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ACCEPTANCE OF THE COVID-19 VACCINE BASED ON THE HEALTH BELIEF MODEL IN SUMATRA BARAT PROVINCE

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Abstract

West Sumatra is in the bottom two ranks with the lowest percentage of willingness to accept the COVID-19 vaccine in Indonesia. This study aims to determine the factors associated with the acceptance of the COVID-19 vaccine based on the health belief model (HBM) in the community in West Sumatra Province in 2021. This study is an analytical observational study with cross-sectional study design. An online questionnaire was distributed to obtain participants ≥18 years old in West Sumatra Province who had never received the COVID-19 vaccine. A total of 266 participants completed the questionnaire form. The acceptance of COVID-19 vaccine was moderate (56,4%). The results of the bivariate analysis showed that there were significant relationship between perceived of benefits (p-value = 0.001), perceived of barriers (p-value = 0.029) and cues to action (p-value = 0.001) with COVID-19 vaccine acceptance. There were no significant relationship between perceived of susceptibility and perceived of severity with COVID-19 vaccine acceptance. It is important to provide accurate information about the disease, vaccines, and their benefits, as well as encourage government and healthcare professionals to increase vaccine acceptance.

Keywords: COVID-19, Health Belief Model, Vaccine Acceptance

Introduction

Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. According to data from the World Health Organization (WHO) in 2023, more than 760 million cases and 6.9 million deaths have been recorded worldwide since December 2019, but the actual number is estimated to be higher [1]. Meanwhile, Indonesia's COVID-19 monitoring data on August 2023 showed that a total of 6.8 million cases were confirmed positive (CFR 2.4%) [2]. Where, West Sumatra is in 12th place as the province with the highest number of COVID-19 cases, namely 104,796 cases (CFR 2.27%) [3]. The spread of the virus that is not controlled effectively will have potential further impacts. The emergence of major challenges for the world health system and broad impacts on the global economy [4].

The statement issued by the WHO Emergency Committee explains that the spread of COVID-19 can be stopped if protection, early detection, and prompt treatment are applied to create a strong system implementation to stop the spread of the virus [5]. Since the first year of the COVID-19 pandemic, there has been increasing evidence that elimination strategies provide better outcomes for public health, the economy and civil liberties. One such strategy is a COVID-19 vaccine which offers high protection against severe forms of COVID-19 [6]. Based on data reported by the Indonesia's Ministry of Health, as of September 25th 2023, 203.877.315 (86,88%) of the targeted population have

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received the first dose of vaccine, while 174,956,260 (74,56%) have completed the second dose 69,345,697 (38,19%), and 69,345,769 (38,19%) for third dose of vaccine rollout. Meanwhile, in West Sumatera, as many as 4,168,884 (83,82%) had been vaccinated for the first dose, 3,352,593 (67,41%) people for dose II, and 1,111,457 (29,10%) people for dose III [2].

The vaccination program that was intensified by the government was not fully accepted by the people. This can be seen based on the results of an online survey conducted by the collaboration between the Indonesian Indonesia's Ministry of Health (2020), WHO, ITAGI, and UNICEF regarding the acceptance of the COVID-19 vaccine in Indonesia, it was found that there are still many people who are reluctant to receive the COVID-19 vaccine. West Sumatra is in the bottom two ranks with the lowest percentage of willingness to accept the COVID-19 vaccine, which is 47% [7]. The low percentage of vaccine acceptance among the West Sumatera residents is inseparable from the presence of influencing factors, one of which can be perceptions of society itself. Individual perceptions in choosing to do something related to their health are examined in the theory of the Health Belief Model.

Research by Shmueli (2021) regarding people's intentions to receive the COVID-19 vaccine shows that there is a relationship between perceptions of susceptibility, perceived severity, perceived benefits, and cues to act with people's want to be vaccinated against COVID-19 [8]. Another study by Ichsan et al. (2021) shows that the factors that influence the willingness of the people of Central Sulawesi to receive the COVID-19 vaccination are age, education level, occupation, marital status, religion, and ethnicity [9]. Zartaloudi (2022) also found that the HBM dimensions perceived barriers, perceived benefits and perceived severity were considered to be significant predictors of acceptance of vaccinations. Individual predictors of vaccination were believing the vaccine is effective at preventing COVID-19, recalling their doctor recommending the vaccine. Common perceived barriers against vaccination included believing the vaccine could give people the virus, believing the vaccine can make individuals ill afterwards and preferring to develop immunity "naturally". Patients who delayed and refused vaccine doses were more likely to have vaccine safety concerns and perceive fewer benefits associated with vaccines. HBM is an effective tool for identifying facilitators and barriers to health behaviors [10].

