RESEARCH ARTICLE

Predictors of Intention to Vaccinate for COVID-19 in the Philippines: Do Trust in Government and Trust in Vaccines Really Matter?

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Abstract: This paper interrogates the influence of trust in government, trust in vaccines, and access to vaccine-related information as predictors of intention to vaccinate for COVID-19 among Filipinos. It also examines the relationship between social- and personal-related measures and the intention to vaccinate. Data for this article were collected from an online survey involving 1,953 respondents, conducted from July 28 to August 2020 before the trials were completed and emergency use authorizations were issued for any of the currently approved COVID-19 vaccines. Multinomial regression results show that trust in vaccines, sex, income, perceived risk exposure, and perceived health status were significant predictors of intention to vaccinate for COVID-19. Access to information, however, was not a result that possibly arose from the mixed bag of true and false information about vaccines that proliferate, especially online. These results suggest that trust in vaccines will likely encourage individuals to vaccinate. It is recommended that the Philippine government launch confidence-building measures and strategic communication that will help build people's trust in the vaccines. Educating the public and improving awareness about risk exposure is thus needed to stimulate intention or interest among the population to get vaccinated for COVID-19.

Keywords: COVID-19, vaccines, trust, healthcare, government, information, vaccine propensity, vaccine hesitancy

Scholars examine attitudes toward vaccination in different ways. However, the most common concepts or terms being used in vaccine studies include acceptance (Lazarus et al., 2021), confidence (Badur et al., 2020; Harrison & Wu, 2020), propensity, and hesitancy (Badur et al., 2020). As defined by the World Health Organization, vaccine hesitancy refers to the "delay in acceptance or refusal of vaccines despite availability of vaccine services and can be influenced by complacency, convenience, and confidence" (Badur et al., 2020, p. 1008). However, this current paper uses

the intention to vaccinate as the conceptual focus to emphasize the behavioral (Böhm et al., 2019) and agentic aspects of health-related personal decisions.

This paper, while it is informed by the Health Belief Model (HBM), goes beyond the individual, which is one of the major critiques of such a model. As observed by scholars, the model fails to account for factors outside the individual. As Abraham and Sheeran (2016, p. 57) put it, "it (Health Belief Model) portrays individuals as asocial, economic decision-makers and consequently fails to account for behavior under

social and affective control." Given this limitation, this present paper examined the intention to vaccinate in the light of trust in government, trust in vaccines, family members' past experience with vaccination, and access to information from various sources (i.e., informants actively or passively seeking information) as variables to explain intention to get vaccinated. Although it veered away from the model, concepts in HBM such as perceived susceptibility, perceived benefits, and cues to action are still used, although recasted using different concepts. For instance, perceived susceptibility is operationalized as perceived risk exposure. Perceived benefit, meanwhile, is embedded in the trust scale. However, as a limitation, this paper does not take into account issues related to barriers as well as the perception of potential severity. Instead, trust-related variables were introduced.

Trust in vaccines is assumed by the authors of this paper to significantly influence Filipinos' intention to vaccinate or the absence thereof. The past ignominy concerning a dengue vaccine in the country resulted in some Filipinos being hesitant to get any type of vaccine, including that of COVID-19. The study of de Figueiredo et al. (2020), in fact, identified the Philippines as one of the six countries that experienced a decrease in vaccine confidence between November 2015 and December 2019, particularly in terms of issues relating to "importance, safety, and effectiveness" (p.898). In the context of vaccination studies, trust is often measured in terms of safety and efficacy (Larson & Clarke et al., 2018). In the study of Jamison et al. (2019), trust in vaccines is attached to the trustworthiness of their producers. Aside from trust, this paper also examines the role of access to vaccine-related information in the intention to vaccinate. Access to information is necessary as it provides a basis for one's decision related to vaccination. The information an individual accesses, whether factual or not, impacts risk perceptions and vaccination decisions. For instance, perceptions of the risk of vaccines can vary based on how it is conveyed to the public by key individuals, groups, institutions, and the media (Larson et al., 2011).

Vaccine Hesitancy as a Continuum

Several studies have highlighted the changing degree or extent of vaccine hesitancy or acceptance. Gualano et al. (2019), in their systematic literature review, showed the varying attitudes toward vaccination among parents, healthcare workers, and the general populace over time. This means that some individuals may at one point desire to vaccinate, while at other times, they may opt not to vaccinate. Piltch-Loeb and DiClemente (2020) noted that five important factors might shape and reshape vaccine uptake. According to them, decisions to vaccinate are influenced by awareness of the health threat, availability of the vaccine, accessibility of the vaccine, affordability of the vaccine, and acceptability of the vaccine.

