

Post-COVID-19 Malaysian parents' views on children's vaccination: subjective norms analysis

Noor Amira Syazwani Abd Rahman^{1,2}, Soon-Yew Ju², Jamal Rizal Razali¹, Nur Hazirah Hamdan², Mohd Rozaimy Ridzuan², Lai-Kuan Kong³

¹Centre for Human Sciences, Universiti Malaysia Pahang, Kuantan, Malaysia

²Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA (UiTM) Pahang Branch, Pahang, Malaysia

³Faculty of Business and Management, Universiti Teknologi MARA (UiTM) Pahang Branch, Pahang, Malaysia

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ABSTRACT

Vaccinating children is a critical life-saving measure that ensures herd immunity and saves numerous lives. However, the rising trend of parental refusal to vaccinate poses a significant threat to disease containment within societies. Amid the widespread COVID-19 pandemic in Malaysia, this study examines how subjective standards impact parents' vaccination intentions and behaviors. Lockdowns and travel restrictions during the pandemic caused a decline in vaccination rates due to missed appointments for children's vaccinations. Even post-pandemic, some parents persist in refusing vaccination for their children. Conducting an online survey and employing quantitative, the study collected data from parents with children aged 1 day to 15 years old. Analyzing the data through IBM SPSS and employing SmartPLS 4.0.9.5 software, specifically using partial least squares-structural equation modeling (PLS-SEM), revealed significant insights. The findings indicate that parents' willingness to vaccinate their children significantly predicts their actual vaccination behavior. Moreover, social norms positively influence parental vaccination intentions. The study highlights the mediating role of vaccination intention between social norms and actual vaccination behavior among parents. Overall, this empirical research strongly supports the theory of planned behavior (TPB) model, emphasizing the importance of targeting social norms to foster vaccination behavior and elevate vaccination rates.

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Corresponding Author:

Soon-Yew Ju

Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA

26400 Bandar Tun Razak, Pahang, Malaysia

Email: drsyju@gmail.com

1. INTRODUCTION

The pandemic status of COVID-19 was declared by the World Health Organization (WHO) on March 11, 2020 [1]. Mandatory lockdowns and travel restrictions were implemented globally as part of an effort to break the disease transmission. However, the implementation of limitations on movement and the concern and unease about catching the highly contagious virus create worrisome obstacles for the regular administration of children's vaccinations. In Malaysia, vaccination uptake for diseases like measles, mumps, and rubella (MMR) has decreased by about 60% to 70% since the implementation of the lockdown in 2020, despite the country having improved vaccination coverage over time, with an approximate childhood vaccination covers of more than 90% in 2019 [1]. Despite that, Malaysia declared on April 1st, 2022, that

COVID-19 would be treated as an endemic nationwide and permit Malaysians to resume everyday life routines after fighting the COVID-19 outbreak for nearly two years.

Nonetheless, while citizens have resumed their daily routines, the pandemic of COVID-19 has influenced the number of kids receiving vaccinations at health clinics due to parents missing scheduled appointments. It can be supported by Rahman *et al.* [2] who postulates that more and more parents in Malaysia are opting out of vaccinating their children, which poses a threat to public health. To date, the Health Ministry is tracking the occurrence of infants or kids who missed their vaccinations during the movement control order (MCO) to arrange new appointments to receive the necessary vaccinations. One factor is that people, such as companions and relatives, are significantly impacted by their views of close people's opinions and attitudes. These opinions are frequently described as a subjective norm. Subjective norms are vital to many decision-making theories, including the theory of planned behavior (TPB) [3].

In the theory of planned behavior, subjective norms refer to a human being's evaluation of the beliefs held by significant people regarding whether they should behave in a certain way [3]. Several researches has been done on the influence of subjective norms on general health-related behaviors and intentions to vaccinate, and there is evidence that subjective norms are a solid prognosticator of vaccination intentions [4]–[7]. Thus, this study presumes that subjective norms encompass parents' perceptions of the social pressure they exert to participate in the specific behavior of vaccinating their children. It reflects the individual's interpretation of the beliefs and attitudes significant individuals hold in their social circle, including friends and family members.