This study aims to determine the factors associated with the acceptance of the COVID-19 vaccine based on the health belief model (HBM) in the community in West Sumatra Province.

Method

This study is an analytic observational study with a cross-sectional study design. This research was conducted in West Sumatra Province from May to December 2021. The sample in this study was part of the community aged 18 years and over who never received the COVID-19 vaccine and lived in West Sumatra Province. Based on the calculation results, the minimum sample required is 266 respondents. The sampling technique used is simple random sampling. Data was obtained through filling out an online questionnaire.

The dependent variable was COVID-19 vaccine acceptance, it refer to participants' willingness to receive the COVID-19 vaccination. The independent variables were perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action. The independent variables were measured with 18 questions. Three items to measured perceived susceptibility, 4 items to measured perceived severity, 3 items to measured perceived benefits, 4 items to measured perceived barriers, and 4 items to measured cues to action. All questions were answered as "very possible/very serious/very high/strongly agree", "possible/serious/high/agree", "no it seems like/moderate/low/disagree", "impossible/mild/strongly disagree" through a four-point Likert scare

and score 4, 3, 2, 1 were assigned to the above answers in descending order. Finally, individual's grade in each dimension was divided into "high" and "low" based on their total points.

Data were analyzed using univariate analysis to determine the frequency distribution and bivariate analysis with the chi-square test. This research has received ethical approval from Ethics Committee of the Faculty of Public Health, Andalas University.

Results

The characteristics of respondents in terms of sex, education, occupation, marital status, and COVID-19 vaccine acceptance descriced in Table 1. From the results of the analysis, it was found that most of the respondents were female (69.2%). Most of the respondents were high school graduates or under (63.9%). Most of the respondents have a work / student (80.5%). Most of the respondents are unmarried (63.2%). It was found that COVID-19 vaccine acceptance in West Sumatra was moderate (56.4%).

Table 1 Respondents Characteristics

Variable	n	%
Sex		
Female	184	69.2
Male	82	30.8
Education		
<= High school	170	63.9
> High school	96	36.1
Occupation		
Do not have work	52	19.5
Have a work / student	214	80.5
Marital status		
Married / widowed	98	36.8
Unmarried	168	63.2
COVID-19 vaccine acceptance		
Yes	150	56.4
No	116	43.6
Total	266	100.0

Table 2 shows a comparison of the acceptance of the COVID-19 vaccine based on the health belief model, which is described based on each of its dimensions. The possibility of their own susceptibility, children and the elderly to COVID-19 show higher levels of vaccine acceptance. Opinions regarding the potential severity of COVID-19 in elderly also show higher vaccine acceptance rates.

Table 2 Comparison of the acceptance rate of the COVID-19 vaccine based on health belief model in West Sumatra

