

Parental hesitancy and perception of the COVID-19 vaccine for children below 5 years in Cheras district, Kuala Lumpur

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ABSTRACT

Introduction: The use of the COVID-19 vaccine for all children below the age of 5 is expected to be available soon in Malaysia. Hence, this study aimed to assess parental hesitancy and perception of the vaccine.

Materials and Methods: A cross-sectional study was conducted among parents of children below 5 years of age, from July to September 2022 at two urban primary care clinics in the Cheras district of Kuala Lumpur. Hesitance and perception of the COVID-19 vaccine were assessed using a self-administered questionnaire.

Results: A total of 219 completed entries were analysed. The rate of COVID-19 vaccine hesitance for children below the age of 5 was 64.4% (n=141). Univariate analysis showed that vaccine hesitancy was associated with parental age and Muslim religion. The multivariate model showed that younger parents were more likely to be vaccine hesitant compared to older parents. A 1-year increase in parental age showed a 13% decrease in the odds of vaccine hesitancy (AOR 0.87, 95% CI 0.80–0.96). Muslim parents were also more likely to be vaccine hesitant compared to non-Muslim parents (AOR 2.46, 95% CI 1.26–4.79). Most parents perceived correctly that the vaccine can prevent complications and the spread of the disease. However, their main barriers to vaccination were concerns regarding side effects, safety and effectiveness of the vaccine.

Conclusion: Our study found that parents have a high rate of COVID-19 vaccine hesitancy for children younger than 5 years of age. Vaccine hesitancy was associated with parents' age and religion. Most of them perceived that the vaccine could prevent complications and the spread of COVID-19. Their main barriers towards vaccination were regarding vaccine side effects, safety and effectiveness.

KEYWORDS:

COVID-19, perception, vaccine delay, vaccine hesitancy

INTRODUCTION

The coronavirus disease has greatly impacted the health and lives of millions of people around the world. The COVID-19 virus not only affected the adults and elderly but also

children and infants. In Malaysia, about 20,000 children under the age of 4 were infected with COVID-19 by October 2022.¹ Most of them were either asymptomatic or presented with symptoms of mild respiratory infection. However, some young children experienced severe infections requiring hospitalisation, intensive care or ventilator support while others succumbed to COVID-19-related death.² Following the COVID-19 infection, children are at higher risk of developing cardiovascular, neurological and respiratory complications, as well as a multisystem inflammatory syndrome (MIS-C), especially among unvaccinated children.³

In 2019, the World Health Organization (WHO) declared that vaccine hesitancy is one of the global health threats.⁴ WHO has defined vaccine hesitancy as “a motivational state of being conflicted about, or opposed to, getting vaccinated; this includes intentions and willingness.”⁵ The cause for vaccine hesitance is multifactorial. It is found to be related to knowledge, awareness, risk, benefits and fear of vaccination. Socio-demographic and economic factors also have a role.⁶ In Malaysia, a study by Panting et al. found that parents' hesitancy to vaccinate their children were associated with a lack of knowledge regarding the adverse effects of vaccines.⁷ Other concerns included the *Halal* status of the vaccine and the negative influence of social media which implied that immunisation was a conspiracy. Malaysian parents preferred to use traditional treatments and natural food sources to boost their children's immunity as an alternative to the vaccine.⁷

A study by Ng et al. in Malaysia found that parents of children less than 12 years of age were hesitant to vaccinate their children with the COVID-19 vaccine because they were uncertain about the new vaccine, its contents and its safety. However, they would consider vaccination if it was safe and the outcome as well as the severity of COVID-19 disease among children in other countries was known.⁸ Malaysian parents who were younger and misinformed about the vaccine's safety, as well as efficacy, were also less likely to vaccinate their children who are less than 17 years of age.⁹ A review article by Hudson et al. showed that vaccine hesitancy among parents in Malaysia was associated with younger parental age and parents with young children. The most common reason for vaccine hesitancy among them was concerning the side effects of the vaccine.¹⁰

