Parental Intention in Getting Children Vaccinated Against COVID-19 Virus: A Case in Iligan City, Philippines

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Abstract

The COVID-19 pandemic has had a profound impact on individuals, health systems, and economies globally. Despite the administration of 13.3 billion vaccine doses worldwide, which has mitigated the devastating effects of the COVID-19 virus, children under five years of age in the Philippines remain vulnerable, as vaccination for this age group has not yet been authorized. This study explores the variables that influence the intent of parents to vaccinate their six-month-old to four-year-old children against the COVID-19 virus. A face-to-face survey was conducted on 200 parents with children aged six-month-old to four-year-old in Iligan City, Philippines from August to October 2022. The findings revealed that 47% of the respondents expressed vaccination intent for their children. Regression analysis showed that intention differed by sex, educational attainment, religious affiliation, and vaccination status, in which male, Catholic, college-degree holders, and vaccinated parents stated higher intention to vaccinate children. Under the Health Belief Model, perceived barriers ($p<0.01$), self-efficacy ($p<0.01$), and cues-to-action ($p<0.01$) were predictors of children's vaccination intention, while no significant relationship existed between parental intent and the perceptions of susceptibility and severity of contracting the virus and benefits of vaccines. Based on the findings, the following recommendations are proposed: Firstly, government and health institutions should implement strategies to increase vaccine uptake among parents. Secondly, future programs should be designed to address barriers and empower parents to make informed decisions regarding their children's health. Finally, Special attention should be given to mothers, individuals without a college degree, non-Catholic parents, and unvaccinated parents to enhance trust and compliance with COVID-19 vaccination programs targeting this age group.

Keywords: *COVID-19 Virus, children vaccination, parent, intent, Health Belief Model*

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Introduction

In December 2019, the first-ever cases of the COVID-19 outbreak were reported in Wuhan, China where it rapidly spread to neighboring cities and countries, infecting much of the globe in due course (Andersen et. al., 2020). A month later, the first confirmed case of the virus was detected in the Philippines (Department of Health [DOH], 2020). Since then, the country has been struggling with the COVID-19 pandemic, with 3,685,643 total cases, 7,165 active cases, and 60,341 deaths reported by April 30, 2022 (DOH, 2022a). To counter this, several preventative measures have been introduced by the Philippine government such as national and community lockdowns, mask mandates, mass testing, and contact tracing, among others. Most prominent of these measures comes in the form of COVID-19 vaccination which has proved itself as the most effective tool against the COVID-19 pandemic (National Institute of Health, 2022; Ladhani, 2022). As a result of various vaccination efforts undertaken by both national and local government units, as of May 2022, 45 Million Filipinos had been fully vaccinated, accounting for 61.9 percent of the country's total population (DOH, 2022).

While the development and deployment of vaccines have been the fastest in history, children have deliberately been left out in the administration of vaccines against COVID-19 (Kormann, 2020; Wiegand et al., 2023). This means that the children continue to be among the most severely impacted populations of the virus, with children under five years old having the highest increase in COVID-19-related hospitalization rates in the United State of America for example (Delahoy et al., 2021). It has also been determined that even if children and adolescents comparatively do not feel the most severe effects of COVID-19, many of those infected children are at risk of severe and long-term health outcomes (Blomberg et al, 2021). Aside from this, children remain one of the most susceptible age groups to contract the virus (Altamimi et al., 2022; Almaki et al., 2022; National Institute of Health, 2022); thus warranting vaccine intake.

Further exacerbating this is the hesitancy of parents to vaccinate their children against COVID-19 which has been one of the rising contemporary issues for medical care, even in the Philippines (Wiegand et al., 2023). It is reported that one in five parents do not intend to vaccinate their children against COVID-19 (Ruggiero et al., 2021). Several studies have mirrored this result wherein many parents have shown unwillingness to vaccinate their children against the COVID-19 virus (Teasdale et al., 2021; Rane et al., 2022).