2. HYPOTHESIS DEVELOPMENT

2.1. Intention and actual behavior

The theory of planned behavior declares that intention is a crucial predictor of behavior [3]. The extent to which a person has consciously prepared for a future event is called their intention [8]. If an individual has a more significant purposeful preparation to carry out a predetermined action, there is a higher probability of achieving it. Behavioral intention discusses parents' perception of the likelihood of vaccinating their child within the parameters of children's vaccination. In the context of conduct, actual behavior refers to the actions individuals choose to take, such as how they use their time and money. The TPB emphasizes that having a specific goal in mind is one of the most significant aspects of the decision-making process to show how one will behave [9]. Additionally, the intention can be translated into actual behavior if the individual can choose whether to engage in the behavior; they have control over whether they do so [10].

However, there is no uncommon discrepancy between intention and behavior because several factors may contribute to this gap, such as unforeseen obstacles or individuals giving in to temptation [11]. Thus, to achieve the maximum vaccination uptake, it is vital to understand how to design effective behavioral interventions that can enhance vaccination intentions and overcome any barriers that hinder good intentions from being translated into action [12]. Supporting this argument, recent studies have shown consistent findings regarding the correlation between vaccination intentions and actual immunization practices. A study by Shiloh *et al.* [11] on COVID-19 vaccinations demonstrated that intentions accurately predicted 82.4% of vaccination behavior.

Furthermore, Schäfer *et al.* [13] found that those who were more aware of and had a more recent experience with previous vaccinations had a higher intention to vaccinate against COVID-19. These findings are a study of people's actions throughout the 2009 H1N1 pandemic, revealing that stronger intentions were linked to higher vaccination uptake [11], [14] consistently discovered that intention reliably predicted the vaccination behavior of healthcare professionals. Therefore, it can be concluded that the intention to be vaccinated is hypothesized to be crucial in promoting essential vaccination. Based on the evidence presented, it is recognized that behavioral intentions serve as a vital and immediate predictor of actual behavior. This can be used in the context of children's vaccination, where parents' intention to vaccinate their kids is a significant factor in deciding whether the vaccination occurs. Therefore, the following hypothesis is proposed in this study: there is a relationship between vaccination intention and vaccination behavior (H1).

2.2. Subjective norms and vaccination behavior

Subjective norms imply the observed influence of individuals who engage in a specific behavior, such as friends, neighbors, or peers, on a person's decision to participate in that behavior [3]. Different groups, including family, friends, and society, can experience social pressure. Some studies focused on verifying relationships between subjective norms and behavior [15]–[17]. When the situation comes to getting vaccinated, individuals are more likely to agree to it if they receive encouragement from those around them. In cases where the outcome of an action is uncertain, people may turn to others for guidance and support [18].

Moreover, individuals are more prone to get vaccinated if they believe their physician endorses the practice regardless of their health status [19]. Additionally, the investigation led by Yang *et al.* [15] in Hong Kong discovered that parents with strong subjective norms were more inclined to vaccinate their children, implying that subjective norms can play a role in influencing vaccination behavior in specific contexts. Similarly, Rad *et al.* [17] conducted a study on COVID-19 vaccine uptake in South Iran. They found a positive association between subjective norms and vaccine uptake, further supporting the idea that subjective norms can affect individuals' decisions regarding vaccination. Hence, previous research has indicated a definite correlation between subjective norms and vaccination behavior. Therefore, the study puts forward the following hypotheses: subjective norms are positively related to vaccination behavior (H2).

2.3. Subjective norms and vaccination intentions

Subjective norms are social stressors a person perceives to act in a certain way or to refrain from acting [3]. Among the variables correlating with people's intentions, subjective norms are considered one of the essential components [20]. In this research, subjective norms imply the perceived community sentiment placed on parents regarding vaccinating their children. Vaccination is often viewed as a personal or family decision, and people's intentions to get vaccinated may be predicted by how close friends and family members perceive vaccination [14]. The outcome denoted that people would have the intention to act if people around them influenced them.