The varying levels of hesitancy have also been observed across different disease-specific vaccines (Yaqub et al., 2014). Such a phenomenon poses challenges in studying people's attitudes towards vaccines but, at the same time, reveals different entry points for policy interventions. The work of MacDonald et al. (2018), for example, identified specific measures in addressing hesitancy, such as targeting health communication, education of children, and the use of language and framing. To get vaccinated or not is a decision that is not fixed or static. Various factors come into play that shape and reshape one's acceptance or otherwise of a vaccine. For instance, in the Philippines, a study under the Vaccine Confidence Project revealed a substantial drop in people's trust in vaccine safety and effectiveness in the Philippines—with the majority (93%) "strongly agreeing" that vaccines were important in 2015 to only 32% in 2018 (Larson et al., 2019). Despite vaccination campaigns and immunization drives of DOH, childhood immunization has also declined from 79.5% in 2008 to 69.9% in 2017 (PSA, 2020). As such, the nationwide delivery of the Expanded Program on Immunization has suffered, causing an outbreak of polio and measles in different regions in 2019 (Department of Health, 2019). The rapid increase in the cases of vaccine-preventable diseases indicates that the existing approaches to rebuilding trust in vaccines at the macro and micro levels need to be revisited to prevent future outbreaks and contain future diseases.

The diversity of attitudes towards vaccines is a function of various individual and social factors. In particular, MacDonald and the SAGE Working Group on Vaccine Hesitancy of the World Health Organization (2015) identified a plethora of influences encapsulated in three categories: contextual, individual, and group and vaccine-specific influences. Interestingly, studies do not see the strong influence of socioeconomic status on vaccine hesitancy (MacDonald, et al., 2018;

Peretti-Watel et al., 2015), which is a slight departure from traditional studies concerning attitudes and perceptions. Also apparent in most definitions and frameworks of vaccine hesitancy are the features of trust and legitimacy of institutions involved in vaccination programs, such as the government (Yaqub et al., 2014), which are the main variables of interest in this study.

Trust in Government and in Vaccines in the Philippines and Overseas

In the Philippines, trust in vaccines has been synonymous with trust in government, most especially in the aftermath of the Dengvaxia controversy. How the government handled the issue and the propagation of unfounded narratives about its adverse effects significantly altered people's awareness and trust in vaccines and resulted in the unprecedented resurgence of prominent infectious diseases such as polio and measles (Tomacruz, 2018). And it is recognized that media has played a vital role in this controversy, and it is only through the same avenue that trust in vaccines can be rebuilt among the general population (Fatima & Syed, 2018).

This atmosphere of mistrust has unfortunately dominated the sentiments of the Filipino population even until the pandemic. A recent survey about COVID-19 vaccines in the Philippines showed that 47% of Filipino adults are unwilling to take a vaccine owing to safety concerns (Pulse Asia Research, Inc., 2020). Moreover, the current political situation, the close ties between the Philippines and China, and the highly militarized approach to handling the pandemic might have reinforced what Vergara (2021) called "social traumas." Such context might have further aggravated the problem of hesitancy. In this case, restoring trust in vaccines also necessitates simultaneous and constant rebuilding of trust in the government.

In other countries, anti-vaccine sentiments borne out of mistrust are almost as old as vaccination itself, as the first organized groups dedicated to it were established as early as the 19th century (Blume, 2006). Anti-vaccination sentiments usually are grounded on some population's low levels of trust in vaccines, partnered with the weak reinforcement of health institutions (Yaqub et al., 2014). These sentiments eventually paved the way for the development of organized movements, which are often reinforced by

deep-seated philosophical and religious beliefs (Blume, 2006). Its continuous growth has been observed in recent years, with perceived risks of vaccines as one of the prominent reasons (Yaqub et al., 2014), and is still making an impact on the delivery of the COVID-19 vaccine (Burki, 2020).

Trust was also crucial in forging vaccine confidence in the context of previous epidemics. In the United States, where partisan politics is more defined, it was found that trust in government and vaccines is relatively high among Democrats than among Republicans, which is likely influenced by the fact that the epidemic was happening under a Democrat-led U.S. government when the study was conducted (Mesch & Schwirian, 2015). This demonstrates how political contexts should also be considered in how vaccine trust is forged (Larson, 2018), most especially now that it is salient in how the government responds to the COVID-19 crisis.