As of July 19, 2021, there has been a reported 4.1 million cases of COVID-19 in children globally. By July 2022, it has been reported that children below five years old accounted for around 2.47% of all COVID-19 infection cases worldwide (World Health Organization [WHO], 2022a). Additionally, the same age group was reported to represent 0.11 percent of the global mortality rates associated with COVID-19 (WHO, 2022a). This is a significant ratio that ought to be paid attention to especially since schools have finally opened for face-to-face classes by the time of this writing and such has the potential to increase COVID-19 transmissions and disease outbreaks in the country (Gurdasabu et al., 2021; Gurdasani et al., 2021). The problem, however, is that public health policymakers can only give so much attention and can only do so much effective policy-making if they do not exactly know what

drives and abstains parents, who are responsible for decision-making regarding a child's health, from being vaccine-optimistic. Therefore, knowing what drives parents to vaccinate or not vaccinate children is paramount in identifying how to improve current public health policies in a way that mobilizes parents to participate in vaccination measures. Choosing interventions that complement the range of factors that facilitate parental intention is thus crucial for successful vaccination campaigns and, ultimately, to achieve the goal of herd immunity.

To provide an answer to this conundrum, this study examined the factors that influence the intent of parents to vaccinate children against the COVID-19 virus. This is one of the first attempts to study the health beliefs and attitudes of parents from Iligan City with regard to the vaccination of their children. Data through this research can provide not only the local government but also the national government with vital information that can help address issues that deter effective vaccine deployment.

Theoretical Framework and Hypothesis

Since the perception and personal beliefs of parents have been found to inform the decision to vaccinate children against COVID-19 virus (Ruggiero et al. 2021), this study investigated the factors that influence the intention of parents to vaccinate children against COVID-19 virus. Specifically, this study sought to identify whether parental intent differed by sex, age, household income, educational attainment, religious affiliation, and vaccination status. Moreover, this paper sought to investigate the influence of perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action, to the parental intent to get their children vaccinated against the COVID-19 virus.

This study utilized the Health Belief Model (HBM) to examine the factors that influence parents' intent to vaccinate their children aged six months to four years against the COVID-19 virus. This theoretical framework was originally constructed in the early 1950s in response to the lack of behavioral theories explaining the infrequent usage of public health services oriented toward prevention (Rosenstock, 1974). Today, this model has been widely applied in multiple studies to understand why people decide whether or not to engage in a range of health preventive behaviors, such as compliance towards vaccination campaigns (e.g., Zampetakis & Melas, 2021). According to the HBM, the individual belief or the subjective response to a particular health-related concern influences their health-related behaviors (Carpenter, 2010). This model hypothesizes that factors such as perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action alike influence the intent of an individual to adopt a specific health preventive action. HBM also hypothesized that sex, age, household income, educational attainment, religious affiliation, and vaccination status of the respondents directly influence the intent to get their children vaccinated against the COVID-19 virus.

Perceived susceptibility is defined as the extent to which an individual believes that he/she will be at risk of getting infected with the disease in question (Rosenstock, 1974). This was examined in this research as it has been found that it is more likely that an individual will express a higher level of intent to get vaccinated against the COVID-19 virus if they feel to

be at more risk of contracting a disease in question (Wong et al., 2020; Seangpraw et al., 2022; Abraham & Sheeran, 2005). Thus, it is hypothesized that perceived susceptibility has a positive influence on the intent of parents to get their children vaccinated against the COVID-19 virus.

Perceived severity was assessed as it has been generally observed that individuals are more likely to take the new vaccine if they believe that getting infected by the disease in question can cause harm and serious medical consequences (Orji et al., 2012; Cahapay, 2022). It is hypothesized that perceived severity has a positive influence on the intent of parents to get their children vaccinated against the COVID-19 virus.

Perceived benefits were also applied in the present study as the belief of an individual towards the effectiveness of getting vaccinated in reducing the risks and threat of the current virus increases COVID-19 vaccine uptake. It is hypothesized that perceived benefits has a positive influence on the intent of parents to get their children vaccinated against the COVID-19 virus (Lin et al., 2020; Coe et al., 2022; Reindl & Catma, 2022)

Perceived barriers were taken into account as low intentions to vaccination against the COVID-19 virus are found to be related to the high perceptions of obstacles, such as cost, convenience, pain, and embarrassment, in adopting such new health-related action (Orji et al., 2012; Cahapay, 2022). It is hypothesized that perceived barriers have a negative influence on the intent of parents to get their children vaccinated against the COVID-19 virus.

