



Vaccinating the future: Parental acceptance towards COVID-19 vaccination in children aged 6-11 years in Indonesia through the Health Belief Model

[Vacunando el futuro: Aceptación de los padres hacia la vacunación contra el COVID-19 en niños de 6 a 11 años en Indonesia a través del Modelo de Creencias en Salud]

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Abstract

Context: The current study focuses on the acceptability of COVID-19 vaccines among parents of children aged 6-11 years, based on a review of the Health Belief Model (HBM) behavioral theory, Indonesia.

Aims: To investigate the acceptability of COVID-19 vaccines among parents of children aged 6-11 years in Indonesia based on a review of the HBM behavioral theory.

Methods: A national, cross-sectional was conducted in June-August 2022. The self-administered online questionnaire was distributed to a random sample of 400 parents.

Results: A total of 400 participants completed the questionnaire, of whom 87.3% received vaccination for their 6-11 years old children. Participants who had adequate information about the COVID-19 vaccine (OR = 27.543; CI 95% = 3.514-215.901) were among the most amenable to vaccinating their children. The results indicated that the HBM construct explained 83.9% (R square = 0.839) of the acceptance of COVID-19 vaccination. However, there are still some parents who reject vaccines due to lack of information, on parental knowledge of vaccine adverse events, and sources of information used by parents, among others.

Conclusions: Parents of children aged 6-11 years old in Indonesia are accepting to receive COVID-19 vaccinations. However, there are still some parents who refuse vaccines. The urge to act construct contributed significantly to the vaccine acceptance variable, and those who had received enough information about the COVID-19 vaccine were more amenable. Therefore, the government of the Republic of Indonesia's efforts must be directed toward increasing parents' vaccine awareness and tackling the constructs of the Health Belief Model through a well-designed vaccination campaign.

Keywords: COVID-19 vaccine; health belief model; Indonesia; parents; pediatrics.

Resumen

Contexto: El estudio actual se centra en la aceptabilidad de las vacunas contra la COVID-19 entre los padres de niños de 6 a 11 años, según una revisión de la teoría conductual del Modelo de Creencias en Salud (*Health Belief Model*, HBM), Indonesia.

Objetivos: Investigar la aceptabilidad de las vacunas contra la COVID-19 entre los padres de niños de 6 a 11 años en Indonesia en función de una revisión de la teoría conductual del HBM.

Métodos: Se realizó un estudio transversal nacional entre junio-agosto de 2022. El cuestionario en línea autoadministrado se distribuyó a una muestra aleatoria de 400 padres.

Resultados: Un total de 400 participantes completaron el cuestionario, de los cuales el 87,3% recibió vacunación para sus hijos de 6 a 11 años. Los participantes que tenían información adecuada sobre la vacuna COVID-19 (OR = 27,543; IC 95% = 3,514-215,901) estaban entre los más dispuestos a vacunar a sus hijos. Los resultados indicaron que el constructo HBM explicó el 83,9% (R cuadrado = 0,839) de la aceptación de la vacunación contra la COVID-19. Sin embargo, todavía hay algunos padres que rechazan las vacunas por falta de información, sobre el conocimiento de los padres sobre los eventos adversos de las vacunas y las fuentes de información utilizadas por los padres, entre otros.

Conclusiones: Los padres de niños de 6 a 11 años en Indonesia están aceptando recibir vacunas contra el COVID-19. Sin embargo, todavía hay algunos padres que rechazan las vacunas. El constructo impulso de actuar contribuyó significativamente a la variable de aceptación de la vacuna, y aquellos que habían recibido suficiente información sobre la vacuna COVID-19 fueron más receptivos. Por lo tanto, los esfuerzos del gobierno de la República de Indonesia deben dirigirse a aumentar la conciencia de los padres sobre las vacunas y abordar las construcciones del Modelo de Creencias de Salud a través de una campaña de vacunación bien diseñada.

Palabras Clave: Indonesia; modelo de creencias sobre la salud; padres; pediatría; vacuna COVID-19.

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INTRODUCTION

The novel coronavirus (COVID-19) has become a pandemic and is a global health problem. COVID-19 was classified by WHO as a Public Health Emergency of Concern for the World (Kedaruratan Kesehatan Masyarakat yang Meresahkan Dunia/KKMMD) on January 30, 2020. Then, it was officially designated as COVID-19 on February 12, 2020 (Kementerian Kesehatan RI, 2020).

