol, including news about the side effects of COVID-19 vaccination (6).

The government and the public collaborate in voicing vaccines for the wider community. In our study, respondents were willing to recommend vaccines to people because they already understood the importance of vaccines. Vaccines are not the most successful weapon or prevention; vaccines serve to provide immunity where immunity must be maintained with various health protocols. Vaccines without health protocols will not succeed in making Indonesia survive in the pandemic era and vice versa. All components must collaborate to protect us from the COVID-19 pandemic.

CONCLUSION

This study examined the relationship between age, education, and people's perception of COVID-19 and the COVID-19 vaccine. We found that knowledge about AEFI is significantly associated with an educational background.

Authors' contribution

LU contributes to research ideas, designing research concepts to collecting research data. YYP contributed to the collection of research data. AT and AKR contribute to research data processing and research data analysis. SND and DS contributed by providing input in writing this manuscript.

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Conflict of interest

There is no conflict of interest in this research.

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