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The Centres for Disease Control and Prevention (CDC) has recommended the COVID-19 vaccination for all children between the ages of 6 months to 5 years, irrespective of their comorbidities or immune status.¹¹ Currently, there are two vaccines (Pfizer-BioNTech and Moderna) which have been approved by The United States Food and Drug Administration (FDA) for this age group. Recent clinical trials using these vaccines reported mild to moderate side effects and no serious adverse effects following immunisation (AEFI).¹²

In Malaysia, the COVID-19 Immunisation Programme for children between ages 5 to 11 years (PICKids) started in February 2022 with two doses of Comirnaty® (PfizerBioNTech). The Ministry of Health Malaysia (MOH) then extended the use of the COVID-19 vaccine for children between ages 6 months to 5 years starting with those who are immunocompromised or with comorbidities and plan to make it available to all children below 5 years of age.¹³ It is unclear if parents would accept the vaccine for their young children as to date, there is no published data on this issue.

The aim of this study is to assess parents' hesitancy and their perception of the COVID-19 vaccine for children below 5 years. It is hoped that the findings from this study would be useful to identify parents' concerns and provide appropriate counselling in the future.

MATERIALS AND METHODS

A cross-sectional study was conducted between July and September 2022 at two urban primary care clinics in the Cheras district of Kuala Lumpur. The two clinics were selected from five clinics that were registered in the district using the fishbowl method. The names of five clinics in this district were written on pieces of paper, folded and kept in a bowl. The researcher then shuffled and picked two at random. The clinics chosen were Klinik Kesihatan Cheras Makmur and Klinik Kesihatan Salak Selatan. Parents from these clinics were approached at the counter upon registration using the convenient sampling method. Those who had children below five years of age and were able to read and write in the local language, Bahasa Melayu were invited to participate in the study. The parents who consented were briefed regarding the study. If both parents were present, either one was given the form to be filled out and collected upon completion. Parents who had more than one child under the age of 5 were asked to answer the questionnaire by keeping in mind their youngest child.

Data were collected using a self-administered form which had three sections. The first section consisted of socio-demographic details of the respondent. The second section assessed parents' acceptance or hesitancy of the COVID-19 vaccine for their children aged less than 5 years. This was assessed using the statement "I would accept the COVID-19 vaccine for my child who is less than 5 years old, once it is available" for which the parent selects one of the five options in the Likert scale (strongly agree, agree, neutral, disagree and strongly disagree). Parents who selected the options "strongly agree" and "agree" were considered to accept the vaccine while those who selected "neutral", "disagree" or "strongly disagree" were considered as vaccine hesitant.

Vaccine hesitancy in this study was defined based on the WHO definition as "a motivational state of being conflicted about or opposed to, getting vaccinated: includes intention and willingness."⁵

The third section assessed parents' perception of the COVID-19 vaccine. This questionnaire was developed from a literature search and prepared for local use in Bahasa Malaysia.¹⁴⁻¹⁶ Vaccine perception was assessed using 12 statements in two domains, which were facilitators (4 statements) and barriers (8 statements). For each statement, parents selected one of the three options; "agree", "unsure" or "disagree". Parents who selected "agree" for the facilitator statement were considered to have the correct perception of that statement while those who selected "unsure" or "disagree" were considered to have a misperception of the statement. For the barriers domain, parents who selected the "agree" response for a statement, were identified as barriers while the "unsure" or "disagree" responses were considered as non-barriers. Content validation for this questionnaire was done by an expert panel consisting of two, family medicine specialists and an infectious disease specialist. Face validation was done among ten patients and did not require any changes. A pilot study for internal consistency was done among 30 respondents at a different health clinic and it showed a Cronbach's alpha of 0.70 for the 12-item scale.

To define and classify income groups of parents, the monthly household income was divided into three groups. The low-income group (B40: household income below RM4,850 per month), the middle-income group (M40: household income between RM4,851 to RM10,970 per month) and the high-income group (T20: household income above RM10,971) based on the Department of Statistic Malaysia 2020.¹⁷

The sample size for this study was calculated using the Kish Formula based on the rate of parental hesitancy towards COVID-19 vaccine by Aedh et al. (72.2%).¹⁸ Using the confidence interval (CI) of 95%, an absolute precision of 6% and an additional 10% for the incomplete response, a sample size was 241 was obtained.