The first case of COVID-19 was reported in Indonesia on March 2, 2020, and within one month, it was widespread in nearly every province. The number of verified COVID-19 cases has significantly increased in Indonesia during the past six months, from 4,446,694 to 6,425,849 cases recorded from February to September 2022, with quite a high case proportion in the child group reaching 3.1% for ages 0-5 years and 10.7% for ages 6-18 years (Kementerian Kesehatan RI, 2022a; 2022b). Although the impact of the COVID-19 pandemic on children is milder than on adults, many children, when infected with COVID-19, experience severe symptoms, in some cases, accompanied by long-term complications (Woodruff et al., 2022).

Efforts to control COVID-19 are required, one of which is implementing health protocols. However, in the midst of increasing community risk, more effective interventions such as COVID-19 vaccination are needed. One of the goals is to achieve herd immunity (Kementerian Kesehatan RI, 2021). Children aged 6-11 years old represent an important segment of the population, and their vaccination is crucial for herd immunity and the protection of vulnerable individuals. In December 2021, the Government of Indonesia issued a regulation regarding the COVID-19 vaccination program for children aged 6-11 years, as contained in the Instruction of the Ministry of Home Affairs (Inmendagri) Number 66 of 2021 concerning Prevention and Control of Corona Virus Disease 2019 at Christmas 2021 and New Year 2022. Based on these instructions, the vaccination program for children aged 6-11 years would officially start on December 14, 2021 (Kementerian Dalam Negeri RI, 2021). Previously, in November 2021, along with the issuance of a permit for use in an emergency situation, the Coronavac® vaccine produced by Sinovac for children aged 6-11 years by the Food and Drug Supervisory Agency (BPOM) of the Republic of Indonesia; The Indonesian Pediatrician Association (IDAI) recommends administering the COVID-19 Vaccine (Coronavac®) in children aged 6 years and older (Pengurus Pusat Ikatan Dokter Anak Indonesia, 2021).

The total dosage one vaccination has met 87.16% of the national objective of 234,666,020 as of Septem-

ber 2022. Even 95.97% of the recommended vaccine dosage has been administered to children between 12 and 17 years. However, from the national target for the group of children aged 6-11 years of 26,400,300 vaccination targets, the total vaccination dose 1 is still lower, only reaching 80.13% (Kementerian Kesehatan RI, 2022c).

There have been reports of parental reluctance to vaccinate their children against COVID-19 in several nations, including 2.8% in Brazil, 35.2% in Qatar, and 42.8% in Bangladesh (Alfieri et al., 2021; Ali et al., 2022; Bagateli et al., 2021; Horiuchi et al., 2021; Musa et al., 2021). Several research studies in Middle Eastern nations, including Saudi Arabia, where rates ranged from 27% to 76%, also revealed the same phenomenon (Aldakhil et al., 2021; Altulaihi et al., 2021; Temsah et al., 2021). However, none of the abovementioned studies can be generalized to our research, considering that the inclusion criteria are specific to children aged 6-11 years.

Doubts about receiving the COVID-19 vaccine may result in lower vaccination rates. Since parents are their children's primary health educators, they must develop a sense of trust and acceptance for the COVID-19 vaccination (Ruggiero et al., 2021). Parental attitudes towards the acceptance of the COVID-19 vaccine may play a key role in the success of herd immunity (Xu et al., 2021).

The Health Belief Model (HBM) is a theoretical framework that can be used to explain the factors that influence health behaviors such as vaccination. The HBM model shows that a person will change his unhealthy behavior when he feels the risk of disease and the consequences of severity and when he feels the benefits outweigh the obstacles. The HBM model also shows how a person's perception is connected to their capacity for engaging in intriguing conduct and the potential effect of outside environmental circumstances on that person's desire to alter harmful or unhealthy behavior (Bish and Michie, 2010; Carpenter, 2010; Rosenstock et al., 1988). One of them is widely used to guide designing health behavior improvement interventions in various populations, including adults and children (Widyawati, 2019).

Exploration of constructs in behavioral theory that significantly influence COVID-19 vaccination may provide intervention plans to increase vaccine acceptance (Wong et al., 2020). In Indonesia, studies on parents' decision-making to vaccinate their children against COVID-19 while they are between the ages of 6 and 11 years old are still under research. Therefore, based on a review of the HBM behavior theory, this study aims to investigate the behavior acceptability of

receiving COVID-19 vaccines among parents of children aged 6-11 years old in Indonesia.