Conversely, parents sharing negative experiences about vaccinating their children with their friends or acquaintances can impact other parents' intentions to vaccinate their children. The position of subjective norms in predicting vaccination intentions has been highlighted in multiple studies. Xiao and Wong [5] identified subjective norms as a significant analyst of vaccination intentions, further supported by Kan and Zhang [19] who concluded that people are more likely to make a more decisive decision to do something if they see other people doing it. In Malaysia, a study by Rahman *et al.* [7] found that subjective norms significantly influence parents' intentions to vaccinate their children against human papillomavirus (HPV). Thus, the current study proposes the subsequent hypothesis: subjective norms are positively related to vaccination intentions (H3).

2.4. Relationship between subjective norms to behavior mediated by intention

Several theoretical perspectives suggest that a person's plan to perform a behavior is the primary cognitive cause of actual behavior [21]. In the study by Fishbein and Ajzen [22], the researcher theorized that intention mediates the connection between subjective norms and behavior, as the TPB proposed. Therefore, subjective norms can be used to study behavior with intention as the mediator. It can be supported by findings in China by Yang *et al.* [15] who discovered that vaccination intention was a mediator in the association between subjective norms and vaccination behavior. In a study related to natural diet intake, Sultan *et al.* [23] observed that the connection between subjective norms and behavior is mediated by behavioral intention. Therefore, the available empirical evidence suggests a prediction that the relationship between subjective norms and behavior will be mediated by intention. Therefore, a plausible hypothesis can be proposed: intention mediates the relationship between subjective norms and behavior (H4).

2.5. Research framework

Figure 1 illustrates the research framework adopted for the study. This framework identifies three key variables, namely: subjective norms, vaccination intention, and vaccination behavior. The graphical representation in Figure 1 clarifies the relationships among these variables.

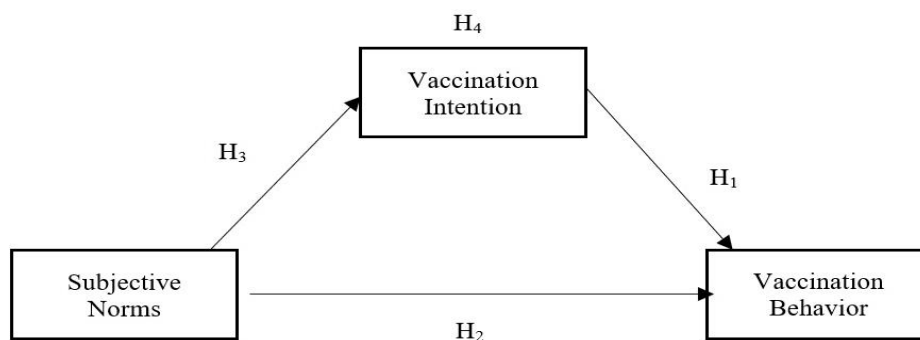


Figure 1. Research framework

3. METHOD

This study used a quantitative approach and an online questionnaire to achieve the research objective. The survey participants were parents of young children aged one day to 15 years old. The data was distributed in 2022 after the post-COVID-19 pandemic. The collected data underwent initial analysis using IBM SPSS. At the same time, the SmartPLS 4.0.9.5 software was utilized to conduct a partial least squares-structural equation modeling (PLS-SEM) examination to assess the hypothesized relationships between the variables.

4. RESULTS

4.1. Demographic profile of respondents

Table 1 displays the demographic characteristics of the survey participants in this study. After being informed about the study's purpose and potential community service contributions, 331 individuals participated in the survey. Most respondents (78.9%) were female, whereas the rest 22.1% were male. Regarding ethnicity, most of the respondents were Malay (91.8%), accompanied by Chinese (6.9%). Most respondents' income fell from RM 4,851.00 to RM 10,970 (43.8%), and most held a degree (92.4%).

