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INTRODUCTION

The coronavirus disease pandemic 2019 (covid-19) has not shown an improved health condition even becoming an increasingly serious world health problem.¹⁻³ This is triggered by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and some cases in its development lead to increased mortality rates.^{4,5} This is common in older people who have comorbidities, such as cardiovascular disease, chronic kidney disease, and chronic obstructive pulmonary disease, showing a significant increase in incidence and death.^{1,6} Although some hospitals have provided medicines and medical measures to patients suffering from covid-19⁷, but cases with covid-19 are still not resolved even lately there has been an increase in incidents in some areas, especially the Asian region.^{3,8} Attempt the government overcomes the problem through breaking the chain of transmission of covid-19 through the spread of vaccines, this is a

strategic step in addressing the crisis.

Several research centers and pharmaceutical companies have developed the SARS-CoV-2 vaccine as a first step in identifying and at the same time as the first agent to issue the covid-19 vaccine.⁹ Research Flannery et al states that if covid-19 has similarities with influenza disease¹⁰ so that in people with covid-19 can receive influenza vaccine and the vaccine has an estimated low effectiveness impact⁹, so that people have a strong desire to do vaccine.¹¹ However, it is also possible if individuals refuse to do vaccines during the pandemic⁶ period, because they feel a lack of confidence in the safety of vaccines to overcome covid-19.^{11,12} Safety perception of vaccine side effects also affects the acceptance of people to want to do covid-19 vaccine.^{11,13}

High vaccination coverage globally may be able to stop the current covid-19²⁹ demic. However, vaccine demand in low and middle income countries has not been well studied and there may be

different considerations when compared to some high-income countries.¹⁴ Indonesia is a developing country with a medium income and relatively low vaccine coverage and high vaccine hesitance.^{13,15}

Some researchers have conducted studies to assess the acceptance of new vaccines against infectious diseases that appear in Southeast Asia, such as dengue fever, dengue fever, and Ebola.^{13,15-19} Some infectious disease studies have not conducted research on the acceptance of the covid-19 vaccine based on health trust models.

This study seeks to conduct a study on the acceptance of the covid-19 vaccine to the general population in Indonesia and Timor Leste based on the health belief model. The results of this study may be very useful and important for the government to formulate new policies in making the best approach to the community, to make the decision for the community to implement the COVID-19 mass vaccination program in Indonesia and Timor Leste, as well as

ABSTRACT

Introduction: Cases of coronavirus that causes Covid-19 disease in the world have reached 1.8 million people. Cases of coronavirus that causes Covid-19 disease in the world have reached 1.8 million people. The purpose of the study analyzed predictions of covid-19 vaccine acceptance based on sufferers and health belief models in Indonesia and Timor Leste.

Method: Analytical research method with cross-sectional survey approach, the population is taken from community living at Surabaya Indonesia and Timor Leste as many as 250 respondents. Sampling was conducted in a consequent sampling in two regions at Surabaya Indonesia and Timor Leste. Data collection using google form, share through were respondents. Statistical analysis with rank spearman.

Result: the relationship of vulnerability perception with acceptance vaccine covid-19 and correlation coefficient showing a figure of 0.29. It refers to the value of 0.20- 0.40 is considered weak. Similarly, the relationship of severity perception with acceptance vaccine covid-19 obtained coefficient correlation 0.41 expressed strong. on the perception of cues doing actions with acceptance vaccine covid-19, there is a strong relationship, because value correlation coefficient 0.41. For the relationship of benefit perception with acceptance vaccine covid-19 get a weak result because the correlation coefficient of 0.23 in the category below 0.40 is considered weak.

Conclusion: there are four components of Health Belief Model associated with Acceptance vaccine covid-19.

Keywords: Acceptance, Covid-19, Prediction, perception, health belief model.

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other countries in the Southeast Asia region, in the future. The purpose of the study analyzed predictions of covid-19 vaccine acceptance based on sufferers and health belief models in Indonesia and Timor Leste.