For the analysis, categorical data were described in absolute numbers (n) and percentages (%). Non-parametric variables were presented using median and interquartile range (IQR). Bivariate analysis was done using Chi-square and Fisher-exact tests to establish the relationships between parents' socio-demographic characteristics, their misperceptions and barriers to vaccination. Variables with *p* values < 0.25, in the bivariate analysis were selected for multivariate logistic regression analysis. Multivariate logistic regression analysis was done using the backwards-step selection method to assess predictors for vaccine hesitancy. The crude and adjusted odds ratio (OR), 95% CI and *p*-values, were reported for each independent variable. A *p*-value of <0.05 was considered statistically significant. Hosmer-Lemeshow test and Nagelkerke Pseudo R² were used to assess the fitness of the model. Data analysis was done using the Statistical Package for Social Sciences (SPSS) version 27. (SPSS Inc., Chicago, IL, USA)

Table I: Demographic characteristics of participants

Demographic characteristics	n (%)
Parent's age	Median (IQR) 32 (6.0)
Relationship with child	
Mother	183 (83.6)
Father	36 (16.4)
Ethnicity	
Malay	166 (75.8)
Chinese	40 (18.3)
Indian	7 (3.2)
Others	
Religion	
Muslim	169 (77.2)
Buddhist	37 (16.9)
Hindu	7 (3.2)
Others	6 (2.7)
Education	
University	122 (55.7)
School	92 (42.0)
No formal education	5 (2.3)
Job description	
Employed	152 (69.4)
Unemployed	67 (30.5)
Household monthly income	
Low	159 (72.6)
Middle	48 (21.9)
High	12 (5.5)

Table II: Parents' hesitancy and perception of COVID-19 vaccine for children below 5 years

Acceptance of future COVID-19 vaccine for children below 5 years	n (%)		
Vaccine hesitancy		141 (64.4)	
Vaccine acceptance		78 (35.6)	
Facilitators	Agree	Unsure	Disagree
The vaccine can prevent complications	116 (52.9)	94 (42.9)	9 (4.1)
The vaccine can prevent spread of COVID-19 infection	110 (50.2)	99 (45.2)	10 (4.6)
The vaccine can protect my children from COVID-19 infection	91(41.6)	113 (51.6)	15 (6.8)
The vaccine is safe for my children	81 (37.0)	123 (56.2)	15 (6.8)
Barriers			
Concern of side effects of the vaccine	152 (69.4)	47 (21.5)	20 (9.1)
Concern regarding the safety of the vaccine	96 (43.8)	90 (41.1)	33 (15.1)
Concern regarding the effectiveness of the vaccine	79 (36.1)	86 (39.3)	54 (24.7)
Fear of needle	75 (33.3)	69 (31.5)	77 (35.2)
The belief that children less than 5 years do not require vaccine	68 (31.1)	101 (46.1)	50 (22.8)
Negative information regarding the vaccine on social media	61 (27.9)	93 (42.5)	65 (29.7)
Vaccination is against my personal belief	30 (13.7)	84 (38.4)	105 (47.9)
Vaccination is against my religion	6 (2.7)	56 (25.6)	157 (71.7)

RESULTS

A total of 241 people fulfilled the inclusion criteria and agreed to participate in this study. However, 22 questionnaires were incomplete. Hence, 219 responses were subjected to analysis. The questionnaire was mostly answered by mothers (83.6%, n=183), from the Malay ethnic group (75.8%, n=166) followed by the Chinese (18.3%, n=40) and the Indian ethnic groups (3.2%, n=7). Most parents were Muslims (77.2%, n=169), had received tertiary education (55.7%, n=122) and were employed (69.4%, n=152). The majority of the parents were from the low-income group (72.6%, n=159) (Table I).