Self-efficacy is defined as the belief of individuals on their ability to successfully do certain health actions to achieve desired outcome (Rosenstock et al., 1988). This was also analyzed as it is generally believed that individuals are less likely to adopt new health behaviors unless they are confident they are capable of doing it. Self-efficacy has also been found as the most influential construct in the HBM that drives people to engage in healthy behaviors (Orji et al., 2012; Liao et al, 2011; McClenahan et al., 2007). It is hypothesized that self-efficacy has a positive influence on the intent of parents to get their children vaccinated against the COVID-19 virus.

Cues to action refer to the stimulus that triggers an individual to perform certain health-recommended behavior. This construct is added as this has been acknowledged as essential to the process of making health decisions (Rosenstock, 1974; Coe et al.; 2012; Reindl & Catma, 2022). It is hypothesized that cues to action have a positive influence on the intent of parents to get their children vaccinated against the COVID-19 virus.

Corollary, the Health Belief Model has been proven to have the capacity to significantly explain the factors that influence compliance with various health behaviors, particularly those oriented towards health preventive actions and new health practices such as COVID-19 vaccination of their children. Specifically, the model can likewise serve as a guide in understanding the extent of how the predisposing factors of HBM can facilitate or deter the intent of the parents to get their children vaccinated against the COVID-19 virus. With the strong empirical evidence supporting that HBM can explain health-related beliefs and behaviors, this theory can thus trace the factors that influence parents to vaccinate children

against the COVID-19 virus and explain why parents still reject this new health preventive measure. In view of the foregoing, this study proposed the Modified Health Belief Model as shown in Figure 1.

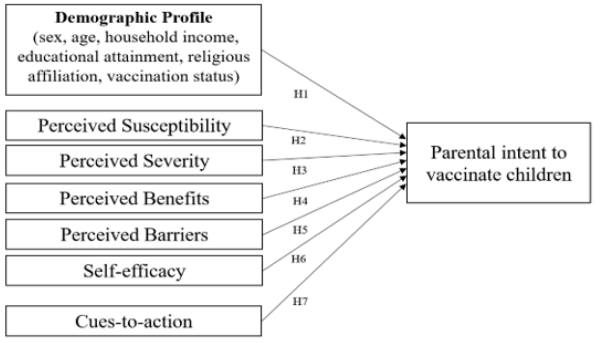

Figure 1. *Modified Health Belief Model*

Methodology

This study utilized a quantitative approach to determining the variables influencing parental intent to vaccinate their children against the COVID-19 virus. The research sample comprised parents in Iligan City, each having at least one child aged between six months and four years during the data collection period. A total of 200 respondents were selected through non-proportional quota sampling, due to the challenges in meeting the essential criteria for respondent selection. Survey questionnaires were used for gathering data from the respondents. During the data collection process, respondents were assured of the anonymity and confidentiality of their responses to ensure that they felt comfortable providing truthful information. The respondents were asked to indicate their level of agreement with the construct indicators using a five-point Likert scale. A chi-square test was performed to assess the difference in intention among subgroups. Multiple linear regression analysis was used to determine if the HBM constructs were predators of parental intention.

Before the actual data collection, a pilot test of the survey questionnaire was conducted to evaluate the reliability and validity of the constructs, determined by Cronbach's alpha coefficient. According to Hair, et. al., (2017), a minimum Cronbach's alpha value exceeding 0.70 is required to establish the instrument's reliability. Table 1 below presents the results of the reliability analysis from the pilot test, which was administered to a convenience sample of thirty (20) respondents.

Upon collection, data was analyzed using Statistical Package for the Social Science (SPSS) version 24 and SmartPLS version 4. The characteristics of the samples were shown through descriptive statistics like percentage, mean, and standard deviation. In testing the association between socio-demographic variables and parental intent, a Chi-Square test was performed, wherein a p-value greater than <0.05 was considered significant (Jabar et al., 2021). Multiple regression analysis was conducted in SmartPLS to test the relationship

between HBM variables and parental intent. A path coefficient weight of at least 0.10 with a p-value of less than 0.05 is considered a statistically significant relationship (Hair et al., 2017; Henseler et al., 2012). After individually testing every component, those found to be significantly associated with vaccination intentions were added to the final theoretical model simultaneously. Finally, a regression square (R2) value was examined to measure the predictive power of the model used in the study (Hair et al., 2017).