METHODS

Subject Research

There is currently no research on the acceptance of covid-19 vaccine based on the health trust model, therefore in this study we compiled questions about the acceptance of covid vaccine based on the health trust model through a research approach that has been done before.^{15,16} During the current covid-19 pandemic outbreaks, conditions in Indonesia and East Timor have limited research in conducting research through data retrieval in person by meeting face-to-face, so we are using a cross-sectional approach online between January 25 and April 15, 2021. The target population is the adult populations of Indonesia and Timor Leste. Samples recruited from 2 countries and all adults who are able to read and understand Bahasa Indonesia both in the Indonesian country sample and in Timor Leste are considered eligible. For respondents who participated in this study, researchers provided an invitation through a google form distributed through communication on WhatsApp. Researchers chose this media and communication platform because 64% of the population in Indonesia currently uses the platform and its users are relatively highly varied across age groups and other sociodemographic characteristics. Respondents were recruited using a simplified snowball sampling technique where invited respondents were asked to forward invitations to their WhatsApp contacts. The minimum sample size is 250 respondents, it is based on the conservative assumption that the accessibility level of margin of error is 5% with a confidence interval of 95%, to conduct sample recruitment, respondents deliberately conduct elections to include urban areas.

The implementation of the survey until the completion of the questionnaire, takes about 10 minutes. Questions in the questionnaire were made to gather information about socio-demography,

knowledge about covid-19, perception of acceptance of covid-19 vaccine (perception of efficacy, perception of benefits, perception of obstacles, perception of threats) and tracking of the results of questions about the examination of antigen swabs and PCR. Before being released, the questionnaire was conducted trials, revised and completed based on feedback and feedback from the testers.

Research Variables

The variable in this study is the perception of acceptance of covid-19 vaccine, the target of respondents in the study is the general public who are willing to be respondent. The variables of the study are the perception of acceptance of vaccines covid-19 (based on health belief models include; perception of efficacy, perception of benefits, perception of obstacles, perception of threats). To assess the perception of acceptance of the covid-19 vaccine, respondents answered the questionnaire as follows: (a) knowledge about the covid-19 and covid-19 vaccines, (b) community behavior during the covid-19 pandemic, (c) respondents' opinions on laboratory examinations supporting diagnostic covid-19, (d) confirmed family history of covid-19 or not. To assess the respondents tracking asked to answer the question whether there are family members confirmed covid-19 and whether respondents have ever confirmed covid-19 and respondents responded "yes" or "no."

In addition to these variables, it is necessary to also explain socio-demographic characteristics including age, gender, educational attainment, occupation, religion, marital status. Ages are grouped into five categories (< 20, 21–31–40, 41–50, 51–60, and >61 years); educational attainment is grouped into junior/high school graduates, diploma graduates, and university/post graduate graduates; and job types are divided into five groups (civil servants, private sector employees, employers, students, and retirees). Respondents were also asked if they worked as health workers or not and whether respondents had heard about COVID-19 before the survey. The risk they feel using the 0% measurement category shows the lowest while 100% is

the highest risk felt.

Statistical Analysis

Statistical analysis to identify tracking and perception of vaccine acceptance covid-19 through rank spearman. Analysis through two vaccine efficiencies (i.e., 95% and 50%). In the first step, the relationship between tracking variables and acceptance perception based on health confidence model (perception of efficacy, perception of benefits, barrier perception, threat perception) to covid-19 was analyzed separately. In the second step, all variables with $p \leq 0.25$ in the first step are included in the customized analysis. The significance of the adjusted gross chance ratio (OR) of univariate and OR (aOR) analysis in multivariate analysis was assessed at $\alpha = 0.05$.

RESULT

The results of the research link between tracking and acceptance with the covid-19 vaccine based on the theory of health belief model is the result of analysis of statistics bivariate test. Dependent variables are tracking and acceptance, while variable independent health belief models include perceptions of vulnerability, severity, requirements for action, benefits and barriers in understanding the acceptance of covid-19 vaccine.

We accept 250 respondents during this period of research is ongoing. Respondents in this study 64/250, 24% aged 21–30 years and 64,8% of them (162/250) showed the level of education graduated from the university (table 1). Most of the respondents were students, namely 39.2% (98/250), Muslims 53.6% (134/250), marital status 52.8% (132/250) is single and 38.8% (based on tracking result) ever confirmed covid-19. Respondents are at risk of being infected with covid-19 at the age of 41–50 years 26.8% (67/250).