MATERIAL AND METHODS

Research design and subjects

The research includes a national, cross-sectional, questionnaire-based study conducted in Indonesia to investigate the behavior of receiving the COVID-19 vaccine for children aged 6-11 years in Indonesia based on a review of the HBM behavioral theory. The questionnaires were distributed to an online random sample using Google form via WhatsApp and social media, i.e., Facebook and Instagram. A margin of 5% error and confidence level of 95% was used to calculate the sample size by Slovin's formula to target parents of 10 million children aged 6-11 years (Kementerian Kesehatan RI, 2022a) and obtain a minimum sample size of 400 participants who met the inclusion criteria. The inclusion criteria were parents aged ≥ 18 years with children aged 6-11 years who have not yet received the COVID-19 vaccine. The exclusion criteria were children with COVID-19 survivors under three months old and children with COVID-19 vaccine contraindications. The Research Ethics Committee of Sari Mulia University approved the research (approval No. 209/KEP-UNISM/VI/2022).

Research questionnaire

The questionnaire used in this study was adapted from previous research and modified by Almalki et al. (2022) and Zhang et al. (2020). It was tested for validity and reliability by 50 respondents. The questionnaire included two parts, namely the informed consent sheet and the main sheet of the questionnaire consisted of a) socio-demographic characteristics of parents, including age, relationship with children, marital status, number of children owned, child's age, religion, occupation, last education, occupation, monthly income, and main source of information about COVID-19; b) vaccination acceptance COVID-19 in children aged 6-11 years, using a Likert scale with five answer choices ranged from strongly disagree to strongly agree; c) respondents' perceptions of receiving the COVID-19 vaccine for children aged 6-11 years based on the HBM behavior review consisting of five constructs, included three items of perception of vulnerability, three items of perception of severity, two items of perception of benefits, four items of perception of barriers, and two items of the urge to act; used a Likert scale with five answer choices ranged from strongly disagree to strongly agree.

Data analysis

Univariate analysis (descriptive statistics) expressed by frequency (%) was used to describe the variables in the study. Acceptance of COVID-19 vaccination in children aged 6-11 years was categorized as accepted if the score exceeds the average score and rejected if the score was less than or equal to the average score. The respondents' perceptions of receiving the COVID-19 vaccine for children aged 6-11 years based on the HBM behavior review were categorized as high if the score exceeds the average score and low if the score was less than or equal to the average score.

Bivariate analysis was used to analyze the relationship between acceptance of COVID-19 vaccination in children aged 6-11 years and respondents' perceptions of receiving COVID-19 vaccine for children aged 6-11 years based on five constructs of HBM behavior review. It was carried out using the Chi-square statistical test (an alternative to the Kolmogorov-Smirnov test). The significant constructs were then analyzed multivariate using logistic regression to examine the predictors that had the most influence on the relationship between receiving COVID-19 vaccination in children and knowing the magnitude of the effect of the HBM model described the acceptance of COVID-19 vaccination in children. Statistical analyses were performed with a significance level of <0.05 using SPSS version 23.

RESULTS

Socio-demographic characteristics of respondents

From June-August 2022, 400 parents from various provinces in Indonesia participated in this study, as presented in Table 1. Overall, 42.3% of the respondents were aged between 31-40 years; 53.5% were mothers of children; 54% had tertiary education; and 41.8% earned IDR 1,000,001 to IDR 3,000,000 per month, as seen in Table 2.

HBM construction and acceptance of COVID-19 vaccination in children

A total of 87.3% of the participants accepted to vaccinate their children aged 6-11 years, as presented in Table 3.

The relationship between the HBM construct and acceptance of COVID-19 vaccination in children

All constructs of HBM were significantly related to the acceptance of COVID-19 vaccination in children aged 6-11 years. It is presented in Table 4. The urge to act construct influenced the acceptance of COVID-19 vaccination in children aged 6-11 years (OR = 27.543;

CI 95% = 3.514–215.901). The ability of the HBM construct explained the acceptance of COVID-19 vaccination by 83.9 % (R square = 0.839) is presented in Table 5.

DISCUSSION

This research aims to analyze the behavior of receiving COVID-19 vaccines in children based on a review of the Health Belief Model (HBM) behavioral theory conducted in June-September 2022. Even though the Government of the Republic of Indonesia has ordered, and IDAI has advised administering COVID-19 immunization in this age group, 12.8% of parents in Indonesia refuse to give their children aged 6 to 11 the COVID-19 vaccine. Doubts about COVID-19 vaccination are shown based on study reports in various countries such as Saudi Arabia, parents' doubts about vaccinating their children for COVID-19 at the age of 12-18 years reaching 27.45% and 5-11 years reaching 61.9% (Aldakkhil et al., 2021; Altulaihi

et al., 2021; Temsah et al., 2021). Other studies have shown lower rates of COVID-19 vaccination doubt, which showed 35% in Qatar and 33% in Chicago (Alfieri et al., 2021; Bagateli et al., 2021; Musa et al., 2021). The reports of these studies included parents with children of age >11 years, which is quite different from this study (Aldakhil et al., 2021; Altulaihi et al., 2021; Temsah et al., 2021). A study in Israel among parents of children aged 5-11 years, similar to the population in this study, reported that 43% were hesitant to vaccinate their child for COVID-19 (Shmueli, 2023).

