KEMAS 19 (2) (2023) 245-253

Jurnal Kesehatan Masyarakat

http://journal.unnes.ac.id/nju/index.php/kemas

Willingness to Receive COVID-19 Vaccination for Children Under Five Years in Jakarta

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Article Info

Article History:
Submitted February 2023
Accepted June 2023
Published October 2023

Keywords:
Health Belief Model, COVID-19, vaccine, children under five years

DOI
https://doi.org/10.15294/kemas.v19i2.42770

Abstract

Indonesia reached the highest number of deaths caused by COVID-19 in children under five years, and the cases continued to rise to 10.6% in February 2022. Vaccination is an effective way to deal with the COVID-19 pandemic. The risk of its infection in children under five years has been underestimated, and parent's hesitancy still becomes an obstacle. This study aimed to identify factors associated with willingness to receive COVID-19 vaccination for children under five years among parents based on the Health Belief Model. A cross-sectional study was held in Jakarta from August 1st – 20, 2022. A total of 173 parents with children under five years (0-59 months) were taken using the consecutive sampling method, and data were taken with self-reported online and printed questionnaires. Chi-square bivariate and binary logistic regression multivariate analysis were used to determine the association. Adjusted odds ratios (OR) and 95% confidence intervals (CIs) were presented, and statistical significance was set at $p < 0.05$. Parent's willingness level to get COVID-19 vaccination for their children was 68.8%. The multivariate analysis revealed that perceived benefit (p=0.045; OR=2.784; 95%CI=1.023-7.579) and cues to action (p<0.001; OR= 23.144; 95%CI= 8.577-62.453) were predictors of parent's willingness to receive COVID-19 vaccine for their children.

Introduction

The outbreak of coronavirus disease 2019 (COVID-19) caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) has impacted the world, including Indonesia (World Health Organization, 2022). The first case of COVID-19 in Indonesia was found in Depok, West Java. The President of Indonesia announced to the public the first two people who were confirmed positive for COVID-19 on March, 2nd 2020 (Health Ministry of Indonesia, 2021). Jakarta, the capital of Indonesia, had high level of population density and became the center of national activities, which were some of the reasons behind the massive transmission of COVID-19 (Rusyani et al., 2021; Zakianis et al., 2021). Of thirty four provinces in Indonesia, Province of Jakarta has recorded the most positive and death cases of COVID-19 in all ages groups so far, including children ages 0-4 years (Task Force For COVID-19 Handling, 2022).

World Health Organization (WHO) reported in February 2022, Indonesia reached the highest number of deaths caused by COVID-19 in children under five years since 2020. On February 21st, 2022, the deaths were 2.7% and continued rising to 10.6% on February 28th, 2022 (World Health Organization, 2022). Since January 21, 2020, there have been over 40,000 positive cases of children under five years in Jakarta (Jakarta Communication Informatics and Statistics (DISKOMINFOTIK), 2022). Although the group of children under five years had the

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pISSN 1858-1196
eISSN 2355-3596

lowest cases and death rates by COVID-19 compared to other age groups, they were more susceptible to infection (Kusumaningrum et al., 2022). Previous research found that COVID-19 infection increased the severity of illness in young children, particularly infants (Razavi et al., 2020).

The Indonesian government has used many strategies to cut the spread of COVID-19, one of which was vaccination. COVID-19 vaccination protects someone by producing an immune response without getting infected by SARS-CoV-2. (Health Ministry of Indonesia, 2021). COVID-19 vaccination is available for people over the age of 60, 18 to 60 years, 12 to 17 years, and 6 to 11 years (World Health Organization, 2022). Currently, The National Agency for Drug and Food Control (BPOM), according to the Indonesian government, has granted Pfizer Emergency Use Authorization (EUA) for COVID-19 vaccinations administered to children under six years (Health Ministry of Indonesia, 2021). However, the technical aspects of distribution are still under discussion with The Indonesian Technical Advisory Group on Immunization (ITAGI) and The National Agency for Drug and Food Control (BPOM) (Health Ministry of Indonesia, 2021).