Dimensions of health belief model	Item	Response	Number (%)	Acceptance of the COVID-19 vaccine
				n (%)
Perceived susceptibility	How likely do you think it is that you will get COVID-19?	Possible	217 (81.6)	134 (61.75)
		Impossible	49 (18.4)	16 (32.65)
	How likely do you think it is that children will get COVID-19 in the next 12 months?	Possible	206 (77.4)	128 (62.14)
		Impossible	60 (22.6)	22 (36.67)
	How likely do you think elderly will be to get COVID-19 in the next 12 months?	Possible	228 (85.7)	144 (63.16)
		Impossible	38 (14.3)	6 (15.79)
Perceived severity	If you were to get COVID-19, how serious do you think the consequences would be?	Severe	93 (35.0)	52 (55.91)
		Mild	173 (65.0)	98 (56.65)
	How chances are you will get symptom remaining on health or impact to economy term long if affected by COVID-19?	High	170 (63.9)	98 (57.65)
		Low	96 (36.1)	52 (54.17)
	If children get COVID-19, how serious do you think the consequences will be?	Severe	129 (48.5)	81 (62.79)
		Mild	137 (51.5)	69 (50.36)
	If elderly get COVID-19, how serious do you think the consequences will be?	Severe	214 (80.5)	138 (64.49)
		Mild	52 (19.5)	12 (23.08)
Perceived benefits	Do you think the COVID-19 vaccine can reduce possibility infection ?	Possible	211 (79.3)	135 (63.98)
		Impossible	55 (20.7)	15 (27.27)
	Do you think the COVID-19 vaccine can reduce the severity and likelihood of complications if people are infected?	Possible	211 (79.3)	130 (61.61)
		Impossible	55 (20.7)	20 (36.36)
	Do you think the COVID-19 vaccine can prevent people from spreading the virus to others?	Possible	189 (71.1)	121 (64.02)
		Impossible	77 (28.9)	29 (37.66)
Perceived barriers	It is difficult to get vaccinations at general clinics or community health centers.	Disagree	193 (72.6)	109 (56.48)
		Agree	73 (27.4)	41 (56.16)
	It is difficult to get vaccination at a private clinic.	Disagree	184 (69.2)	100 (54.35)
		Agree	82 (30.8)	50 (60.98)
	The COVID-19 vaccine causes a person to get COVID-19.	Disagree	196 (73.7)	121 (61.73)
		Agree	70 (26.3)	29 (41.43)
	People will experience serious residual symptoms after getting the COVID-19 vaccine	Disagree	152 (57.1)	93 (61.18)
		Agree	114 (42.9)	57 (50.00)
Cue to action	I will do COVID-19 vaccination if the government recommends it.	Agree	146 (54.9)	123 (84.25)
		Disagree	120 (45.1)	27 (22.50)
	I will do COVID-19 vaccination if doctor recommends it.	Agree	177 (66.5)	133 (75.14)
		Disagree	89 (33.5)	17 (19.10)
	I will do COVID-19 vaccination if	Agree	147 (55.3)	107 (72.79)

Dimensions of health belief model	Item	Response	Number (%)	Acceptance of the COVID-19 vaccine
				n (%)
	my family has been vaccinated.	Disagree	119 (44.7)	43 (36.13)
	I will do COVID-19 vaccination if	Agree	119 (44.7)	97 (81.51)
	my friend has been vaccinated.	Disagree	147 (55.3)	53 (36.05)

Bivariate analysis was carried out between acceptance of the COVID-19 vaccine and health belief model (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action). Table 3 shows that there are significant relationship between perceived benefits (p-value = 0.001; OR = 4.45; 95% CI = 2.29-8.68), perceived barriers (p-value = 0.029; OR = 1.82; 95% CI = 1.09-3.03), and cues to action (p-value = 0.001; OR = 9.66; 95% CI = 5.41-17.24) with COVID-19 vaccine acceptance. Participants with lower level of perceived benefits, higher level of perceived barriers, and lower level of cues to action were less likely to accept the COVID-19 vaccine. Meanwhile, there were no significant relationship between perceived susceptibility and perceived severity with COVID-19 vaccine acceptance in the community in West Sumatra (p-value> 0.05).

Table 3 Acceptance of the COVID-19 vaccine based on the health belief model

Variable	COVID-19 vaccine acceptance				p-value	OR 95% CI
	Yes		No			
	n	%	n	%		
Perceived susceptibility						
High	45	16.9	28	10.5	0.356	1.35
Low	105	39.5	88	33.1		(0.77-2.33)
Perceived severity						
High	77	28.9	51	19.2	0.285	1.34
Low	73	27.4	65	24.4		(0.83-2.19)
Perceived benefits						
High	54	20.3	13	4.9	0.001	4.45
Low	96	36.1	103	38.7		(2.29-8.68)
Perceived barriers						
Low	107	40.2	67	25.2	0.029	1.82
High	43	16.2	49	18.4		(1.09-3.03)
Cues to action						
High	104	39.1	22	8.3	0.001	9.66
Low	46	17.3	94	35.3		(5.41-17.24)