The majority of parents were vaccine-hesitant (64.4%, n=141) while only about one-third of them (35.6%, n=78) were willing to accept the COVID-19 vaccine for their children below 5 years of age.

About half of the parents perceived that the COVID-19 vaccine could prevent complications (52.9%, n=116) and the spread of the virus (50.2%, n= 110). Common barriers to vaccination were concerns regarding side effects (69.4%, n=152), safety issues (43.8%, n=96) and effectiveness of the vaccine 79 (36.1%, n=79). Details of other facilitators and barriers towards the COVID-19 vaccine are given in Table II.

Testing the association between parent’s socio-demographic characteristics and vaccine hesitancy showed that age, ethnicity, religion and income of parents were associated with COVID-19 vaccine hesitancy as shown in Table III.

Testing the association between acceptance or hesitance for the vaccine with facilitators and barriers using Chi-square test, showed a few significant associations (Table IV).

Table III: Association between parent's characteristics with vaccine acceptance and hesitancy

Demographic data	Vaccine acceptance n (%)	Vaccine hesitancy n (%)	p value
Parental age (years)	Mean (SD) 33.51 (4.74)	Mean (SD) 31.87 (5.21)	0.02 <i>T test</i>
Gender			
Father	12 (33.3)	24 (66.7)	χ^2
Mother	66 (36.1)	117 (63.9)	0.754
Ethnic group			
Malay	50 (30.1)	116 (69.9)	χ^2
Non-Malay	28 (52.8)	25 (47.2)	0.003
Religion			
Muslim	51 (30.2)	118 (69.8)	χ^2
Non-Muslim	27 (54.0)	23 (46.0)	0.002
Education			
University	45 (36.9)	77 (63.1)	χ^2
School	32 (34.8)	60 (65.2)	0.782*
No formal education	1 (20.0)	4 (80.0)	
Employment			
Employed	56 (36.8)	96 (63.2)	χ^2
Non- employed	22 (32.8)	45 (67.2)	0.568
Income Group			
Low	47 (29.6)	112 (70.4)	χ^2
Middle	23 (47.9)	25 (52.1)	0.005*
High	8 (66.7)	4 (33.3)	
Child's Comorbidities			
None	68 (34.7)	128 (65.3)	χ^2
Yes (e.g. heart /lung disease/others)	10 (43.5)	13 (56.5)	0.405

*Fisher-Freeman-Hilton exact test, p value < 0.05 is significant.

Table IV: Association between perception (facilitators and barriers) vaccine acceptance and hesitancy to COVID-19 vaccine

Facilitators		Acceptance n (%)	Hesitancy n (%)	p value
The vaccine is safe for my children	Correct perception	61 (75.3)	20 (24.7)	χ^2
	Misperception	17 (12.3)	121 (87.7)	<0.001
The vaccine can protect my children from COVID-19 infection	Correct perception	62 (68.1)	29 (31.9)	χ^2
	Misperception	16 (12.5)	112 (87.5)	<0.001
The vaccine can prevent the spreading of COVID-19 infection	Correct perception	70 (63.6)	40 (36.4)	χ^2
	Misperception	8 (7.3)	101 (92.7)	<0.001
The vaccine can prevent complications	Correct perception	70 (60.3)	46 (39.7)	χ^2
	Misperception	8 (7.8)	95 (92.2)	<0.001
Barriers				
Fear of needle	Non-barrier	49 (62.8)	97 (68.8)	χ^2
	Barrier	29 (37.2)	44 (31.2)	0.369
Concern about side effects of the vaccine	Non-barrier	32 (41.0)	35 (24.8)	χ^2
	Barrier	46 (59.0)	106 (75.2)	0.013
Concern regarding the effectiveness of the vaccine	Non-barrier	60 (76.9)	80 (56.7)	χ^2
	Barrier	18 (23.1)	61 (43.3)	0.003
Concern regarding the safety of the vaccine	Non-barrier	60 (76.9)	63 (44.7)	χ^2
	Barrier	18 (23.1)	78 (55.3)	<0.001
Negative information regarding the vaccine on social media	Non-barrier	60 (76.9)	98 (69.5)	χ^2
	Barrier	18 (23.1)	43 (30.5)	0.241
The belief that children less than 5 years do not require vaccine	Non-barrier	72 (92.3)	79 (56.0)	χ^2
	Barrier	6 (7.7)	62 (44.0)	<0.001
Vaccination is against my personal belief	Non-barrier	72 (92.3)	117 (83.0)	χ^2
	Barrier	6 (7.7)	24 (17.0)	0.06
Vaccination is against my religion	Non-barrier	77 (98.7)	136 (96.5)	χ^2
	Barrier	1 (1.3)	5 (3.5)	0.326