Initial studies at the onset of the pandemic showed that there is still a great deal of uncertainty regarding the sentiments toward COVID-19 vaccines. Studies found that vaccine acceptance rates vary among different population groups. Most of the respondents of a recent global survey conducted among 19 countries showed significant willingness to take a COVID-19 vaccine, provided that it is safe (Lazarus et al., 2020). On the side of the healthcare workers, those who are directly administering vaccines to COVID-19 patients reported high rates of acceptance compared to those who are handling non-COVID-19 cases (Dror et al., 2020). Higher levels of acceptance have also been associated with higher trust levels in government information (Lazarus et al., 2020). This shows how the integrity and performance of governments play a vital role in the implementation of an efficient vaccination program.

A number of studies have examined the role of trust (e.g., Freimuth et al., 2017) in people's willingness to vaccinate (vaccine propensity) in other countries. The study of Justwan et al. (2019) found that respondents who strongly trust the Centre for Disease Control (CDC) in the United States exhibited positive views about vaccination (in this case, for measles). The critical review of Yaqub et al. (2014) identified trust issues (in health care providers/health system [also in Ozawa & Stack, 2013], government sources, and pharmaceutical companies) more than lack of information and misinformation as the primary reason

for vaccine hesitancy. The study of Palamenghi et al. (2020), meanwhile, concluded that willingness to avail of a COVID-19 vaccine is associated with trust in research and in vaccines (also in Ozawa & Stack, 2013). Their study opined that a low level of trust might negatively impact COVID-19 vaccine intentions. Vaccine decisions may also be influenced by the source of the vaccine.

The Role of Risk Communication in Vaccine Acceptance

Public perception of risks associated with vaccines and immunization are varying and complex. Negative public risk perception of vaccines can lead to long-term impacts such as a low level of vaccination coverage and recurrence of diseases and infections (Larson et al., 2012). Moreover, poor communication and information dissemination can shape the attitudes and behaviors of individuals towards vaccination in a negative way (Goldstein, et al., 2015). With the emergence of new epidemic diseases and the changing public perception of vaccines, scholars and experts emphasized the importance of risk communication at the individual and societal levels.

Learning from previous experiences and cases, studies on pandemic and vaccination perceptions suggest different models of risk communication. For instance, the U.K. Risk and Regulation Advisory Council (as cited in Bouder, 2015) focused on the "five As": assembling the evidence, acknowledgment of public perspectives, analysis of options, authority in charge, and interacting with the audience. This approach highlights the need to "test for trust" by taking public perspectives into account when devising a communication strategy. Alternatively, a three-step model on vaccine risk communication shows that risk assessment, risk communication, and risk mitigation are inextricably linked. Risk communication should be integrated into the whole process of managing risks related to vaccines. Operational and policy strategies employed through communication are essential in building trust in vaccines and mitigating existing and potential risks (Larson et al., 2012).

Although governments and institutions have utilized various approaches to communicate the benefits and risks of vaccines, efforts to improve vaccine risk communication must be sustained and intensified. An assessment of the current situation, risks, and measures for promoting vaccination must be done to reinforce

strategic communication at all levels. Furthermore, information to be shared with the public should be true, complete, balanced, and easily understood (Bozzola et al., 2020; Dittmann, 2001; Goldstein, et al., 2015). Overall, vaccine-related communication strategies can be used to relay and clarify information, reduce risks, manage public concerns, and maintain trust in vaccines (Bozzola et al., 2020; Larson et al., 2012). Amid a global pandemic such as COVID-19, having an integrated communication strategy plays a crucial role in potentially increasing vaccine acceptance and ensuring vaccine safety.

Understanding Vaccine Hesitancy Using the Health Belief Model

There are different models to explain vaccine hesitancy or acceptance. The most common of which is the HBM. The health belief model, developed by Hochbaum and Rosenstock in the 1950s, maintains that the likelihood of occurrence of a behavioral action (e.g., to vaccinate) is influenced by a confluence of factors, including socio-demographic characteristics (e.g., education, age, sex, race, ethnicity), perceptions (perceived susceptibility and perceived severity), expectations (perceived benefits, perceived barriers to actions, perceived self-efficacy to perform the action), and cues to action (e.g., media, personal influence, and reminders) (Rosenstock et al., 1988).