Discussion

The HBM is defined as a psychological framework that explains health-related behavior based on factors such as perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. It has been applied to various health behaviors, particularly preventive and adherence behaviors [11]. Perceived susceptibility: assessing the probability of acquiring an illness or encountering an undesirable outcome. Perceived severity: understanding the severity of the illness, condition, or unfavorable outcome and what could happen if no additional action is taken. Perceived benefits: how the effectiveness of various available actions to reduce the risk of illness are perceived. Perceived barriers: obstacles to performing a recommended health action that may stop one from doing what is recommended. Cues to action: whether from one's surroundings or subjective experiences [12].

In this study context, perceived benefits refer to respondents' subjective opinions about the health benefits obtained from receiving the COVID-19 vaccine. Meanwhile, perceived barriers refer to respondents' subjective opinions regarding access conditions that are obstacles to obtaining the COVID-19 vaccine. Our study found that there were significant relationship between perceived benefits and perceived barriers with COVID-19 vaccine acceptance. In line with a study conducted by Wong et al. (2020) in Malaysia found that the important predictors of a definite intention to take the COVID-19 vaccine include high-perceived benefits and lower perceived barriers to receiving the vaccine. Interventions targeting HBM constructs could be effective in increasing the uptake of the vaccine [13]. Align with study from China, high level of perceived barrier associated with a higher vaccine hesitancy rate [14].

Study conducted by Zampetakis and Melas (2021) found that components of HBM had significant effects on intentions to vaccinate. Two-way interactions between severity and susceptibility beliefs and three-way interaction among perceived severity, susceptibility, and perceived benefits were detected [15]. Tao et al. (2021) and Qin et al. (2022) also found that respondents' were more likely to accept the COVID-19 vaccine in those with high level of perceived susceptibility, low level of perceived barriers, high level of perceived benefit, and high level of perceived cues to action [16,17].

Our study also found that cues to action have a significant relationship with COVID-19 vaccine acceptance. Cues to action are events, people, or things that trigger people to change behavior. Advice from others, the illness of a family member or social media can provide cues [18]. Study conducted by Shmueli (2021) found that participants were more likely to get vaccinated if they reported higher levels of perceived severity of COVID-19 infection and of cues to action. Regarding cues to action, significant predictors which increased the intention to COVID-19 vaccine were recommendations from the government, ministry of health or carrying out the vaccination at the place of work [8,19]. Studies also found that COVID-19 vaccine acceptance may be related to cues to action (if doctors or healthcare provider, families, and friends recommending the vaccine) [20–22].

A study in United States found that respondents less likely to accept vaccinations if they do not know anyone directly impacted by the COVID-19 pandemic [23]. This leads to lower perceived susceptibility. However, according to our results, there were no significant relationship between perceived susceptibility and perceived severity with COVID-19 vaccine acceptance. This aligned with a study in Egypt that used the HBM to evaluate COVID-19 vaccine acceptance among the older adults [24]. A study comparing COVID-19 vaccine acceptance among healthcare workers and the general population found that healthcare workers were significantly more likely to accept the COVID-19 vaccine than the general population. They also found that healthcare workers perceived significantly higher susceptibility and severity of COVID-19 infection compared to the general population [25].

The HBM is an effective tool for identifying enablers and barriers to health behavior. It also provides theoretical insights into the dynamics that may enable the success of important health policies after COVID-19 and future pandemics, and identifies communication mechanisms that governments and authorities should utilize in enforcing policies [10].

Conclusion

The acceptance of the COVID-19 vaccine in the community in West Sumatra Province was moderate. Based on the results of the bivariate analysis, it was found that there was a significant relationship between the variables of perceived benefits, perceived barriers, and cues to action on the acceptance of the COVID-19 vaccine. There was no significant relationship between the variables of perceived susceptibility and perceived severity on the acceptance of the COVID-19 vaccine in the community in West Sumatra Province. It is important to provide accurate information about the disease, vaccines, and their benefits, as well as encourage government and healthcare professionals to increase vaccine acceptance.

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