Table V: Multivariate logistic regression for predictors of vaccine hesitancy

Variables	Crude OR ^a (95% CI)	p	Adjusted OR ^b (95% CI)	Wald statistics (df)	p	
Age	0.94 (0.89–0.10)	0.024	0.87 (0.80–0.96)	8.27 (1)	0.004	
Ethnicity	Non-Malay	1				
	Malay	2.60 (1.38–4.89)	0.003	1.1 (0.20–11.24)	0.16 (1)	0.68
Religion	Non-Muslim	1				
	Muslim	2.71 (1.42–5.18)	0.002	2.46 (1.26–4.79)	6.92 (1)	0.008
Income group	High income	1				
	Middle income	2.17 (0.57–8.19)	0.251	1.62 (0.41–6.40)	0.48 (1)	0.48
	Low income	4.77 (1.37–16.59)	0.014	3.56 (0.98–12.93)	3.75 (1)	0.053

For further analysis, independent variables with a *p*-value of less than 0.25 (age, ethnicity, religion, income) were selected for multivariate logistic regression analysis. There was no multicollinearity and interaction between the independent variables tested. The regression model fit reasonably well. After adjusting for covariates, parental age and religion were the main predictors for COVID-19 vaccine hesitancy with significantly high odds. The final model showed that with a 1-year increase in parents' age, there was a 13% decrease in odds for vaccine hesitancy (AOR 0.87, 95% CI 0.80–0.96). Muslims (AOR 2.46, 95% CI 1.26–4.79) had 2.46 times the odds of vaccine hesitancy compared to non-Muslims (Table V).

DISCUSSION

In general, vaccine acceptance reflects the overall perception of disease risk, vaccine attitudes and demand.¹⁹ The rising trend in vaccine hesitancy and delayed acceptance over the past few decades has affected vaccine uptake and resisted efforts in fighting vaccine-preventable diseases.²⁰ The World Health Organization (WHO) recently declared that vaccine hesitancy is considered a global health threat.⁴ Immunisation among children depends on the parents' consent as they are minors. Hence, it is important to study parents' perception, facilitators, and barriers towards the COVID-19 vaccine.

Our study found that the majority of parents (64.4%, n=141), were hesitant to vaccinate their children below 5 years of age with the COVID-19 vaccine and had concerns regarding vaccine safety, side effects and effectiveness. A high rate of vaccine hesitancy was also found in Saudi Arabia and Thailand, where 56.9% to 72.2% parents of children less than 12 years of age were hesitant and less likely to immunize their children against COVID-19.^{18,21} Parents in Thailand were also mainly concerned about the vaccine's side effects (82.5%), safety issues (60%) and efficacy (37.2%).²¹ A previous study in New York found that the safety of the vaccine, effectiveness and perceptions that children did not need vaccination, were the primary reasons for vaccine hesitancy.²² These finding suggests that vaccine safety and efficacy are two very important issues which overwhelmed parents, outweighing the benefits of vaccination. Currently, there are 2 vaccines (Pfizer-BioNTech and Moderna) which have been approved by FDA for this age group. The safety profile of this vaccine was found similar to placebo and it was well-tolerated with mild to moderate side effects.¹² Based on this information, it is important to create awareness among

parents regarding the vaccine's safety and side effects profile to enhance its uptake for children below 5 years of age.

