ORIGINAL RESEARCH

Perception of COVID-19 Vaccination Based on Health Belief Model and the Acceptance of COVID-19 Booster Vaccination

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Article Info	Abstract
  Corresponding Author: Jon Hafan Sutawardana Medical-Surgical Nursing Department, Faculty of Nursing, Universitas Jember, East Java, Indonesia Email: hafan@unej.ac.id	**Background:** The COVID-19 booster vaccination proposes a spike in cases due to new infection variants. According to the Health Belief Model (HBM), vaccination acceptance is a health change behavior measured by perception. However, more information is needed about the relationship between public perception and future acceptance of the COVID-19 booster vaccination. **Purpose:** This research aimed to analyze the relationship between the perception of COVID-19 vaccination based on the HBM and the acceptance of COVID-19 booster vaccination. **Methods:** The research used observational analytics design with a cross-sectional approach conducted at the community of a public health center in Jember Regency, Indonesia. Purposive sampling was used to recruit 387 respondents. The inclusion criteria were people aged >18 who had received a complete primary vaccination. The research instruments consisted of some questionnaires: respondent characteristics, perceptions of COVID-19 vaccination based on the HBM, and the acceptance of COVID-19 booster vaccination. Data were analyzed using Chi-square and a logistic regression test. **Results:** The results showed that most respondents accepted the COVID-19 booster vaccine (67.4%). There was a significant relationship between perception's subscales of COVID-19 vaccination, such as perceived susceptibility (p=0.001), perceived severity (p=0.001), perceived benefits (p=0.001), perceived barriers (p=0.001), cues to action (p=0.001) and the acceptance of the COVID-19 booster vaccination. Cues to action were the most dominant factor related to the acceptance of the COVID-19 booster vaccination (OR=5.265; 95%CI=3.073-9.022; p<0.001). **Conclusion:** Positive perceptions of all HBM subscales, which showed a good perception in the community, indicated the high acceptance of the COVID-19 booster vaccine. For clinical practice, this research can be developed by surveying patients who have comorbidities.

1. Introduction

Coronavirus disease 2019 (COVID-19) cases increased in December 2021 due to the new variant, namely Omicron (World Health Organization [WHO], 2021). Omicron variants can develop and damage the immune system that is initially formed in the previous dose of vaccine over time (Dolgin, 2021). As the pandemic spreads to lower-middle-income countries, there is growing concern about the risk of severe COVID-19, including in Indonesia (Efendi et al., 2022). As of March 13, 2022, Indonesia already ranks 16th in the world with the highest number of confirmed cases of 45,847,900, and a death rate of 151,414 (Worldmeter, 2022). More than one year of the COVID-19 pandemic, cases continue to fluctuate. In Indonesia, the government has established several policies based on four critical components of surge capacity: staff, goods, structures, and systems (Mahendradhata et al., 2021). Currently, available medical staffs are insufficient to deal with the potentially increased demands due to the pandemic, putting a spotlight on human resources challenges faced by the healthcare system. In addition, the surge in patients requiring hospitalization led to a shortage of medical supplies. The existing health infrastructure is still inadequate to handle the increase in COVID-19 cases (Mailani et al., 2022). Therefore, COVID-19 booster vaccines are recommended to prevent the risk of more severe symptoms.

However, the acceptance of COVID-19 booster vaccination in Indonesia is still low at 14,400,781 doses (7.01%). This condition is in line with the high number of cases of COVID-19 infection (Ministry of Health The Republic of Indonesia [MoHRI], 2022). The acceptance of the COVID-19 booster vaccination in Indonesia has created a debate in the community about whether or not the booster vaccine needs amid efforts to spread the infection of the Omicron variant (Sihidi et al., 2022). Post-vaccination death can occur because the immunity or protection forming in the body will decrease over time (Jain et al., 2021). Public perception of the new COVID-19 variant concerns the safety, the effectiveness of the COVID-19 booster vaccine, and the side effects of booster vaccination (Lai et al., 2021). The perception of susceptibility related to COVID-19 infection and barriers to vaccination affordability was high (85.4% and 88.5%, respectively), followed by the fear of contracting (56.3%), and the halal of vaccines (52.3%) (Wong, Alias et al., 2020). Some reasons for people to refuse COVID-19 booster vaccination in China are the safety of the booster vaccine, as many as 79.0%, and the concerns about the effectiveness of the booster vaccine protection as many as 75.9% (Lai et al., 2021).