A small-scale study conducted on July 2021 conducted in Arkansas showed that 30% of parents stated they would not vaccinate their children and would only vaccinate their children if necessary. Interestingly, the level of parental doubt of 12-18 years old children was similar to that of <12 years old at 28% and 27%, respectively (McElfish et al., 2022). Meanwhile,

Table 1. Distribution of respondents.

Province	Amount	Percentage (%) (n=400)	Province	Amount	Percentage (%) (n=400)
Java Island			Sulawesi Island		
DIY Yogyakarta	10	2.5	Gorontalo	8	2
DKI Jakarta	24	6	West Sulawesi	4	1
West Java	21	5.25	South Sulawesi	20	5
Central Java	18	4.5	Central Sulawesi	2	0.5
East Java	14	3.5	Southeast Sulawesi	6	1.5
Banten	5	1.25	North Sulawesi	7	1.75
Kalimantan Island			Nusa Tenggara Islands, Maluku, and Papua		
West Kalimantan	2	0.5	Maluku	12	3
South Kalimantan	52	13	North Maluku	7	1.75
Central Kalimantan	21	5.25	Bangka Belitung	11	2.75
East Kalimantan	7	1.75	West Nusa Tenggara	9	2.25
North Kalimantan	4	1	East Nusa Tenggara	19	4.75
Sumatera Island			Bali	9	2.25
Aceh	31	7.75	Papua	13	3.25
West Sumatra	6	1.5	West Papua	12	3
South Sumatra	4	1			
North Sumatra	5	1.25			
Riau	8	2			
Riau islands	4	1			
Jambi	11	2.75			
Bengkulu	4	1			
Lampung	10	2.5			

Table 2. Socio-demographic characteristics.

Category	Number	Percentage (%) (n = 400)	Category	Number	Percentage (%) (n = 400)
Parent's age			Last degree of education		
19-30 years old	129	32.3	Elementary school	22	5.5
31-40 years old	169	42.3	Junior high school	20	5.0
41-50 years old	88	22.0	High school	142	35.5
>50 years	14	3.5	University/college	216	54.0
Relationship with the child			Occupation		
Father	186	46.5	Housewife	58	14.5
Mother	214	53.5	Self-employed	94	23.5
Marital status			Private employees	126	31.5
Divorced	22	5.5	Retired	3	0.8
Widow/widower (divorced dead)	13	3.3	Civil servant	84	21.0
Marry	365	91.3	Other	35	8.8
Number of child			Field of work		
One	144	36.0	Non-health	332	83.0
Two	139	34.8	Health	68	17.0
>2	117	29.3	Monthly income		
Child's age			<IDR 1,000,000*	63	15.8
6 years	116	29.0	IDR 1,000,001 up to IDR 3,000,000**	167	41.8
7 years	69	17.3	IDR 3,000,001 up to IDR 5,000,000***	115	28.7
8 years	53	13.3	>IDR 5,000,000****	55	13.8
9 years	55	13.8	Main source of information on COVID-19		
10 years	47	11.8	Social media	264	66.0
11 years old	60	15.0	TV or radio	59	14.8
			Health service facilities	57	14.2
			Friends or family	13	3.3
			Other	7	1.8

* <IDR 1,000,000 ≤ 64.54 USD; ** IDR 1,000,001 up to IDR 3,000,000 = 64.54 USD up to 193.62 USD; *** IDR 3,000,001 up to IDR 5,000,000 = 193.62 USD up to 322.71 USD; **** >IDR 5,000,000 ≥ 322.71 USD.

studies from other countries showed lower levels of parental doubt such as studies from China, Vietnam, and Italy reported only about 26%, 21%, and 18% of parents were hesitant to vaccinate their children aged 5-17 years, 3-17 years, and 12-18 years (Bianco et al., 2021; Huynh et al., 2022; Li et al., 2022). Although a trend of lower skepticism is illustrated in this research, inconsistent country-wide reports show variations between countries in the true level of doubt.