Through vaccination, children are potentially protected from morbidity and mortality of serious infections (Rodrigues & Plotkin, 2020). Vaccines contain a weakened germ or virus, which can stimulate the immune system to produce antibodies against the virus (Sockrider & Krishnan, 2021). Thus, it can help to decrease the transmission and positive cases, including COVID-19 and its latest variants. According to the Wuhan study, children and adolescents younger than 20 years were more likely to spread COVID-19 than adults aged 60 years, who had the highest risk of infection. (Li et al., 2021). Nevertheless, those who had been vaccinated might become less infectious due to the reduction in viral load and duration of viral retention (Harris & Hall, 2021).

However, there were several obstacles in society to the COVID-19 vaccine acceptance, such as skepticism from parents about its safety and effectiveness, its side effects, and doubtfulness of its halal status (Paul et al., 2021). Therefore, to ensure the COVID-19 vaccination program for children under five years is running smoothly, it requires the role of the parent who holds the right to make a final decision to vaccinate their children (Parinyarux et al., 2022). Health Belief Model (HBM) theory was used to asses the perception of parents against COVID-19 vaccination for children (Vatcharavongvan et al., 2020), (Charkazi et al., 2022). The components of its concepts are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action. The HBM was used by several studies to predict the willingness of COVID-19 vaccination in different countries (Mahmud et al., 2021). For that reason, the objective of this study was to identify factors related to the willingness for COVID-19 vaccination for children under five years among parents in Jakarta based on the Health Belief Model.

Methods

From August 1st – August 20th, 2022, an observational study with a cross-sectional method was conducted in Jakarta. The area of study was five cities in Jakarta namely East Jakarta, South Jakarta, West Jakarta, Central Jakarta, and North Jakarta. The inclusion criteria of the study were as follows: parents who had children under five years (0-59 months), reside permanently in the area of study, and agree to participate. The sample size was determined using the Lemeshow formula assuming a 95% confidence interval (CI) and 80% power, so the minimum sample size for this study was 142 subjects. The final samples were 173 subjects. Ethical approval was obtained from the Ethics Commission of Universitas Diponegoro number 315/EC/KEPK/FK-UNDIP/VIII/2022.

Data were collected using a self-administered online and printed questionnaire. The questionnaires had been tested on 20 parents before. The questionnaire was valid because the r count > r table was found in all questions, and Cronbach's Alpha score was 0.947. The online questionnaire was administered via Google Form and was distributed to parents through a WhatsApp group assisted by the head of the neighborhood. Face-to-face interviews with parents were

conducted using printed questionnaires at Integrated Health Post (Posyandu) and door-to-door to reach the minimum sample size. The questionnaire consisted of three parts: the socio-demographic information, perceptions of the COVID-19 vaccine based on the Health Belief Model, and the willingness to receive COVID-19 vaccination. The socio-demographics of the parents included age, gender, region of residence, and educational background. Perceives to all components of the Health Belief Model (perceived susceptibility, perceived severity, perceived benefit, perceived barrier, self-efficacy, and cues to action) were assessed with the Likert scale (strongly disagree, disagree, agree, and strongly agree).

Perceived susceptibility was assessed with the statement "I am worried that my child will be infected by COVID-19". Perceived severity was measured with statements "If my child is infected by COVID-19, it causes severe illness", "COVID-19 infection in children led to hospitalization" and "COVID-19 infection in children can cause death". Perceived benefit was measured with statements "Vaccination can prevent my child from being infected by COVID-19", "Vaccination can prevent serious side effects if my child is infected by COVID-19" and "By vaccination, it can prevent the transmission of COVID-19". For perceived barrier was assessed by statements "I am worried about COVID-19 vaccine conspiracy that it has chip inside", "I am worried about side effects of COVID-19 vaccine in my children" and "I am worried about safety of COVID-19 vaccine in my children". Self-efficacy was measured by "I am putting on a mask for my child when going outside", "I always wash my children's hands after returns from outside" and "I always make sure my children keep the minimum distance (one meter) with others". Cues to action were measured with the statement "I will give COVID-19 vaccine to my child if I receive reliable information about COVID-19 vaccine in children under five years", "I will vaccinate my child if COVID-19 vaccine is recommended by Indonesian government" and "I will vaccinate my child if it is recommended by my office or co-workers".