The study of Wong et al. (2020), for instance, examined intention to receive and willingness to pay for a COVID-19 vaccine using such a model. In their operationalization, they defined perceived susceptibility as one's belief or assessment of the likelihood of contracting the disease. This was defined as being anxious or worried about getting the virus, the perceived likelihood of being infected, and the perception of the possibility of acquiring the virus. These authors examined perceived severity as the understanding of the negative effects of the diseases on one's mental and physical health. These included the perception of the possible complications once infected, fear of getting the disease, and the perception that one will be very sick if infected with the virus.

Perceived benefits refer to the advantages of getting vaccinated, while perceived barriers refer to the psychosocial, physical, and financial factors that inhibit a person from performing the expected behavior. In the study of Wong et al. (2020), perceived benefits were measured in terms of the likelihood of reducing

the chance of being infected and of being worried. Perceived barriers, meanwhile, were examined in terms of doubts and concerns regarding efficacy, safety, affordability, side effects, and halal certification compliance. For cues to action, the authors included variables, namely, information (adequate information about the vaccine is acquired), people, and events (many people are receiving the vaccine), which can influence an individual to receive the vaccine.

There are mixed results as regards what factors within the model significantly explain vaccine acceptance or hesitancy. The results of the study of Wong et al. (2020) pointed out that the intention to take a COVID-19 vaccine among their respondents (n=1,159) was highly influenced by perceived benefits (decreased chance of infection and reduction of being worried). The study by K. Walker et al. (2021) revealed that mothers were somewhat skeptical about getting the COVID-19 vaccine due to their past vaccine hesitancy attitudes and behavior. However, their perceptions of threats or risks shaped their protected behaviors such as "handwashing, mask-wearing, and [physical] distancing." Their skepticism in getting the vaccine is due to issues of safety, efficacy, and conflicting information.

A multi-country study was conducted by Kebede et al. (2021) in Bangladesh, India, Kenya, Myanmar, Tanzania, and the Democratic Republic of Congo. Their analysis revealed that COVID-19 vaccine acceptance was significantly associated with "perceived social norms, perceived positive and negative consequences, perceived risk, perceived severity, trust in Covid -19 vaccines, perceived safety of Covid -19 vaccines, and expected access to vaccines" (p. 2) in Bangladesh, Kenya, Tanzania, and the Democratic Republic of Congo. However, in India and Myanmar, apart from the factors already mentioned, "self-efficacy, trust in Covid -19 information from leaders, perceived divine will, perceived action efficacy of the Covid-19 vaccine" (p. 2) were likewise found to be significantly associated with vaccine acceptance.

Variations in the results of studies using the health belief model to understand vaccine acceptance or hesitancy can be due to several factors, but most notably, the personal background of the individuals and the time or period in which these studies have been conducted. Although this review is not exhaustive, one can surmise that among health care workers, the factor that seems to drive them to accept vaccination

is its perceived benefits (Wong et al., 2020; Youssef et al., 2020) more than the other HBM factors, including the perception of susceptibility and severity. This may be due to the fact that health care workers are more or less familiar with the pathology of the disease. Among the general population, however, quite a number of the HBM factors seem to explain their willingness or otherwise to accept or receive the vaccine. These included perceived barriers (Wong et al., 2021; K. Walker et al., 2021; A.N. Walker et al., 2021, susceptibility, severity (Shmueli, 2021), cues to action (Wong et al., 2021; Shmueli, 2021), and benefits (Shmueli, 2021; K. Walker et al., 2021; A.N. Walker et al., 2021). However, as more and more people are becoming aware of the nature of COVID-19 (including transmission, prevention, and health effects), the decision to receive the vaccine is now more focused on benefits, barriers, and cues to action.

Despite its usefulness in understanding behavioral intention/action, the HBM has its limitations. This model, however, is very much appropriate to vaccination acceptance because this refers to a behavior that is not habitually expected. This model is highly criticized, though, because of the very reason that it cannot explain habitual behavior. Kirscht (1988) even suggested that the model may be best applied in less repetitive behavior that requires specific actions that are deemed as solutions to health predicaments (e.g., prevention of breast cancer through annual breast examinations; immunizations).