According to the acceptance of the COVID-19 vaccine in the community, further interventions are forming to increase public awareness about the benefits and safety of the COVID-19 vaccine that can control the spread of the COVID-19 virus (WHO, 2021). In connection with the public response to rejecting the COVID-19 booster vaccine, it is assumed that there is concern over the uncertainty of the implications of the booster vaccine for the body's immunity. In line with that, suspicions arise about the vaccine's performance, the timing of immunity, and its usefulness to the body, causing factors affecting people who refuse the vaccine to maintain their arguments (Sihidi et al., 2022). At the same time, vaccines are one of the last solutions to treat infectious diseases. Therefore, utilizing HBM to identify people's perceptions plays an important role in improving the acceptance of COVID-19 booster vaccination.

The Health Belief Model (HBM) explains that there are perceptions about health, disease, and means in a person that can determine behavioral health that a person does to maintain his health, according to Rosenstock (1874) in Glanz et al. (2015). This concept gives the idea that a person will take action if they feel the adverse effects of the situation he experienced, hoping to improve his condition by believing in the success of an action. HBM emphasizes indicators of individual perception of a phenomenon that affects health (Glanz et al., 2015). The framework includes constructs on perceived (susceptibility, severity, benefits, barriers) and cues to action (Glanz et al., 2015; Rodriguez et al., 2021; Vebrielna, 2021).

The purpose of the study is to build on the phenomenon that occurred. The researcher wanted to know the relationship between perceptions felt by the public based on the HBM with the acceptance of the COVID-19 booster vaccination so that it could produce an output to determine the causes of perceptions that emerged in the community which affected the acceptance of the COVID-19 booster vaccination. This study used the basic theory of HBM to measure perceptions about the COVID-19 vaccination in the general public by including all five components of perception. The selection of this basis is because the concept of the HBM focuses on the basic problems of a disease related to means in a person, which can determine health behaviors that a person does to maintain health accordingly. To date, no known studies have been found on this topic in Indonesia. More information about the relationship between public perception and future acceptance of the COVID-19 booster vaccination in Indonesia is needed. Therefore, this study aimed to analyze the relationship between the perception of COVID-19 vaccination based on the HBM and the acceptance of COVID-19 booster vaccination.

2. Methods

2.1 Research design
This study used an analytical observational design with a cross-sectional approach. This survey-based study collected the perceptions of COVID-19 vaccination based on the Health Belief Model (HBM) and the acceptance of COVID-19 booster vaccination from the public community in the working area of a public health center in Jember Regency, Indonesia.

2.2 Setting and samples
The study involved the public community in the working area of a public health center in Jember Regency, Indonesia, and was conducted in May 2022. The inclusion criteria were people aged >18 who had received complete primary vaccination. In contrast, the exclusion criteria were

health workers, people with mental and cognitive disorders, and the respondents who withdrew during the research. A formula developed by Lwanga and Lemeshow for an unknown population was used to determine the number of samples in this study, with estimated proportions of the population at 0.05 (Nursalam, 2020). The minimum sample was 385 respondents. Adding 10%(39) of respondents was necessary to anticipate respondents who withdrew, resulting in a total of 424 respondents. After going through the dropout stage due to samples that did not meet the research criteria, such as two respondents under 18 years old and 46 respondents who had received the COVID-19 booster dose vaccine, the number of samples that could be further analyzed was 387 respondents from 3 sub-districts in the specified area.