Data from our study show that parents' hesitancy to give their children the COVID-19 vaccine was significantly associated with their age and religion. With every one-year increase in parents' age, they had a 13% decrease in odds to refuse the vaccine (AOR 0.87, 95%CI 0.80-0.96) suggesting that older parents are more likely to accept the COVID-19 vaccine. In Malaysia, vaccine hesitancy is generally associated with younger parental age.¹⁰ Another multicentric study from the Eastern Mediterranean Region (EMR) also showed that older parents were more receptive to the COVID-19 vaccine.²³ This EMR study found that parents aged 40 years and above had an OR between 13 to 18 to vaccinate their children below the age of 17 years compared to younger parents. A study from Saudi Arabia also found that older parents were more likely to vaccinate their children because they sought information regarding the COVID-19 vaccine from a reliable source which was the healthcare personnel.¹⁸ The exact cause for vaccine hesitancy among young parents is not clearly known and could be multifactorial. Young parents have less experience vaccinating their children, compared to older ones. Older parents would have experienced safe vaccination for their children in the past and hence may be more receptive towards the COVID-19 vaccine. Providing accurate information regarding the vaccine to young parents may prove beneficial.

Our study showed a significant association between vaccine hesitancy and religion, where Muslim parents had 2.46 times the odds to be vaccine hesitant compared to non-Muslims (AOR 2.46, 95% CI 1.26-4.79). A similar trend was also noted in Bangladesh whereby 45% of the Muslim population refused to vaccinate their children with the COVID-19 vaccine.²⁴ A previous study done among different communities in Asia, Africa, and South America during the COVID-19 pandemic showed that 84% of Muslims were vaccine hesitant.²⁵ This could be due to misinformation about vaccination in this community which may have influenced their decision against the vaccine. In February 2021, The National Fatwa Committee of Malaysia announced that the use of the COVID-19 vaccine was permissible.²⁶ This information needs to be emphasized among Malaysian Muslim parents during counselling to change their perception with the hope to increase vaccine uptake among young children.

Our study did not show any association between low income and vaccine hesitancy. However, a study in Bangladesh found that parents who are from the low social income group and staying in village or semi-urban areas, refused to vaccinate their children.²⁴ Similarly, a study by AK et al in China also found that regional, cultural, and economic factors have a significant impact on vaccine hesitancy.¹⁶ The exact cause for vaccine hesitancy among the low-income population remains unknown and may be answered by further research using a qualitative design approach. Simas et al, highlighted that the cause may be complex and multifactorial, arising from different cultural backgrounds, ethnicity, religion and socioeconomic factors. Other contributing factors may be social isolation or marginalization by the system and politics.²⁷ Some of the suggestions to overcome these problems are to train healthcare workers to listen empathetically, address vaccine-related uncertainties and deliver tailored information regarding the benefits of vaccination. This process should ideally be done by working together with the native or religious leaders to alleviate parents' fears regarding the vaccine.²⁷

LIMITATIONS

Parents were sampled from an urban setting using the convenient sampling technique, hence the findings may not be a true reflection of the hesitance and perception of the vaccine among the general population. Hence, future studies should include a mixture of sampling of parents from rural and suburban areas. The questionnaires used in this study were not psychometrically validated for Malaysian population. Hence, a proper validation study is recommended in future studies.

CONCLUSION

The majority of parents in our study were hesitant to vaccinate their children below the age of 5 years, with the COVID-19 vaccine. Most parents had correct perception that the vaccine could prevent complications and the spread of the disease; however, their main barriers were concerns regarding side effects, safety and effectiveness of the vaccine. Parents' age and religion were significantly associated with vaccine hesitancy where the younger parents and those from the Muslim religion were more likely to be vaccine hesitant compared to older and non-Muslim parents.

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This study was self-funded, and we declare no conflicts of interest.

ETHICAL APPROVAL

This study was approved by the Universiti Kebangsaan Malaysia (UKM) Research Ethics Committee and Institute of Medical Research Ethics Committee (FF-2021-336) and also registered with the National Medical Research Registration (NMRR-21-1901-59694).

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