The willingness of parents to receive the COVID-19 vaccine for their children was assessed with answers "Yes, I will", "No" and "Not sure". Respondents who answered "Yes" were included in the "Definitely yes" category and those who answered "No" and "Not sure" were included in the "Definitely/probably not" category. Data were analyzed using SPSS 24.0 software, bivariate association were performed by chi-square test to analyze the significant relationship between two categorical variables. Then, multivariate binary logistic regression with 95% Confidence Intervals (CI) was used to determine the strength of the association. For all the data, $p < 0.05$ was significantly considered.

Results and Discussion

A total of 173 people participated in the study, most of them (50.9%) aged 31 – 40 years. About two-thirds of the respondents (63.0%) were female. The majority of the participants (49.7%) had secondary education. About 22.0% of respondents lived in East Jakarta, 21.4% lived in West Jakarta, 20.8% lived in South Jakarta, 18.5% lived in Central Jakarta, and 17.3% lived in North Jakarta.

More than half of the study participants (68.8%) intended to give their children the COVID-19 vaccination. It was in line with a previous study in Italy, where two-thirds of the participants allowed their children to accept COVID-19 vaccination (Di Giuseppe et al., 2022). Compared to a prior study in East Java, it was lower and the level of parent's willingness to do COVID-19 vaccination for their children (7-11 years old) was 88.0% (Astarini et al., 2022). Moreover, a higher rate was also found in the Province of Central Java and Yogyakarta, 95.6% of parents were willing to give the COVID-19 vaccine to their children because they believed it could protect their children from COVID-19 (Chabibah, 2022).

TABLE 1. Socio-demographic Characteristics of Respondents

Variables	Frequency (n=173)	Percentage (%)
Age		
< 20 years	1	0.6
20 – 30 years	56	32.4
31 – 40 years	88	50.9
> 40 years	28	16.2
Gender		
Male	64	37.0
Female	109	63.0
Regions		
East Jakarta	38	22.0
South Jakarta	36	20.8
West Jakarta	37	21.4
Central Jakarta	32	18.5
North Jakarta	30	17.3
Education Background		
Primary (Elementary school)	9	5.2
Middle (Junior High School)	17	9.8
Secondary (Senior High School)	86	49.7
Post-secondary (Diploma)	10	5.8
Tertiary (Bachelor, Master)	51	29.5

Source: Primary Data, 2022

TABLE 2. Parent's Willingness in COVID-19 Vaccination for Their Children Under Five Years

Willingness in COVID-19 vaccination	Frequency (n=173)	Percentage (%)
Definitely yes	119	68.8
Definitely/probably not	54	31.2

Source: Primary Data, 2022

TABLE 3. Bivariate Analysis of HBM and Parent's Willingness in COVID-19 Vaccination for Children Under Five Years

Variables	Parent's Willingness to get COVID-19 Vaccination for Children Under Five Years		*p*
	Definitely/probably not	Definitely yes	
Perceived susceptibility			
Low	31 (25.8%)	89 (74.2%)	0.022*
High	23 (43.4%)	30 (56.6%)	
Perceived severity			
Low	25 (37.3%)	42 (62.7%)	0.169
High	29 (27.4%)	77 (72.6%)	
Perceived benefits			
Low	27 (52.9%)	24 (47.1%)	<0.001*
High	27 (22.1%)	95 (77.9%)	
Perceived barriers			
Low	16 (23.2%)	53 (76.8%)	0.064
High	38 (36.5%)	66 (63.5%)	
Self-efficacy			
Low	33 (35.5%)	60 (64.5%)	0.191
High	21 (26.3%)	59 (73.8%)	
Cues to action			
Low	44 (69.8%)	19 (30.2%)	<0.001*
High	10 (9.1%)	100 (90.9%)	