2.3 Measurement and data collection

The instrument used to collect the data in this study consisted of a questionnaire of participant's characteristics, the perception of the COVID-19 vaccination questionnaire based on HBM, and the acceptance of the COVID-19 booster vaccination questionnaire. The first questionnaire consisted of 9 grouped items using nominal and ordinal scales, namely evidence of COVID-19 vaccination, age, gender, marital status, education, occupation, monthly income, history of contracting COVID-19, and comorbidities.

The perception of COVID-19 vaccination questionnaire based on the HBM had a total of 34 questions modified from previous studies by Vebrielna (2021) and Lai et al. (2021), which consisted of 5 subscales: perceived susceptibility (7 questions), perceived severity (7 questions), perceived benefits (7 questions), perceived barriers (7 questions), and cues to action (6 questions). Modifications were made as there was no prior existing questionnaire found. This questionnaire measures respondents' perceptions of positive and negative perceived COVID-19 vaccinations using a Likert response of 4 points from 1 to 4, indicating strongly disagree to strongly agree. The positive perception category was determined if the total score was ≥ 21, while negative perception was categorized if the total score was <21. This questionnaire had been tested for its validity dan reliability on 50 respondents in another area that had the same characteristics as the research area. The questionnaire met the construct validity test result for perceived susceptibility of 0.456-0.737, perceived severity of 0.380-0.701, perceived benefits of 0.299-0.845, perceived barriers of 0.440-0.805, and action cues of 0.547-0.770, which indicated that the items on the scale were valid (r>0.279) at a significant level of 5%. Moreover, Cronbach alpha values of the questionnaire indicated good reliability, which included perceived susceptibility (α=0.749), perceived severity (α=0.682), perceived benefits (α=0.831), perceived barriers (α=0.798), and cues to action (α=0.754).

The acceptance of the COVID-19 booster vaccination questionnaire consisted of 6 question items about willingness, support, and confidence as a result of a modification from previous studies by Vebrielna (2021) and Lai et al. (2021). The minimum and maximum scores of this questionnaire were 0 and 6, respectively. This questionnaire was categorized as "accept" (score $\geq$3) and "do not accept" (score <3) to measure the acceptance of respondents who had received the COVID-19 booster vaccination. A validity and reliability test had been conducted on the questionnaire on 50 respondents in another area that had the same characteristics as the research area. The validity test showed that all question items of the questionnaire were valid with r=0.728-0.994 at a significant level of 5%. The questionnaire also showed high internal consistency with a Cronbach alpha of 0.931.

Data collection was carried out offline by meeting the respondents directly according to the research criteria and providing a questionnaire sheet that the respondents filled out. The research was carried out after permission from the related public health center was obtained. The health center then provided a travel document as proof of scientific data collection at the working area of the health center. The research team collected the data by spreading the questionnaires door to door using COVID-19 health protocols, such as maintaining a distance between the research team and respondents, encouraging them to use the hand sanitizer that was provided by the research team, and encouraging them to use masks.

2.4 Data analysis

This study conducted analytical observations to describe the distribution of sample characteristics, the perception of the COVID-19 vaccination based on the HBM, and the acceptance of the COVID-19 booster vaccination. This study produced a statistical summary using

the frequency and proportion in categorizing each variable for descriptive analyses. The Chi-square test was used to examine the relationship between the perception dimensions of the HBM and the acceptance of the COVID-19 booster. A logistic regression analysis followed the unadjusted analysis to measure the most dominant association of the perceived HBM subscales on the acceptance of the COVID-19 booster vaccination.

2.5 Ethical considerations

The ethics committee of the Faculty of Nursing, Universitas Jember, had approved this study, with the permit certificate number of 068/UN25.1.14/KEPK/2022. On the first page of the research questionnaire, an informed consent form informed the respondents regarding the research objectives. If the respondent was willing to participate in the study, it was necessary to provide a signature as consent.

3. Results

3.1 Characteristics of the participants

Table 1 presents the characteristics of the participants in the study. A total of 387 participants responded to the survey in this study. Most respondents had a vaccination cards (77.8%) and were women (78.8%). Less than half of the respondents were aged 36-45 years (25.6%), housewives (46.5%), and graduated from high school (37%). Almost all respondents were married (85%), had an income of less than 2,400,000,- IDR (86.3%), had never contracted COVID-19 (93.3%), and had no comorbidities (87.1%).