Table 1. Demographic profile of respondents (n=331)

Items	Frequency	Percentage (%)
Gender		
Male	70	21.1
Female	261	78.9
Ethnic		
Malay	304	91.8
Chinese	23	6.9
Indian	2	0.6
Others	2	0.6
Income		
RM 4,850.00 and below	92	27.8
RM 4,851.00–RM 10,970	145	43.8
Above RM 10,970	94	28.4
Education		
STPM	13	3.9
Diploma	12	3.6
Degree	306	92.4

4.2. Measurement model

As portrayed in Table 2, all of these loadings of the indicators are significantly higher than the recommended cutoff point of 0.70 [24]. Those values for loading of the hands vary from 0.824 to 0.987. Thus, the findings suggest that every indicator is significantly loaded on their specific constructs and less on others [25]. Therefore, there were no indicators deleted. The composite reliability (CR) was examined to evaluate the measurement's internal consistency [24]. It was proposed that reliability means the degree to which an indicator set demonstrates internal consistency with the construct. Table 2 presents that the reliability values of CR for all constructs vary from 0.949 to 0.990, surpassing the minimum suggested value of 0.7.

In this study, the average variance extracted (AVE) was examined to evaluate the degree of convergent validity, which refers to the degree to which indicators from similar constructs cluster together. In SEM, it is recommended that the threshold values for AVE should be higher than 0.50 [26]. Table 2 shows that the AVE values for all constructs ranged from 0.827 to 0.971, indicating an acceptable level of convergent validity. Social work research requires a reliable and valid measure of data [27]. Besides, to evaluate the quality of measurements, reliability and validity are two critical factors [25].

The study used the Fornell-Larcker criterion [26] and the Heterotrait-Monotrait ratio (HTMT) to assess discriminant validity [25]. Following the Fornell-Larcker criteria presented in Table 3, the square root of the AVE for each construct was compared with the correlations with other constructs, both horizontally and vertically. The results showed that the diagonal elements of the square roots of AVE were higher than all of the off-diagonal features, confirming the Fornell-Larcker criterion and the discriminant validity. The associated construct should share more variance with its indicator. The study used this criterion to verify the discriminant's validity [26]. Table 4 displays the results of the HTMT ratio test, which is used to determine the discriminant validity of the constructs. The values obtained, ranging from 0.678 to 0.786, are all below the recommended threshold of 0.85, suggesting that the constructs are distinct [26].

Table 2. Measurement model for convergent validity of the reflective indicators

Construct	Indicator	Loading	CR	AVE
Behavior	BEH1	0.900	0.960	0.827
	BEH2	0.824		
	BEH3	0.932		
	BEH4	0.945		
	BEH5	0.940		
Intention	INT1	0.986	0.990	0.971
	INT2	0.987		
	INT3	0.984		
Subjective norm	SN1	0.930	0.949	0.861
	SN2	0.932		
	SN3	0.922		

Table 3. Fornell-Larcker criterion

Construct	Behavior	Intention	Subjective norm
Behavior	0.909		
Intention	0.759	0.986	
Subjective norm	0.635	0.650	0.928

Table 4. HTMT ratio

Construct	Behavior	Intention	Subjective norm
Behavior			
Intention	0.786		
Subjective norm	0.678	0.681	

*Discriminant validity is established at HTMT 0.85

Based on the criterion mentioned earlier, the discriminant and convergent validity of the constructs are established. Construct validity denotes the degree to which a measure is used to assess a construct in the manner it was meant to be evaluated [28]. The confirmatory factor analysis results indicate that the study variable has been confirmed with distinctiveness, thereby providing a solid foundation for further analysis, as the measurement model exhibited adequate convergent and discriminant validity.

4.2.1. Structural model

To ensure no collinearity issue in the study, Table 5 was analyzed, and the variance inflation factor (VIF) values were found to be lower than the recommended threshold of 3.0 [24], indicating no such problem. The structural model was then computed using the bootstrapping technique, resampling 5,000 times, to obtain the beta value, standard error, t-values, p-values, VIF, and f^2 (Table 5). The findings indicate that intention had a significant association with behavior ($\beta=0.599$, $t=7.679$: LL=0.435, UL=0.740), subjective norm had a substantial relationship with behavior ($\beta=0.246$, $t=3.313$: LL=0.109, UL=0.401), and subjective norm had a significant connection with intention ($\beta=0.650$, $t=14.537$: LL=0.550, UL=0.728), hence supporting H1, H2, and H3 was supported. According to Cohen [29], an f^2 value of 0.02 is a small effect size, 0.15 is a medium effect size, and 0.35 is a large effect size. Therefore, this study found that the subjective norm to behavior has small effect sizes while the intention to behavior and subjective norm to intention have large effect sizes.