Source: Primary Data 2022, *significant if p-value <0.05

TABLE 4. Determinant Predictors of Parent's Willingness to get COVID-19 Vaccination for Children Under Five Years Based on Health Belief Model

Variabel	p	OR	95% CI	
			Lower	Upper
Perceived susceptibility	0.064	0.384	0.140	1.056
Perceived severity	0.661	0.791	0.277	2.254
Perceived benefits	0.045*	2.784	1.023	7.579
Perceived barriers	0.104	0.460	0.180	1.173
Self-efficacy	0.607	0.760	0.268	2.156
Cues to action	<0.001*	23.144	8.577	62.453

Source: Primary Data, 2022, *significant if p-value <0.05

Table 3 showed that perceived susceptibility (p = 0.022), perceived benefits (p = <0.001), and cues to action (p <0.001) had significant correlations with parent's willingness to vaccinate their children with COVID-19 vaccine. However, perceived severity (p = 0.169), perceived barriers (p = 0.064), and self-efficacy (p = 0.191) were not significantly related to the parent's willingness to do COVID-19 vaccination in children under five years. Variables included in the multivariate analysis were those with a p-value <0.25 in the bivariate analysis. Those were perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action. The results obtained from this multivariate analysis showed the components of HBM that had a significant association with parent's willingness to do COVID-19 vaccination for their children under five years were perceived benefits (p = 0.045, OR = 2.784, CI = 1.023–7.579) and cues to action (p = <0.001, OR = 23.144, CI = 8.577–62.453). Perceived benefit had the strongest correlation with willingness to do COVID-19 vaccination for children among parents.

The perceived benefit refers to an individual's belief that if a person gets vaccinated, it will reduce the risk or severity of the disease (Goulding et al., 2022). Increasing knowledge about the perceived benefits of vaccination was a strategy to increase vaccination (Zampetakis & Melas, 2021). A study conducted in Bangladesh found that among the HBM constructs, perceived benefits had the greatest influence in predicting willingness to do COVID-19 vaccination (Hossain et al., 2021). Increasing the perception of the benefits that a person feels from getting the COVID-19 vaccine will reduce doubts about the vaccine. Individuals tend to have healthier behavior when they believe it can reduce the likelihood of disease (Goulding et al., 2022).

In addition to perceived benefit, we found that cues to action had also significantly associated with parent's willingness. Similar to prior study perceived benefits and cues to action are the most vital predictor of willingness to accept the COVID-19 vaccine (Okmi et al., 2022; Simegnew et al., 2021). These were found to be a significant driving force in vaccine acceptance (Wong et al., 2021). Cues to action can be formed as external and internal factors, such as COVID-19 infection status (individual or family), recommendations from doctors, politicians, government health authorities, social media or online news portals, and family/friends (Jennings et al., 2021). Wong found that cues to action had a positive relationship with willingness to accept the COVID-19 vaccine (Wong et al., 2021). It happened because people with high cues to action would have better behavior than bad behavior (Hupunau et al., 2019). Encouragement from the environment played an essential role in increasing people's willingness to be vaccinated against COVID-19. A prior study showed that willingness to receive the COVID-19 vaccination for children was most potentially related to compliance (Krakowczyk et al., 2022). Compliance represents a person's overall acceptance and adherence to the policies regarding vaccination (Geiger et al., 2022).