Table 1. Characteristics of the participants (n=387)

Characteristics	*f*	*%*
Evidence of COVID-19 vaccination		
Vaccination Certificate / Vaccine Card	301	77.8
Peduli Lindungi Applications	86	22.2
Age (years)		
18-25	53	13.7
26-35	75	19.4
36-45	99	25.6
46-55	84	21.7
56-65	54	14.0
>65	22	5.6
Gender		
Male	82	21.2
Female	305	78.8
Maternal status		
Married	329	85
Never married	35	9.1
Widow/widower	23	5.9
Educational level		
No formal school	35	9
Unfinished elementary school	24	6.2
Elementary school	104	26.8
Junior high school	56	14.5
Senior high school	143	37
College	25	6.5
Employment status		
Unemployment	14	3.6
Student	12	3.1
Entrepreneur/trader	99	25.6
Farmer	10	2.6
Day laborer/driver/household assistant	21	5.4
Government employees/Army/Police/state-owned enterprises	5	1.3
Private employees	39	10.1
Retired	7	1.8
Housewife	180	46.5

Table 1. Continued

Characteristics	f	%
Monthly income		
< 2,400,000,- IDR	334	86.3
≥ 2,400,000,- IDR	53	13.7
History of contracting COVID-19		
Yes	26	6.7
No	361	93.3
Have Comorbidities		
Yes:		
Hypertension	34	8.8
Diabetes Mellitus	4	1
Asthma	8	2
TBC	2	0.5
Cancer	1	0.3
Liver	1	0.3
No	337	87.1

3.2 Perceptions of COVID-19 vaccination and the acceptance of COVID-19 booster vaccination

The results of COVID-19 vaccination perceptions based on HBM are listed as positive and negative perceptions, as shown in Table 2, while Table 3 illustrates the acceptance of COVID-19 booster vaccination. As seen in Table 2, all subscales of the COVID-19 vaccination showed more positive perceptions, namely perceived susceptibility (57.1%), perceived severity (65.9%), perceived benefits (61.0%), perceived barriers (54.8%), and cues to action (57.6%). Table 3 also showed that most respondents accepted COVID-19 booster vaccination (67.4%).

Table 2. Perceptions of COVID-19 vaccination based on HBM (*n*=387)

No	Perception of COVID-19 vaccination	f	%
1.	Perceived Susceptibility		
	Negative Perception	166	42.9
	Positive Perception	221	57.1
2.	Perceived Severity		
	Negative Perception	132	34.1
	Positive Perception	255	65.9
3.	Perceived Benefits		
	Negative Perception	151	39.0
	Positive Perception	236	61.0
4.	Perceived Barriers		
	Negative Perception	175	45.2
	Positive Perception	212	54.8
5.	Cues to Action		
	Negative Perception	264	42.4
	Positive Perception	223	57.6

Table 3. The acceptance of COVID-19 booster vaccination (*n*=387)

No	The acceptance of COVID-19 booster vaccination	f	%
1.	Do not accept	126	32.6
2.	Accept	261	67.4
	Total	387	100

3.2. Correlations between the perception of COVID-19 vaccination based on HBM and the acceptance of COVID-19 booster vaccination

The results of the analysis showed that there were significant relationships between all perception subscales of COVID-19 vaccination and the acceptance of COVID-19 booster

vaccination (*p*=0.001), as can be seen in Table 4. Table 4 indicates that most respondents with a positive perception of each subscale (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action) chose to accept COVID-19, which accounted for 77.8%, 76.9%, 80.1%, 85.4%, and 84.8% respectively.