Table 1. *Reliability and Validity Results of the Survey Instrument*

HBM Construct	*Cronbach's Alpha (α)* [a]	*rho_A* [b]	*Composite Reliability* [c]	*Average Variance Extracted (AVE)* [d]
Perceived Susceptibility	0.846	0.971	0.793	0.565
Perceived Severity	0.850	1.024	0.811	0.519
Perceived Benefits	0.959	0.990	0.950	0.768
Perceived Barriers	0.823	0.916	0.823	0.524
Self-Efficacy	0.969	0.977	0.969	0.865
Cues-to-Action	0.941	0.955	0.938	0.757

[a] $\alpha > 0.7$ indicates internal consistency reliability (Hair et al., 2021)
[b] rho_A value 0.7 confirms construct reliability and validity
[c] CR value ≥ 0.7 shows internal consistency (Gefen et. al., 2000).
[d] AVE score ≥ 0.5 shows commonality of item indicators (Hair et al., 2021)

Results

Characteristics of the Respondents

From the samples, 83.5% were mothers while the 16.5% were fathers. Majority of the respondents were between 26 to 40 years old, accounting to 55.5% of the samples. In terms of educational attainment, 51.50% of the respondents were high school graduates while college graduates and elementary graduates comprised 32% and 16.5%, respectively. Seventy-six percent (78%) were Roman Catholic, while Muslims and those who affiliate as members of other Christian denominations were only 7.5% and 14.5%, respectively. For the household income, the majority (n=147, 73.5%) had a monthly income of less than Php 10,597. Almost all of the respondents (91%) were vaccinated with the COVID-19 vaccine.

The intention of Parents to vaccinate children aged 6-59 months

The respondents in this study indicated a slightly positive to a neutral response *(mean=3.26 ± 1.16)* about their intention to get their children vaccinated against COVID-19 virus. When asked whether they consent to have their children vaccinated, the majority of the responses indicated intent (31% agreed and 14% strongly agreed), while 18% disagreed,

8.5% strongly disagreed, and the other 29% remained neutral.

Influence of Sociodemographic Variables on Parental Intention

As shown in Table 2, the results revealed that the sex, educational attainment, religious affiliation, and vaccination status of parents significantly influence the intent of parents to vaccinate their children against the COVID-19 virus. Other variables such as age, monthly household income, and vaccination status of parents have not shown a significant influence on parent's intention.

Table 2. *Relationship between demographic profile and the intention of parents to vaccinate their children against COVID-19 virus.*

Hypothesized Relationship	χ2	p-value	Interpretation
Sex -> Intent	26.311	0.011*	Supported
Age -> Intent	2.713	0.679	Rejected
Monthly Household Income -> Intent	16.305	0.335	Rejected
Educational Attainment -> Intent	5.146	0.001*	Supported
Religious Affiliation -> Intent	8.171	<0.001*	Supported
Vaccination Status -> Intent	5.956	<0.001*	Supported

*Note: ns= not supported; * significant relationship*

Influence of the HBM Constructs on Parental Intent

Results of regression analysis are shown in Table 3. Among the components of HBM, perceived barriers, self-efficacy, and cues-to-action have a significant influence on the intention of parents to vaccinate their children against the COVID-19 virus. No substantial evidence is found to suggest a significant relationship between perceived susceptibility, perceived severity, perceived benefits, and parental intention.

Table 3. *Relationship between HBM constructs and the intention of parents*

Hypothesized Relationship	Path Coefficients (β)	p Value	Interpretation
Perceived Susceptibility -> Parental Intent	0.033	(ns)	Rejected
Perceived Severity -> Parental Intent	-0.041	(ns)	Rejected
Perceived Benefits -> Parental Intent	0.089	(ns)	Rejected
Perceived Barriers -> Parental Intent	-0.170	0.001*	Supported
Self-Efficacy -> Parental Intent	0.349	0.001*	Supported
Cues-to-action -> Parental Intent	0.438	0.001*	Supported

Based on the overall findings in the preceding discussions, this study proposes the Parental Intention to Vaccinate Children Model in Iligan City as being illustrated in Figure 2. It demonstrates that parental intentions to vaccinate children under five years old against

COVID-19 virus is influenced by factors of sex, educational attainment, vaccination status, religious affiliation, perceived barriers, self-efficacy, and cues to action.