The results showed variable independent health belief model includes vulnerability perception, severity perception, cues to act and perception of benefits and variable dependent acceptance vaccine covid-19 using statistic rank spearman test (table 2). When viewed from the strength of the relationship between independent variables in the form of vulnerability perception factors with

dependent variables acceptance vaccine covid-19 there is a weak relationship. This is seen from the perception of vulnerability with acceptance vaccine covid-19 and correlation coefficient that shows a figure of 0.29. It refers to the value of 0.20- 0.40 is considered weak. Correlation perception of severity and dependent variables acceptance vaccine covid-19 that has been conducted by the study subjects obtained correlation coefficient 0.41. If the correlation

coefficient is between 0.41-0.70 then it is expressed strong. If observed in statistical tests conducted on variable cues to take action with acceptance vaccine covid-19, then it can be known that there is a strong relationship. Correlation coefficient value 0.41. This means that there is a strong relationship because between 0.40-0.70 In relation to the perception of benefits with acceptance vaccine covid-19 get weak results. This is because the correlation coefficient indicates 0.23. It is based on a

category below 0.40 considered weak.

DISCUSSION

The covid-19 vaccine is one of the main strategic efforts to stop the spread of Covid-19 transmission so that the pandemic period will end soon. As of April 8, 2020, there are more than 100 types of COVID-19 vaccine candidates being developed by several countries to break the chain of transmission of covid-19.²⁰

Table 1. Result Statistic test logistic regression analyses acceptance vaccine covid-19.

Variable	n(%)	Accept n (%)	Unadjusted		Adjusted	
			OR (95% CI)	P-Value	aOR (95%CI)	p-Value
Age Group (year) :						
< 20 (R)	23 (9.2)	15 (65.2)	1		1	
21-30	61(24.4)	53 (86.9)	0.81 (0.39-1.71)	0.58	0.74 (0.32-1.86)	0.57
31-40	64 (25.6)	54 (84.4)	0.38 (0.17-0.72)	0.01	0.32 (0.9-1.03)	0.05
41-50	52 (20.8)	34 (65.4)	0.83 (0.26-2.86)	0.61	0.82 (0.22-3.42)	0.91
51-60	38 (15.2)	15 (39.5)	0.61 (0.21-1.92)	0.41	1.23 (0.26-4.90)	0.87
>60	12 (4.8)	7 (58.3)	0.62 (0.22-1.90)	0.43	0.67 (0.32-1.92)	0.45
Gender:						
Male (R)	104 (41.6)	76 (73.10)	1		1	
Female	146 (58.4)	88 (60.3)	1.45 (1.23- 1.30)	0.12	1.49 (0.95-2.35)	0.01
Education attainment (R):						
- Junior/senior school graduated	56 (22.4)	34 (60.7)	1		1	
- Diploma graduated	32 (12.8)	23 (71.9)	0.50 (0.21-1.13)	0.09	0.48 (0.17-1.23)	0.133
- University graduate/post-graduated	162 (64.8)	79 (48.8)	0.87 (0.52-1.43)	0.42	0.91 (0.45-1.81)	0.76
Occupation						
- Civil sector (R)	39 (15.6)	36 (92.3)	1		1	
- Private sector employee	46 (18.4)	19 (41,3)	1.31 (0.71-2.65)	0.32	1.17 90.60-2.24)	0.61
- Entrepreneur	51 (20.4)	23 (45.1)	1.01(0.51 – 2.01)	0.89	1.16 (0.61-2.12)	0.63
- Student	98 (39.2)	87 (88.8)	1.65 (0.94-2.96)	0.087	1.23 (0.47-2.13)	0.76
- Retired	16 (6.4)	7 (43.8)	0.29 (0.09-0.87)	0.03	0.13 (0.04-0.62)	0.01
Religion						
- Islam (R)	134 (53.6)	126 (94.1)	1		1	
- Hindu	7 (2.8)	2 (28.6)	1.32 (0.32-4.73)	0.63	1.01 (0.23 -.32)	0.76
- Cristian	49 (19.6)	32 (65.3)	0.53 (0.22-1.29)	0.16	0.49 (0.19-1.23)	0.23
- Catholic	53 (21.2)	27 (50.9)	0.58 (0.17-1.96)	0.38	0.46 (0.13-1.70)	0.23
- Buddhism	7 (2.8)	2 (28.6)	1.36 (0.32-5.77)	0.64	1.01 (0.23-3.32)	0.98
Marital Status						
- Single (R)	132 (52.8)	110 (83.3)	1		1	
- Married	118 (47.2)	98 (83.1)	0.63 (0.41-0.92)	0.02	1.03 (0.52-2.02)	0.72
Tracking Covid-19						
- Yes (R)	97 (38.8)	97 (100)	1		1	
- No	153 (61.2)	79 (51.6)	0.86 (0.23-0.97)	0.32	1.02 (0.53-2.03)	0.23
Perceived risk to be infection with covid-19 (%)						
< 20 (R)	23 (9.2)	17 (73.9)	1		1	
21-30	35 (14)	26 (74.3)	1.63 (0.67-2.17)	0.02	1.2 (0.80-2.23)	0.18
31-40	42 (16.8)	23 (54.8)	1.34 (0.82-3.33)	0.18	1.53 (0.76-3.21)	0.23
41-50	67 (26.8)	42 (62.7)	2.13 (1.03-3.21)	0.23	2.21 (1.02-3.27)	0.02
51-60	57 (22.8)	32 (56.1)	2.10 (1.03 – 3.42)	0.32	1.17(0.34-3.78)	0.03
>60	26 (10.4)	12 (46.2)	1.34 (0.34-3.43)	0.34	1.14 (0.23 – 3.82)	0.76