Table 4. Correlations between the perception of COVID-19 vaccination based on HBM and the acceptance of COVID-19 booster vaccination (n=387)

Perceptions' subscales of COVID-19 vaccination		The acceptance of COVID-19 booster vaccination				95% CI	*p*
		Accept		Do not accept			
		f	*%*	*f*	*%*		
Perceived susceptibility**	Negative	89	53.6	77	46.4	3.03 (1.95-4.71)	0.001a
	Positive	172	77.8	49	22.2		
Perceived severity**	Negative	65	49.2	67	50.8	3.42 (2.18-5.36)	0.001a
	Positive	196	76.9	59	23.1		
Perceived Benefits**	Negative	72	47.7	79	52.3	4.41 (2.80-6.93)	0.001a
	Positive	189	80.1	47	19.9		
Perceived Barriers**	Negative	80	45.7	95	54.3	6.93 (4.27-11.24)	0.001a
	Positive	181	85.4	31	14.6		
Cues to action**	Negative	72	43.9	92	56.1	7.103 (4.40-11.45)	0.001a
	Positive	189	84.8	34	15.2		

Note. aChi-square test; **Reference for multivariate analysis

3.3. The most dominant subscales of perceptions relating to the acceptance of COVID-19 booster vaccination

Table 5 illustrates the results of two steps of a multivariate analysis. From the step 1 analysis, it can be seen that perceived susceptibility and perceived severity should be removed as their p-values were more than 0.05. Step 2 analysis showed that perceived benefits, perceived barriers, and cues to action were significantly related to the acceptance of COVID-19 booster vaccination. However, cues to action were the most dominant subscales of COVID-19 vaccination perception relating to the acceptance of COVID-19 booster vaccination (OR=5.265; 95%CI=3.073-9.022; *p*<0.001). It means that respondents who had action cues were 5.265 times more likely to accept the COVID-19 booster vaccination.

Table 5. The most dominant subscales of perceptions relating to the acceptance of COVID-19 booster vaccination

	Variable	B	SE	OR (CI 95%)	*p*
Step 1	Perceived susceptibility	0.208	0.299	1.231 (0.686-2.211)	0.486*
	Perceived severity	0.540	2.289	1.715 (0.974-3.201)	0.062*
	Perceived benefits	1.093	2.275	2.984 (1.742-5.113)	0.001*
	Perceived barriers	1.637	2.276	5.142 (2.991-8.838)	0.001*
	Cues to action	1.590	2.292	4.904 (2.765-8.696)	0.001*
Step 2	Perceived benefits	1.100	0.274	3.003 (1.754-5.145)	0.001*
	Perceived barriers	1.636	0.276	5.135 (2.989-8.822)	0.001*
	Cues to action	1.661	0.275	5.265 (3.073-9.022)	0.001*

Note. *Backward LR method

4. Discussion

This study aimed to determine the relationship between the perception of COVID-19 vaccination based on the health belief model (HBM) and the acceptance of the COVID-19 booster vaccination in the community. The results found that most respondents accepted COVID-19 booster vaccination, and they had positive perceptions of COVID-19 vaccination in all subscales. There were significant relationships between all perception subscales of COVID-19 vaccination and the acceptance of COVID-19 booster vaccination, even though the action cues subscale was found to be the most dominant factor relating to the acceptance of COVID-19 booster vaccination.

The finding showed that most respondents accepted COVID-19 booster vaccination. This finding was similar to a study by Lai et al. (2021), reporting that a relatively high COVID-19 booster vaccination acceptance was obtained in China. This acceptance level was also in accordance with the presence of a new variant of COVID-19 and a moderate resurgence of cases ongoing, emphasizing the importance of booster doses of the COVID-19 vaccine and the durability of the effects of the COVID-19 Booster vaccine on the Omicron variant. Compared to the acceptance of COVID-19 primary vaccination, the acceptance of COVID-19 booster vaccination was lower in Wang et al. (2020)'s study, although it was higher in Vebrielna (2021)'s study. The higher level of acceptance of the COVID-19 booster vaccination was influenced by high public expectations with the provision of the COVID-19 booster vaccination during the transmission of the new COVID-19 virus variant (Lai et al., 2021). Acceptance is a person's willingness to be aware of a phenomenon in the environment based on conditions of passive acceptance of a problem or situation (Bloom et al., 1956, as cited in Arumsari et al., 2021). The factors that influence the acceptance of the COVID-19 booster vaccination can be affected by age, gender, marital status, education level, and sources of information, as well as other demographic factors (Al-Mohaithef & Padhi, 2020; Burke et al., 2021; Lasmita, 2021; Wang et al., 2020). Adults show high vaccination acceptance. This is influenced by knowledge and maturity in thinking (Wang et al., 2020). This study's result also confirmed the claim, reporting that most respondents were adults. In another study, women reported more associations with unexpected events with the COVID-19 vaccine, but women were more proactive in accepting the COVID-19 vaccine (Mondal et al., 2021). This is in line with the result of this study which showed that the majority of the respondents were female. The level of education is one of the benchmarks for the community toward accepting COVID-19 vaccination, where 16% of the reasons for respondents' refusal are lower levels of education (Paul et al., 2021). The efficacy of communication and information technology is one of the vital needs for the community, which has a broad impact on the need for access to information in the community (Zonneveld et al., 2020).