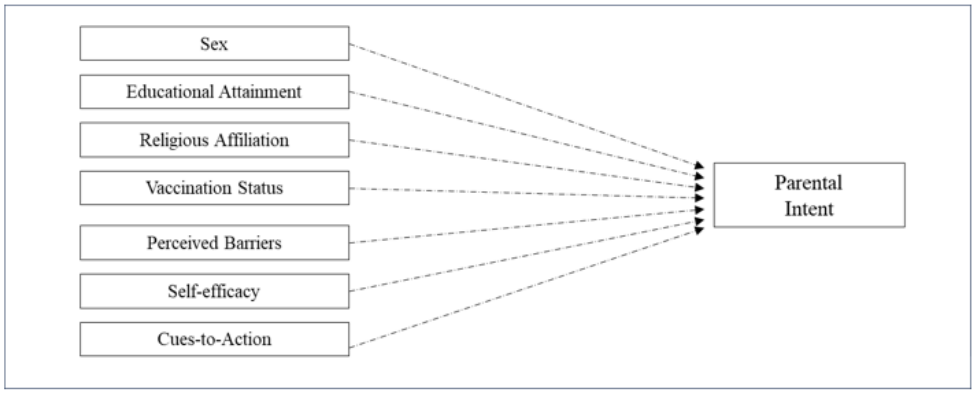

Figure 2. *Model for Parental Intention to Vaccinate Children*

Predictive Utility of Modified HBM Model to explain Parental Intent

In measuring the predictive power of HBM as a theoretical framework to understand the motivating factors of parents to vaccinate their children, regression squared (R2) was used. Henseler et al. (2012) proposed a rule of thumb for acceptable R2 with 0.75, 0.50, and 0.25 is described as substantial, moderate and weak respectively. As seen in Table 4, the results showed a R2 score of 0.613, indicating that the constructs of HBM can explain 61.3% of the variation in the parents' intent to vaccinate their children.

Table 4. *Coefficient of Determination for Parental Intent*

Variable	Coefficient of Determination (R^2)
Parental Intent	0.613

Discussion

Vaccination remained the most important health measure against COVID-19 pandemic (WHO, 2022b; Ladhani, 2022; Chen, 2023). However, whether or not the future pediatric vaccination programs against this virus become successful depends largely on whether the parents support it. After all, it is the parents who decide if they choose to vaccinate their children or not. As the first study to date in Iligan City that examines parent's view regarding vaccination of children under five years old, the findings herein can provide useful baseline information for future research and follow-up policy interventions, taking into account that vaccination for the said age group remained unauthorized in the Philippines.

The results in this study reveal that intention to vaccinate children differed according to parents' sex, educational attainment, religious affiliation, and vaccination status. This implies that pediatric vaccination attitudes vary across different socio-demographic groups. In terms of sex, this study observed that men were more likely to vaccinate their children compared to women. This finding is consistent with the results of studies conducted in the US and Saudi Arabia (Litaker et al., 2021; Almalki et al., 2022; Ruiz & Bell, 2022).

Nevertheless, this result is not universal. In fact, a similar study in Hong Kong and Poland reported that mothers showed more favorable attitudes and willingness in vaccinating children against COVID-19 (Wang et al., 2022; Babicki et al., 2021). The reason for this discrepancy is unclear yet previous studies provided explanations why vaccine acceptance remains gendered. For example, Liu and Li (2021) found that women's vaccination hesitancy is associated with women's greater circumspection around health. Accordingly, this attitude explains why vaccine hesitancy among women was more pronounced at early stages of pandemic (Liu & Li, 2021); and even possibly why they expressed adverse worry and fear on the side effects of COVID-19 vaccines (Bono et al., 2021).

Notwithstanding, the circumspection attitude in women could also explain why women are more likely to adjust their view regarding vaccination and express more positive behavior towards it the more information they receive about the efficacy and safety of the vaccine (Liu & Li, 2021). For this reason, it comes as no surprise why women expressed less intention in the present study considering that information about vaccines for children under five years old was rather scant at the time that the data collection was conducted. Even so, this attitude is also an optimistic signal that we may see positive changes in the level of intention of women to vaccinate their children once more efforts and programs are undertaken to facilitate acceptance towards pediatric vaccination against COVID-19.