All HBM constructs are significantly associated with the acceptance of COVID-19 vaccination of children aged 6-11 years; the urge to act is the most important factor. The results showed that most parents (82.75 %) received the COVID-19 vaccination. Interestingly, the majority (67.5%) of parents who feel their children are vulnerable to being infected with

COVID-19 refuse the COVID-19 vaccination. In addition, most parents (80%) received the COVID-19 vaccination. In fact, the data also shows that the majority (68.25 %) of parents received the COVID-19 vaccination even though they were concerned about its safety, efficacy, and side effects. These findings highlight the lack of information about vaccines and concerns about the safety or efficacy of COVID-19 vaccination as the underlying reasons parents refuse COVID-19 vaccination for their children (Altulaihi et al., 2021; Marquez et al., 2021). The results also showed that most (83.75%) parents would register their children to receive the COVID-19 vaccination if they received adequate information and many people participated in the COVID-19 vaccination. Information provided by the government, such as the official government-

Table 3. Acceptance of COVID-19 vaccination in children.

Variable	Category	Number	Percentage (%) (n = 400)
Vaccination acceptance	Reject	51	12.8
	Accept	349	87.3
Vulnerability perception	Low	330	82.5
	High	70	17.5
Severity perception	Low	69	17.3
	High	331	82.8
Perception of benefits	Low	80	20.0
	High	320	80.0
Obstacle perception	Low	127	31.8
	High	273	68.3
The urge to act	Low	65	16.3
	High	335	83.8

Table 4. Bivariate analysis of the relationship between HBM constructs and acceptance of COVID-19 vaccination in children 6-11 years old.

Variable	Category	Vaccination acceptance (%) (n = 400)		Pearson Chi-square p-value
		Rejected	Accepted	
Vulnerability perception	Low	12.75	0	0.000
	High	69.75	17.50	
Severity perception	Low	12.75	0	0.000
	High	4.50	82.75	
Perception of benefits	Low	12.75	0	0.000
	High	7.25	80.00	
Obstacle perception	Low	12.75	0	0.000
	High	19.00	68.25	
The urge to act	Low	12.75	0	0.000
	High	3.50	83.75	

Table 5. Multivariate analysis (Logistic Regression) relationship between HBM constructs and acceptance of COVID-19 vaccination in children 6-11 years old.

Independent variable	Sig.	Exp (B)	95% CI	
			Lower	Upper
Severity perception	0.122	5.637	0.630	50.416
Perception of benefits	0.556	0.475	0.040	5.653
The urge to act	0.002	27.543	3.514	215.901

run site on COVID-19, was the most important source of information used by parents, but 66.0% of parents were mostly informed via social media, including hoax information, so it is not possible that they were well informed about COVID-19 vaccination. However, almost sixteen percent of parents rejected the

COVID-19 vaccination due to a lack of information about vaccine benefits and adverse events.

This study's results can guide the design of an effective COVID-19 vaccination campaign by focusing on the most significant predictor, i.e., urge to act. The findings in the study indicate that the main source of parental information regarding COVID-19 vaccina-

tion was social media. This showed that the Ministry of Health of the Republic of Indonesia must maximize the use of the media platform for the COVID-19 vaccination campaign for children.

The ability of the HBM construct to explain the acceptance of COVID-19 vaccination was 83.9%. The remaining 16.1% shows that the acceptance of COVID-19 vaccination for children aged 6-11 years in Indonesia is explained by other variables outside of this study. Another variable, for example, is the existence of school policies in several regions in Indonesia requires students to vaccinate against COVID-19 as a condition for face-to-face learning in schools. It was not constitutional in Indonesia, The Indonesian Child Protection Commission (Komisi Perlindungan Anak Indonesia/KPAI) has criticized the attitude of schools, which prohibit students from entering classes that have not received the COVID-19 vaccination (Tempo, 2022).

CONCLUSION

Vaccine acceptance is prevalent among parents of 6-11 years old children in Indonesia. However, there are still some parents who reject vaccines, which might affect governmental efforts' success in containing the pandemic. The urge to act construct contributed significantly to the vaccine acceptance variable and those who had gotten enough information from the COVID-19 vaccine were more amenable. Therefore, the government of the Republic of Indonesia's efforts must be directed toward increasing parents' vaccine awareness and tackling the constructs of the Health Belief Model through a well-designed vaccination campaign.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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AUTHOR CONTRIBUTION:

Contribution	Mardiati N	Hasymi LF	Kusuma IY	Purba RPK	Rizal R	Jayanto I
Concepts or ideas	x					
Design	x					
Definition of intellectual content	x					
Literature search	x	x				
Experimental studies	x	x		x	x	x
Data acquisition	x	x				
Data analysis		x				
Statistical analysis		x				
Manuscript preparation	x					
Manuscript editing	x		x			
Manuscript review	x	x	x	x	x	x

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