The other limitation of the HBM in examining behavioral intention is "trust" related variables. Given this limitation, we made reference to the work of Dubé et al. (2013). Their framework, to the minds of the authors, is somewhat informed by the HBM, such as the use of the concepts like perceived importance (benefits), knowledge and information (cues to action), risk perception, and trust (perceived risks). However, the framework of Dubé et al. (2013) included other contexts like past experiences, subjective norms, religious and moral convictions, trust in public health and vaccine policies, trust in health professional's recommendations, and trust in communication and media (i.e., traditional and social media and anti-vaccination activists). Informed by the HBM and the work of Dubé et al. (2013), this study, however, made some adjustments. First, the trust variable is related to trust in vaccines and trust in government. At the individual level, it looks into the influence of personal

demographics, risk exposure perception, perceived current health status, and access to vaccine-related information. Additionally, this study also looks into the family members' past experience with any type of vaccination.

Other Factors Influencing Vaccine Hesitancy

Understanding of individuals toward the risk of getting a vaccine varies differently, depending on different factors and circumstances. Larson et al. (2014), in their global analysis of vaccine hesitancy, revealed that despite several studies on vaccine confidence and refusal, some potentially relevant determinants of vaccine hesitancy still need to be identified and examined. Further studies now consider factors such as socioeconomic status, educational attainment, cost of vaccines, knowledge about the vaccines, familiarity with the disease, perceived consequences, and social, communication, and media environment as part of analyzing attitudes towards vaccines (Bond & Nolan, 2011; Larson et al., 2014). In some cases, psychological, sociocultural, and political factors such as religious and philosophical beliefs, unsuccessful immunization programs, inadequate health programs and infrastructures, negative publicity, and counter propagandas can also affect the acceptance and trust of people in vaccines (Barrelet et al., 2013; Dittmann, 2001; Larson et al., 2012).

A closer look at the existing case studies on immunization programs indicates that socio-demographic profile (gender, age, household composition, socioeconomic status) and family members' experience of getting a vaccine can also be associated with the change in public attitudes on vaccines. For instance, it is suggested that campaigns on COVID-19 vaccines should target women as decisions regarding the health and safety of their families often depend on them (Lazarus et al., 2020). Interestingly, studies do not see the strong influence of socioeconomic status on vaccine hesitancy (MacDonald & SAGE Working Group on Vaccine Hesitancy, 2015; Peretti-Watel et al., 2015), which is a slight departure from traditional studies concerning attitudes and perception. Instead, studies have shown the varying extent of vaccine hesitancy differentiated by population, namely parents, healthcare professionals, and the general populace, as well as by disease-specific vaccines (Gualano et al., 2019; Yaqub et al., 2014).

Information related to vaccination is also crucial in determining the public's decision on vaccines. At the onset of the COVID-19 pandemic, the World Health Organization have raised its concern about the possible effects of a "global epidemic of misinformation" as the internet and social media enable borderless and seamless sharing of information and misinformation on vaccine safety and other health interventions (Zarocostas, 2020). However, it is essential to note that the credibility of the source, accuracy of the information, and delivery and content of the message should also be considered in understanding vaccine attitudes (Yaqub et al., 2014). Ultimately, identifying factors that contribute to vaccine hesitancy is necessary to ascertain its possible implications on vaccination roll-out programs and to create further trust-building interventions through health and risk communication effectively.

Conceptual Framework

As earlier mentioned, this paper is informed by the HBM and the work of Dubé et al. (2013). The paper's focus is to establish the link between trust in government and trust in vaccines to the intention to vaccinate for COVID-19. The choice of trust as a variable was guided by the work of Dubé et al. (2013). Meanwhile, there are concepts in the HBM that this paper adopted, namely, perceived risk exposure (perceived susceptibility), demographics, and access to vaccine-related information (cues to action). Although not present in HBM and the work of Dubé et al. (2013), this paper included family members' past experience with any type of vaccination and perceived current health status as factors that would likely influence the intention to vaccinate for COVID-19.