Table 2. Health belief model relationship with acceptance vaccine covid-19.

Component health belief model			Acceptance vaccine covid-19			E	Sign	r _s
			Less	Enough	Good			
Vulnerability perception	Not vulnerable	E	37	18	12	67	0.01	0.29
		(%)	55.2	26.9	17.9	100		
	Quite vulnerable	E	11	31	54	96		
		(%)	11.4	32.3	56.3	100		
Perception of Severity	vulnerable	E	23	24	40	87	0.01	0.41
		(%)	32.3	27.6	40.1	100		
	Not severe	E	35	18	13	76		
		(%)	46.1	23.7	17.2	100		
Gestures to Perform Actions	Pretty severe	E	9	34	45	88	0.01	0.41
		(%)	10.2	38.6	51.2	100		
	severe	E	21	26	39	86		
		(%)	24.4	30.2	45.4	100		
Perception benefits	Less do	E	12	14	19	45	0.01	0.41
		(%)	26.7	31.1	42.2	100		
	Simply do	E	21	27	33	81		
		(%)	25.9	33.3	40.8	100		
Perception benefits	Do	E	14	42	68	124	0.01	0.23
		(%)	11.3	33.8	54.9	100		
	Less useful	E	12	32	18	62		
		(%)	19.4	51.6	29.0	100		
Perception benefits	Quite useful	E	19	38	37	94	0.01	0.23
		(%)	20.2	40.4	39.4	100		
	useful	E	13	43	38	94		
		(%)	13.8	45.7	40.4	100		

In some countries for the Southeast Asian region, some studies on the acceptance of vaccines that are sorry to be able to stop the transmission of the disease has been widely conducted.^{18,21,25} In this study, we try to understand the acceptance of COVID-19 vaccine as one of the strategies to disusing the chain of transmission of COVID-19 based on health belief model that is common in Indonesia and Timor.^{15,23} It is necessary to be able to understand the acceptance of covid-19 vaccine based on health belief model in Indonesia and Timor Leste is something very important²⁴, considering that in addition to the very large population in Indonesia²⁵, between Indonesia and East Timor have similarities in culture and have relatively very high vaccine doubts to be willing to accept existing vaccines and vaccination coverage is still very low.^{12,26} Acceptance of the vaccine covid-19 based on health belief model becomes one of the very characteristics, namely about how people perceive to want and receive the vaccine covid-19. This is because many people have the opinion that the covid-19 vaccine has very low benefits to break the chain of transmission of covid-19.²⁷⁻²⁹