Results also showed that parental intent to vaccinate children was significantly influenced by their educational attainment, with college graduates expressing greater willingness to vaccinate. This result is in concordance with the findings of many authors who obtained evidence that parents with higher educational level were more eager to vaccinate children against COVID-19 virus (Szilagyi et al., 2021; Bono et al., 2021; Litaker et al., 2021; Aedh, 2022; Ruiz & Bell, 2022). Possible reasons for this may include the differences in exposure to vaccine safety concerns and information sources (Szilagyi et al., 2021; Ennaceur & Al-Mohaithef, 2022). For instance, evidence has been found that those with lower educational attainment were more likely to become susceptible to misinformation about vaccines (Bitar et al., 2021). Taken together, this suggests that interventions and communication strategies should be tailored to match towards all educational backgrounds as the same will be critical to address hesitancy and children-vaccine concerns in the city.

Intention to vaccinate children against COVID-19 virus also differed based on parent's religious affiliation. This complements many global studies affirming that religious affiliation has a significant relationship with the willingness towards vaccine uptake (Aedh, 2022). The findings showed that those who affiliate as Roman Catholic intended to vaccinate their children against COVID-19 than Muslims and Non-Roman Catholic. Reasons for this disparity may include concerns on the halal status and other components of the vaccines

(McKee & Bohannon, 2016). As Flores and Garinto (2022) pointed out, religious leaders played a pivotal role in encouraging vaccination as they may set a tone for their constituents to follow. Thus, although samples in this study are skewed to parents who do not affiliate as Roman Catholics, the findings here still denote that more focus should be given to Non-Catholics as they expressed less intention to vaccinate children against COVID-19 virus.

Lastly, vaccination status also affected parents' willingness to vaccinate their children, with vaccinated parents being more willing compared to unvaccinated ones. It is expected as evidence has been found that many parents who were hesitant to vaccinate for themselves were also more likely to be hesitant as in vaccinating their children (Szilagyi et al., 2021; Khatatbeh et al. 2022; Almalki et al., 2022).

As previously noted, several researches have already been undertaken using HBM as this framework has been impressively proven to have the capacity to explain motivating factors of intention to vaccinate (Reindl & Catma, 2022; Seangpraw et al., 2022; Chen et al., 2021). In testing the predictive utility of the framework in the present study, the results conclude the HBM to be an apt model to use in understanding parental intention with regards to getting their children vaccinated with the COVID-19 vaccine. It showed that the proposed framework in this study may explain 61.3% of factors of parental intent (Henseler et al., 2012).

Among HBM components, we find that perceived barriers negatively influence parental intent, which is aligned with previous literature showing that perceived barriers have a negative effect on COVID-19 vaccination willingness (Zartaloudi, 2022; Almalki, et al, 2022; Reindl & Catma, 2022). Even in the Philippines, Capahay (2022) disclosed that low perceived barriers predict the intention to vaccinate against COVID-19. As also depicted in the findings, the primary reasons for parents' hesitancy include concerns about the safety, side effects, and lack of effectiveness of vaccines (Huynh et al., 2022; Ruiz & Bell, 2022). These concerns possibly stem from the negative information and related events that parents have discovered from social media and their acquaintances (McKee & Bohannon, 2016; Ruiz & Bell, 2022). As researches have shown that negative information generally fosters more attention and is typically perceived as more credible compared to positive information, regardless of the evidence supporting the safety and efficacy of vaccines, the negative information will still overwhelmingly cause unintended fears and uncertainty about vaccines which in turn will have a significant effect on the capacity of parents to make well-informed decisions about children's vaccination (Ruiz & Bell, 2022, McKee & Bohannon, 2016).

Similarly, studies have shown that humans have the tendency to commit omission−commission bias during health crises (Ritov & Baron, 1992; Robertson et al., 2021). This explains why individuals respond more strongly to actions that involve risk, such as vaccination of children, than any inaction that involves risk like not getting vaccinated. Attention is therefore needed to address the perceived barriers towards children's vaccination as it may have an important implication for the success of future COVID-19 vaccine promotion campaigns for children under 5 years old.

However, the results in this study contravene with a significant number of studies citing

that a person's belief of their susceptibility to contracting COVID-19 and other diseases makes them more likely to adopt health preventative behavior such as vaccination (Seangpraw et al., 2022; Abraham & Sheeran, 2005; Sim et al., 2014; Chen et al., 2021). Explanations for this may include individuals downplaying their vulnerability to contracting the disease (Redding et al., 2000; Fathian-Dastgerdi et al., 2021), people naturally adjusting to the pandemic over time (Phillips et al., 2022), or the unintended effects of lockdowns which tend to transfer health-related responsibilities from the individual to the state (Hargreaves & Logie, 2020).