Based on the results of the study, the acceptance of COVID-19 booster vaccination was related to all perception subscales of COVID-19 vaccination based on the Health Belief Model (HBM), namely perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action. This study reported that there was a significant relationship between perceived susceptibility and the acceptance of COVID-19 booster vaccination. People with a positive perception of susceptibility would likely accept the booster vaccines. This result was supported by (Wong, Wong et al., 2020), stating that when there are concerns about the possibility of contracting COVID-19, people will think that they are at high risk of contracting COVID-19. This condition is characterized by feelings of being at risk or being vulnerable. According to Rosenstock (1874) in Glanz et al. (2015), perceived susceptibility occurs when persons believe that they are vulnerable or at risk of contracting a disease. The greater the risk of contracting the disease, the greater the preventive behavior to reduce the risk. When the risk of disease arises, more and more preventive behaviors are better carried out by people unless for those who are contracting COVID-19 and who have comorbidities that underlie risk conditions (Lai et al., 2021). A previous study claims that perceived susceptibility refers to the chance that there is a high risk of contracting the disease (Neumann et al., 2020). Neumann et al. (2020) stated that a person's exposure starts from the extent to which they believe that they have a chance of contracting COVID-19. This statement was supported by Wong, Wong et al. (2020). The researchers point out that the vulnerability experienced by people depends on the extent to which they believe that they are at risk of contracting COVID-19 if they receive the vaccine. However, this result was different from a previous study. The study reported that 35 respondents (72.9%) who were found to be vulnerable to contracting COVID-19 did not accept the COVID-19 vaccine. This is because the respondents who felt vulnerable to contracting COVID-19 did not want to be vaccinated due to a lack of information related to COVID-19 disease (Liaumin et al., 2021).

This study found that there was also a significant relationship between perceived severity and the acceptance of COVID-19 booster vaccination. People with positive perceived severity tend to accept the COVID-19 booster vaccination. In accordance with the HBM, which states that the more serious the impact caused by a disease, the greater the urge to take precautions. The perception of the severity of contracting COVID-19 was related to the intention to accept the COVID-19 booster vaccine (Lai et al., 2021). A previous study found that a positive perceived severity was one of the factors that influenced the respondent's request to accept the COVID-19

vaccine (Erawan et al., 2021). People have a solid vulnerability to the risks derived from the severity of contracting COVID-19 when they are about to accept a COVID-19 vaccination (Zampetakis, 2021). Perceived severity is an individual's subjective perception of how serious the consequences of the illness he suffers are. The more serious the threat of disease, the stronger a person's urge to take preventive action or avoid the danger (Glanz et al., 2015)

In addition to the result of this study, perceived benefits had a significant relationship with the acceptance of the COVID-19 booster vaccination in individuals. This result was in line with studies by Lin et al. (2020) and Shmueli (2021), which reported that there was also a relationship between high perceptions of the benefits of COVID-19 vaccination and increased acceptance of COVID-19 vaccinations. People can understand the benefits of booster vaccination resulting in a positive perception that affects the intention to accept vaccination (Lai et al., 2021). The perception of benefits or a person's belief that the preventive actions he takes provide benefits for his health condition can reduce the risk of developing a disease (Glanz et al., 2015).