The study introduced the mediation variable (intention) within the study framework to detect the mechanism that causes the observed relationship between subjective norms and behavior [30]. The findings indicated that the indirect effects of intention between the relationship between subjective norms and behavior were positive and significant, with $\beta=0.389$, $t=6.352$, lower limit (LL)=0.270, upper limit (UL)=0.506, supporting hypothesis H4 since there is no zero between lower and upper levels in the results.

Table 5. Path coefficient for the main model

Hypothesis	Relationship	β	SE	t-values	p	LL	UL	VIF	f^2
H1	INT→BEH	0.599	0.078	7.679	0.000	0.435	0.740	1.731	0.534
H2	SN→BEH	0.246	0.074	3.313	0.001	0.109	0.401	1.731	0.090
H3	SN→INT	0.650	0.045	14.537	0.000	0.550	0.728	1.000	0.731
H4	SN→INT→BEH	0.389	0.061	6.352	0.000	0.270	0.506		

5. DISCUSSION

The study revealed a significant association between parents' intention to vaccinate their child and their subsequent behavior toward vaccination. This finding aligns with the conclusions drawn by several researchers [9], [11] which suggested a consistent pattern. It underscores the solid connection between the intention to vaccinate and actual vaccination behavior, as supported by the research by Dai *et al.* [12]. The research evidence demonstrates the intention of parents to vaccinate their child is a reliable predictor of their actual behavior regarding vaccination. These findings highlighted a robust relationship between the intention to vaccinate and the subsequent vaccination behavior. Parents with firm intentions to vaccinate their children are more likely to carry out those intentions and ensure their children receive the necessary vaccinations.

In addition to the findings, as mentioned earlier, this study highlights the impact of subjective norms on parents' vaccination behavior. Various researchers [19], [31] have demonstrated the significant influence of subjective norms on vaccination behavior. When parents perceive vaccination as a widely accepted norm among their peers and social circles, they are more likely to agree and vaccinate their children. Furthermore, vaccination behavior can also be influenced by community norms, broader cultural norms, and values. Public health practitioners can enhance vaccination rates among parents and their children by developing targeted and effective strategies considering the social and cultural factors shaping vaccine decision-making.

Different outcomes from this study reveal a meaningful impression of subjective norms on the vaccination intentions of parents. These results, in keeping with previous research, have consistently demonstrated the positive impact of subjective norms on vaccination intentions [14], [20]. Therefore, recognizing and addressing subjective norms and building trust with parents is crucial for maintaining high vaccination rates and controlling the spread of infectious diseases. Public health initiatives can tailor strategies to align with societal expectations and influences related to vaccination. Building trust through open communication, education, and addressing concerns reinforces the importance of vaccination and improves compliance. Addressing subjective norms and fostering trust can lead to higher vaccination rates, improving disease control and prevention.

One more major finding of this study found a mediating role of intention to vaccination between social norms and vaccination behavior among parents. The outcomes of this study suggest that the intention to vaccinate serves as a mediator between social norms and vaccination behavior among parents. In other words, social norms influence parents' vaccination behavior by shaping their intentions to vaccinate their children. When parents perceive strong social norms that promote vaccination, it increases their intention to vaccinate, which in turn leads to actual vaccination behavior. This suggests that social norms indirectly impact vaccination behavior through the pathway of intention. In many studies, intention is tested as a direct relationship [5], [20].

Consequently, the present study makes an empirical contribution to underpinning the model of TPB in the framework of vaccination intention among parents. It shows subjective norms are essential factors influencing parents' decision to vaccinate their children, subsequently affecting their vaccination behavior. Therefore, to effectively increase vaccination rates, public health initiatives should consider the significance of subjective norms on parents' determination to vaccinate and target these social norms in their strategies. Public health efforts can promote positive vaccination behavior by understanding the prevailing social norms surrounding vaccination and addressing them directly. This can be achieved through tailored messaging, community engagement, and educational campaigns emphasizing vaccination's importance as a societal norm. Public health interventions can promote vaccination behavior and improve vaccination rates by targeting and leveraging social norms.