Perceived susceptibility refers to the perception and knowledge of vaccination, which could affect vaccination acceptance (Mohd Rani et al., 2022). This study revealed that perceived susceptibility was not significantly associated with the level of willingness of parents to

vaccinate against COVID-19 in children under five years, which might explain why the community felt they were no longer vulnerable to COVID-19. This result was also in line with another study that reported that perceived susceptibility did not play an essential role in a person's willingness to receive the vaccine (Alobaidi, 2021). Otherwise, a study in Saudi Arabia found that perceived susceptibility to the COVID-19 vaccine was positively related to a person's desire to vaccinate against COVID-19. Individuals were more likely to get the vaccine after receiving complete information and when the vaccination had been widely disseminated among society (Mahmud et al., 2021), (Getachew et al., 2022)

Perceived severity is a person's belief about the seriousness or severity caused by illness. In line with the finding conducted in Yogyakarta, that perceived severity did not affect the prevention of COVID-19 (Rusyani et al., 2021). Also, another finding implied that perceived severity was not enough to reduce vaccine hesitancy and encourage vaccination behavior (Chen et al., 2021). In contrast, Mahmud et al stated that perceived severity had a positive relationship with the willingness to do vaccination against COVID-19 (Mahmud et al., 2021; Yılmaz & Sahin, 2021). Perceived barriers and people's willingness to get the COVID-19 vaccine had a negative relationship in the previous study. In other words, the lower the perceived barrier, the higher the level of a person's willingness to receive the COVID-19 vaccination (Zampetakis & Melas, 2021). Perceived barriers are defined as people's beliefs associated with the efficacy and the costs of the expected actions (Nga et al., 2023). However, the relationship between perceived barriers and the level of parents' willingness to vaccinate against COVID-19 in children under five years was not significant in this study. It might be explained that people perceived the more benefits of vaccination than the barriers, such as the side effects of vaccination (Sudiman, 2021).

Self-efficacy is self-belief in its ability to do something. Self-efficacy was not significantly related to the level of willingness of parents to vaccinate COVID-19 vaccine to their children under five. This finding aligns with a previous study where people with low self-efficacy tended to do negative coping styles such as avoidance (Wang & Zhang, 2021). Similar to perceived barriers, individuals who were exposed to a lower degree of threat, which in this case was exposure to COVID-19, also had a lower degree of self-efficacy (Shah et al., 2022), (Allen et al., 2023). Vaccination of COVID-19 aims to achieve herd immunity, and the minimum threshold was about 80% for SARS-CoV-2 variants. It might be higher for the latest variants (She et al., 2022). The herd immunity threshold is the percentage of the population that must be immune to an infectious disease (Bolotin et al., 2021). This study showed that the level of parent's willingness was neither at the threshold nor higher than in prior studies in some provinces and regions in Indonesia, as previously mentioned.

Both perceived benefit and cues to action components were found to be positively associated with the parent's willingness in this study. The higher those aspects were, the more likely it was to increase the willingness among parents, while the lower they were, the lower their willingness. Reliable and complete information about the COVID-19 vaccine is required to increase the readiness for giving their children vaccination (Mohd Rani et al., 2022). Also, healthcare providers play a big role for most parents (Purvis et al., 2021). Trust in the health system was a high-risk factor, a key factor in achieving, maintaining, and increasing vaccine demand among people in developing countries (Sri et al., 2022). Parents generally expressed trust and learned about COVID-19 vaccination to ensure its safety and efficacy (Goulding et al., 2022). This study had several limitations. First, the online self-questionnaire distributed to respondents created some biased information due to the researchers could not directly explain questions that might not be understood by respondents. Despite that, the bias had been minimalized with the validity test of the questionnaire. Second, there were confounding factors that probably influenced the parent's willingness but were not determined in this study.

Conclusion

The majority of parents are willing to do COVID-19 vaccination for their children under

five years when it is available. Perceived benefits and cues to action were found to be predictors of parent's willingness to receive the COVID-19 vaccine. To increase parental will, both the Indonesian government and the government of Jakarta Province should develop strategies and collaborate with all health workers at public health centers in Jakarta to achieve the target of COVID-19 vaccination coverage, particularly in children under five years.

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