The perceived barrier subscale in this study was significantly related to the acceptance of COVID-19 booster vaccinations. This result is in line with a previous study which stated that respondents with perceived barriers doubted the effectiveness and safety of the COVID-19 vaccine (Wong, Alias et al., 2020). Barriers can be related to vaccination inconveniences such as access, cost, and time with negative results in accepting COVID-19 vaccinations (Burke et al., 2021). For someone who has a history of hypertension and diabetes, this condition will bring up more severe clinical manifestations, resulting in some obstacles to vaccination (Liu et al., 2020). The HBM explains that someone with a high perception of barriers will have a lower tendency to take preventive action. In other words, if people have increased perceived barriers, they tend to commonly accept COVID-19 vaccination (Glanz et al., 2015).

Apart from the other subscales, cues to action subscales were not only significantly related to but also were the most dominant factor relating to the acceptance of COVID-19 booster vaccination. People who had action cues were 5.265 times more likely to accept the COVID-19 booster vaccination. This result is supported by a previous study reporting that the cue to act was a significant predictor of the acceptance of the COVID-19 vaccine (Shmueli, 2021). Information aligns with good knowledge to affect the action (Al-Mohaithef et al., 2020). It is linked to the easiness of finding the correct information about the COVID-19 booster vaccination through the mass media and health workers. Providing the correct information to the public is focused on providing confidence about vaccine safety to achieve high vaccine acceptance (Karlsson et al., 2021). The support provided is a form of encouragement to help individuals solve a problem or motivation to carry out specific actions (Yazia et al., 2020). The action cues subscale in the HBM is influenced by perceived vulnerability and benefits. Other factors can only potentiate in the form of environmental events that trigger actions (Glanz et al., 2015).

5. Implications and limitations

This research has implications for nursing and health policies to maintain the health behavior of Indonesian people during the COVID-19 pandemic. Primary prevention or prevention through education is one of the roles of nursing in improving public health status, which urgently needs to be intervened during the COVID-19 pandemic. Understanding the relationship between COVID-19 vaccination perceptions based on the Health Belief Model (HBM) in the community and the acceptance of COVID-19 booster vaccination means that applying a multidisciplinary and multifaceted approach is very important. For example, the collaboration between clinical nursing and community nursing forms an interdisciplinary health team that provides health services that can provide a platform for education and vaccination service providers, using online and offline counseling platforms, and health screening, especially in vulnerable groups, before carrying out a COVID-19 booster vaccination.

There are some limitations of this study. First, the total primary dose of COVID-19 vaccination recipients was mixed with vaccine recipients from various regions other than the health center where the study took place. Second, the questionnaire used in this study had not been psychometrically tested as a qualified instrument, so it was likely to affect the results of the study. In addition, the HBM perception questionnaire could not measure the overall relationship to each component, so this study could only find the relationship between each subscale of the perception and the acceptance of the booster vaccination.

6. Conclusion

The findings concluded that public perceptions based on the HBM related to the acceptance of the COVID-19 booster vaccination in the community. The five subscales of the COVID-19 vaccination perceptions (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action) showed positive results that related to the acceptance of the COVID-19 booster vaccination. The most dominant factor related to the acceptance of COVID-19 booster vaccination was cues to action. This study recommends future research to look at the latest phenomena that have occurred because the conditions of the COVID-19 outbreak along with the COVID-19 vaccination program are currently still running and carry out a psychometric study for the instrument used in this study. For clinical practice, this research can be developed by surveying patients who have comorbidities.

Author contribution

REPAKD: Conceptualization, design analysis of data collection, interpretation of results, manuscript preparation.

REPA, JHS, and AN: Confirming the eligibility for this study and involved in preparing the article.

JHS and AN: supervising the entire research and approving the final version of the article.

Conflict of interest

The authors declare that there were no actual or potential conflicts of interest in the research process.

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