The findings in our study showed that when the vaccine was provided free of charge, 93.3% of participants said they wanted to be vaccinated if the vaccine had a 95% effectiveness, and did not cause any side effects that caused disability or death. The findings are supported by previous research, which stated that the acceptance rate for the first model (i.e., efficacy was 95%) much higher than the acceptance of other new vaccines in Southeast Asia.^{20,30} It shows that both respondents from Indonesia and Timor Leste had the majority of respondents in general support the implementation of the provision of covid-19 vaccine as proclaimed by the government as one of the strategic steps in breaking the chain of transmission of covid-19. It should be understood that in measuring the receipt of the covid-19 vaccine is based on the assumption that the covid-19 vaccine is provided free of charge by the government both in Indonesia and in Timor Leste. We researchers do not provide a map of the assumption if the vaccine covid-19 needs to be purchased. It should also be understood that we have also not found a clear threshold for the association of the covid-19 vaccine

immunity threshold as an effort to break the chain of transmission of the spread of covid-19 with 67.0% vaccination coverage may be found to be lower than the basic thinking required to stop the spread of the disease.

The results of this study also showed that health workers more support the implementation of the covid-19 vaccine compared to the elderly and non-health workers. This is one form of awareness and desire made by health workers to protect family, friends, and patients as one of the main drivers to make the decision to get covid-19 vaccination based on previous research.³¹ This is because health workers have more comprehensive knowledge about the transmission of covid-19, their awareness to do a relatively high vaccine that has the benefit to make behavior changes that cause them to protect themselves, their families and the wider community not to transmit the covid virus to their family members and the community.

The study also found that health workers have a higher risk of contracting virus covid-19 compared to the public, even though they have been vaccinated

twice with an effectiveness rate of 95%. In previous research stated that there is risk of infection due to the transmission of diseases to be carried out vaccines as a strategy to break the chain of transmission of infectious diseases such as covid-19.³² It is very important to increase public awareness and concern for effort¹⁰ break the chain of transmission of covid-19, because in this study also found almost 40% of respondents have a risk of transmission that does not show any symptoms of illness. Respondents showed that there is no low chance of pain symptom not only related to the acceptance of the covid-19 vaccine, but also need¹² for preventive measures such as wearing a mask, washing hands with soap or hand sanitizer, maintaining social distance and avoiding crowds. But on the other hand, what becomes more complicated is the people who have the idea that they comply with health protocols so that they no longer need to receive the covid-19 vaccine.³¹

The study also found²¹ that retirees had low acceptance of the covid-19 vaccine compared to those who were still actively working as civil servants. This is because pensioners have a lower risk⁹ of exposure and contact with others. Although the elderly are more vulnerable to covid-19, most of the retired population in Indonesia and in Timor Leste have low mobility. They spend most of their time at home and rarely travel long distances.¹⁷ This behavior causes them to²⁷ have a lower risk of exposure and infection with SARS-CoV-2, and that ultimately leads to lower acceptance of the covid-19 vaccine as well.¹⁸ In addition, respondents' acceptance of the covid-19 vaccine as one of the efforts to break the chain of transmission of covid-19 is influenced by their knowledge of diseases caused by coronavirus called covid-19 disease. Most of the public get information about the transmission of covid-19 disease through social media or online media, where the media is less accessible to the elderly or adults.^{12,33}

CONCLUSION

The acceptance of the covid-19 vaccine based on the health belief model includes four perceptions influenced by the effectiveness felt by respondents.

Respondents always consider the side effects to receive the covid-19 vaccine, this is in accordance with the perception of benefits, barriers, environment, and threats. Further research with a different study design and a larger sample size⁵ needed to find out more about other factors that affect the acceptance of the covid 19 vaccine based on health belief model.

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AUTHOR CONTRIBUTION

All authors contributed to this study's conception and design, data analysis and interpretation, article drafting, critical revision of the article, final approval of the article, and data collection.

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CONFLICT OF INTEREST

There is no conflict of interest in this manuscript.

ETHICAL CONSIDERATION

This study has been declared ethical by the Ethical Commission for Health Research of Universitas Nahdlatul Ulama Surabaya.

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