6. CONCLUSION

Built on the available data, it can be presumed that the post-COVID-19 pandemic has negatively affected the administration of childhood vaccinations in Malaysia, with a drop in uptake reported for the children's vaccine. The subjective norms of parents, or their perceptions of what significant people in their lives believe about vaccination, are a powerful predictor of vaccination intentions and behavior. Social norms have been discovered to affect parents' decision to vaccinate their children positively, and this intention, in turn, predicts vaccination behavior. Therefore, it is recommended that public health efforts to increase vaccination rates should consider the social norms' influence on parental vaccination intentions and behavior. To increase vaccination uptake, targeted interventions could address negative perceptions or beliefs about vaccination held by significant people in parents' lives, such as friends and family. It is also recommended that parents should raise awareness about the importance of maintaining vaccination schedules for their children, even during periods of lockdown or movement restrictions. The Health Ministry's efforts to track cases of missed vaccinations and arrange new appointments for children should be continued and expanded.

Public health messaging campaigns can be crucial in encouraging parents to prioritize their children's health and well-being by ensuring they receive all necessary vaccinations.

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BIOGRAPHIES OF AUTHORS






Noor Amira Syazwani Abd Rahman    is a dedicated Ph.D. Candidate at the esteemed Centre for Human Sciences, Universiti Malaysia Pahang, situated in the vibrant region of Pahang Darul Makmur, Malaysia. In addition to her pursuit of academic excellence, she serves as a lecturer at the Faculty of Administrative Science and Policy Studies within Universiti Teknologi MARA (UiTM) Pahang Branch. She can be contacted at email: amirarahman@uitm.edu.my.






Soon-Yew Ju    is a graduate with a Doctor of Philosophy (Ph.D.) in Environmental Administration. His research focus and expertise center on the environmental behavior of public sector workers, leadership studies, organizational behavior and quantitative behavioral analysis. With over 20 years of experience in the academic industry, he currently serves as academic staff at the Faculty of Administrative Science and Policy Studies, Universiti Teknologi MARA (UiTM). He can be contacted at email: drsyju@gmail.com.






Jamal Rizal Razali    is an Associate Professor at Centre for Human Sciences, Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA). He is a recipient of Public Service Department (JPA) sponsorship in 1990 under the Government-to-Government program (Indonesia). He obtained his Bachelor Degree in Art and Linguistic from Universitas Andalas, Indonesia. Beside teaching, he has fond interest in sharing TRIZ knowledge with various parties especially schools and university students. He can be contacted at email: jamalrizal@umpas.edu.my.






Nur Hazirah Hamdan    received her bachelor degree in finance from Universiti Teknologi MARA, Melaka, Malaysia in 2011, Master Business Administration from Universiti Teknologi MARA, Shah Alam, Malaysia in 2014, and Ph.D. holder in Islamic Banking and Finance from International Islamic University Malaysia in 2022. She is currently Senior Lecturer at Universiti Teknologi MARA, Pahang Branch, Raub Campus, Malaysia. Her research interests include social science, finance, and public administrative. She can be contacted at email: hazirahamdan@uitm.edu.my.



Mohd Rozaimy Ridzuan    is a lecturer at the Faculty of Administrative Science and Policy Studies, UiTM Pahang Branch, Raub Campus. He earned a Bachelor of Administrative Science from UiTM Shah Alam and later pursued a Master of Administrative Science at the same institution. Concurrently, he also pursued a Master's in Public Administration at the University of Malaya, Kuala Lumpur. Actively involved in writing, he contributes articles to journals and newspapers such as Harian Metro, Berita Harian, Sinar Harian, Mingguan Malaysia, Utusan Malaysia, and The New Straits Times. He can be contacted at email: rozaimy@uitm.edu.my.



Lai-Kuan Kong    holds a Doctor of Philosophy (Ph.D.) in small and medium-sized family business, a Master of Science in Management, and a Bachelor of Arts in International Studies. Her areas of expertise and research concentration are in quantitative behavioral studies, small and medium-sized family business and educational research. She presently works as academic staff at the Faculty of Business and Management, Universiti Teknologi MARA (UiTM), and has over 18 years of experience in the academic field. She can be contacted at email: konglaikuan@gmail.com.