No significant influence was also found with regard to the perceived severity component, as echoed by a number of preceding studies (Janz & Beker, 1984; Coe et al., 2012; Cahapay, 2022). The World Health Organization (2017) asserts that this may be because of the relative absence of diseases such as those caused by viruses; thus, the fear of viruses is being replaced with the fear of unintended effects of vaccines itself. Jabar et al. (2021) also outlined that as more and more individuals become more aware of the nature and the health effects of the COVID-19 virus, the decision whether or not to vaccinate is now hinged on benefits, barriers, and cues-to action, as opposed to perceived severity.

Perceived benefits also appear to not have significant influence on intent, which contradicts most preceding literature that has established a significant positive correlation between one's perceived benefits and one's intent to vaccinate (Reiter et al., 2020; Lin et al., (2020); Coe et al., 2022; Reindl & Catma, 2022). Despite this, a number of noteworthy studies that reached similar results have put forward various interpretations. Karrafilakis and Larson (2017) posited that oftentimes perceived benefits can be outweighed by the perceived risks of vaccination which leads to people having safety reservations about being vaccinated. Additionally, Robertson et al. (2021) argued that respondents who were hesitant to vaccinate had lesser perceived benefits of vaccination due to the 'affect heuristic' which is the psychological phenomenon that describes a person's reliance on feelings to guide decisions rather than reliable information. This precipitates the inverse correlation between perceived benefits and perceived risk.

In light of this, it can be asserted that the study's results regarding perceived benefits reflect a largely vaccine-hesitant pool of respondents who either lack awareness of the benefits of vaccination or are attributing risks more to vaccination rather than benefits. Either way, the results pose a need to better highlight the benefits of vaccination in order to increase parental intention to vaccinate their children under five years old, and ultimately outweigh perceived risks attributable to COVID-19 vaccination. Studies have also shown that people who lack information regarding vaccines made them unsure of their intention to vaccinate, preferring to "wait and see" before deciding whether to vaccinate or not (Evans et al., 2021; Szilagyi et al., 2021). This phenomenon can also serve as a viable interpretation to the study's results on perceived benefits especially since COVID-19 pediatric vaccination is yet to be introduced in the Philippines.

On a different note, self-efficacy was found to have an influence on intent, which goes in accordance with a significant number of related studies asserting that self-efficacy is a strong determinant of health preventative measures such as vaccination against COVID-19 and

other diseases (Redding et al., 2000; Orji et al., 2012; Mehta & Sharma, 2011; Fathian-Dastgerdi et al., 2021; McMahon, 2018; Guidry et al., 2021; Rosenthal & Cummings, 2021; Limbu et al., 2022; Shah et al., 2022). This effectively shows that programs and efforts to boost confidence of parents in their own abilities to achieve a desired action (i.e. conduct research on COVID-19 vaccines, participate in vaccine discourse, and make meaningful decisions about vaccinating their children) may lead to higher level of intention to have their children under five years old be vaccinated against the COVID-19.

Finally, the same positive influence on parental intent was found with the variable cues to actions. These findings are supported by existing literature which has asserted cues to action as a major determinant of health preventative behavior intention (Coe et al.; 2012), such as getting children vaccinated against the COVID-19 virus (Reindl & Catma, 2022; Szilagyi et al., 2021). In addition, this study observed that prompts from vaccine recommendations made by healthcare professionals had the greatest impact on vaccination intentions which is a common theme found in a number of related studies concerning vaccine behavior (Reindl & Catma, 2022; Donaldiki et al., 2014; Fontenot et al., 2014). Several studies also assert that parents tend to rely on their children's doctor for information involving COVID-19 pediatric vaccination which then serves as a prompt to get them vaccinated (Middleman 2021; Szilagyi et al. 2021). Aside from healthcare provider recommendations, prompts from peers and family also serve to impact vaccine intentions. This indicates that if an individual receives good support from their peers with regard to getting vaccinated, they will then be more likely to get it (Richards, 2016; Chen et al., 2021). In conclusion, the results in the present study suggest that cues which prompt pediatric vaccination will be instrumental in vaccine acceptance, whether it comes from health professionals, government instrumentalities, or peers and friends of the parents.

Limitation and Future Research Directions

The present study is limited in several aspects. First, while having a larger sample size is ideal, the absence of an estimated population of respondents and the challenges associated with identifying and recruiting participants resulted in a relatively limited sample size. Therefore, future studies should endeavor to overcome these limitations by implementing strategies to accurately estimate the population and enhance the recruitment process to achieve a larger and more diverse sample. Second, a control group was not considered in the study because vaccination of children aged six months to four years had not yet been authorized in the Philippines at the time of the data collection. Consequently, this study aims to identify the factors influencing parental intent to vaccinate in anticipation of potential future vaccination authorization for this age group. Future research should consider incorporating a control group if vaccination for the said age group is available, to enhance the study's robustness and provide more comprehensive insights. Finally, the current study is purely quantitative, focusing on numerical data and statistical analysis to understand the variables influencing parental intent to vaccinate children aged six months to four years. While the quantitative approach provides valuable insights, future studies would benefit from incorporating the qualitative approach. Qualitative methods, such as interviews or focus groups, could offer deeper, more nuanced understandings of parental attitudes, beliefs, and motivations regarding vaccination.

Conclusions

While the recorded cases of COVID-19 infections have significantly decreased, experts warn that it will remain a persistent public health threat worldwide as the virus continues to spread and evolve (Wise, 2023). The resumption of traditional face-to-face classes in the Philippines, along with the lifting of COVID-19 health protocols and restrictions, pose another concern since the increased in-person interaction as a result thereto may trigger the next surge of COVID-19 outbreaks (Gurdasabu et al., 2021; Gurdasani et al., 2021). As noted in several studies, the most potent protection against the COVID-19 virus remains to be vaccination (WHO, 2022b; Ladlani, 2022; Chen, 2023). However, as we are seeing statistics which show that Filipinos are becoming less and less likely to vaccinate themselves and their children (Wiegand et al., 2023), empirical information which informs what affects the actual vaccination decision-making process of the parents for their children is extremely vital to ensure optimal vaccine uptake.

This study contributes to the literature by attempting to answer three fundamental questions, to wit: (1) Do the parents in Iligan City have the intention to vaccinate their children aged six months to four?; (2) Is the intention to vaccinate children different among subgroups?; and, *(3)* Are the components of the HBM capable of examining the factors that influence parent's intent to vaccinate children aged six months to four against the COVID-19?

In this study, the findings showed that parental intention to vaccinate children is influenced by sociodemographic characteristics of parents. Particularly, sex, educational attainment, religious affiliation, and vaccination status of the parents are important variables to consider when predicting the intent of parents to vaccinate their children under five years old. Should pediatric vaccination be required in the Philippines, special attention is needed to specific concerns of parents who are women, Non-Catholic, unvaccinated and with low educational attainment as they are found to be the least willing to vaccinate their children in this study. Otherwise, health interventions and communication strategies may emerge ineffective in facilitating pediatric vaccine acceptance among the Filipino public.

Remarkably, results in the present study also reveal that Health Belief Model substantially aids in understanding the factors involved in parental intention; and among its components, cues to action poses as the highest determinant of parents' intention to vaccinate their children. This implies that the orchestrated encouragements of the health community, government agencies and other entities trusted by parents will play a unique but instrumental role to increase vaccine acceptance and, ultimately, to ensure a successful vaccination programs for children under five years old should it be needed in the future to control the effect of COVID-19 virus.

Consistent with existing literature, we also found that concerns about the safety, efficacy and side effects of vaccines remained a significant facilitators of reluctance to vaccinate children. As the data in the present study indicate significant negative influence of perceived barriers towards parental intent, this underscores the need for more effective strategies in helping the parents understand the benefits and disregard misconceptions and misinformation

about vaccines. Leveraging this with the confidence of the parents to handle and make COVID-19 vaccination decisions for their children may also prove to be helpful as self-efficacy is found to have a significant positive relationship with parental intent.

Overall, this study confirmed the need for more strategic, informed, and responsive health programs to address parents' declining willingness to vaccinate their children under five years old against COVID-19, and to increase support for future vaccination roll-out programs. Importantly, this revealed modifiable variables that deter and influence parents' intention to vaccinate their children against COVID-19 which will surely guide health policy and communication strategies to increase vaccine uptake. And since a large number of Iliganon parents stated low intention to vaccinate their children, the government should work twice as hard in maintaining vaccine trust and confidence as post COVID-19 Philippines confront.

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