Method

This paper is based on an online survey involving 1,953 respondents (general population who own a Facebook or Instagram accounts). The said online survey was conducted from July 28 to August 2020. Recruitment of participants was done through paid online advertisement. The respondents were asked to read the informed consent and to confirm that they agreed with the conditions for participation. Once they
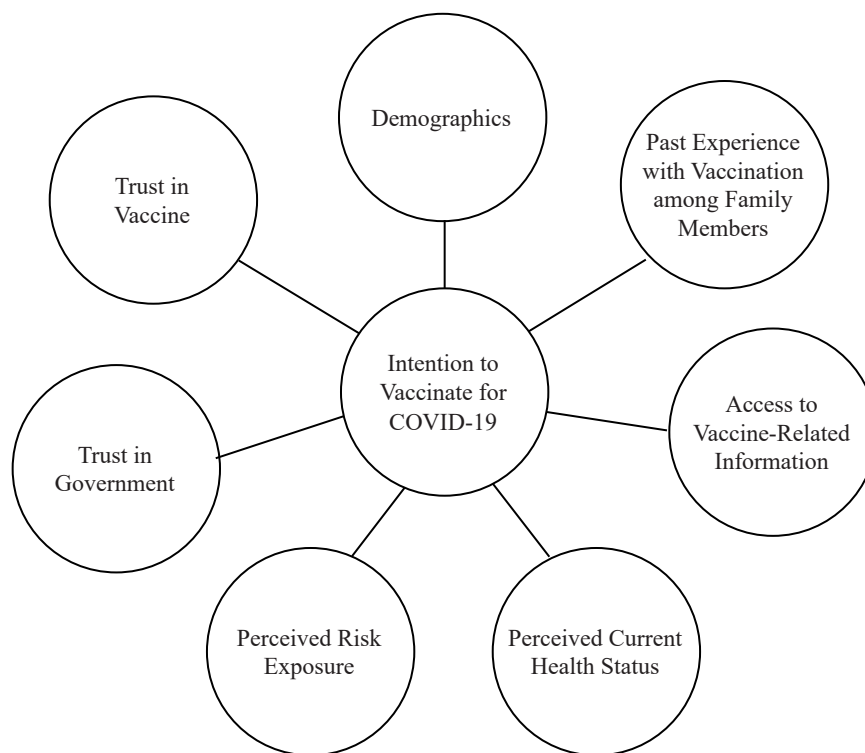
Figure 1. Factors Influencing Intention to Vaccinate

had indicated their agreement, the respondents were then directed to the online survey. This study underwent an ethics review by the De La Salle University Ethics Review Board with the number FAF.012.2019-2020. T2.SDRC.

The survey, on which this paper is based, covered the following variables were analyzed: information related to personal demographics, intention to vaccinate, trust in government, trust in vaccines, access to vaccine-related information from different sources, family members' past experience in receiving a vaccine, perceived risk exposure, and perceived current health status. Statistical tests (chi-square test) were conducted to see the association between personal demographics and intention to vaccinate, namely, sex (male or female), marital status (married, single, separated, or widowed), level of education (high school or lower and college level or higher), and monthly household income from all sources (Below 30,000 pesos or 30,000 pesos and above. In the study context, respondents were asked to convey their intention to vaccinate (yes, no, or maybe). Likewise, using the chi-square test of association, perceived risk (high, moderate, or low) and perceived current health status

(very healthy, healthy, not so healthy, very unhealthy) were tested vis-à-vis intention to vaccinate.

For the perceived risk exposure, the respondents were asked, "In your opinion, which of the following best describes your risk for COVID-19." To guide the respondents with their assessment of risk exposure, we provided an operational definition. High-risk exposure means the respondents had many encounters or interactions with people suspected or confirmed to have COVID-19. Moderate risk exposure, meanwhile, pertains to a few encounters. Low-risk exposure means no interaction with people suspected of having or confirmed to have COVID-19. The respondents were asked to indicate whether they think they are very healthy, healthy, not so healthy, and very unhealthy for the perceived current health status.

We designed a scale for the trust in government. The said scale covers the following items: (a) satisfaction with the way the local government handles the COVID-19 pandemic in the respondent's locality, (b) trust that the government can decide effectively regarding which vaccine should be made available to the public, (c) trust that the government will be able to manage COVID-19 pandemic in the country

effectively, (d) confident that the government can make decisions that are in the best interest of the public when it comes to what health remedies/intervention to offer for COVID-19 patients, and (e) satisfaction with the way the government has handled the COVID-19 pandemic in the country. The Cronbach's **α** for this scale is .780 (sd=.921). In this scale, the respondents were asked to indicate their response to each item by choosing either strongly agree, agree, neutral, disagree, or strongly disagree. In the analysis, the mean score of all the items for each respondent was used in the statistical treatment.

Another scale specifically made for this study is the trust in vaccines in scale (Cronbach's **α**=.704, sd=.733). This scale measures the following: (a) belief in the importance of vaccine as a preventive measure,

(b) disagreement with some groups of people who are against any kind of vaccine, (c) belief that vaccine will stop the spread of COVID-19, (d) willingness to have oneself vaccinated once the vaccine is available, (e) willingness to participate in clinical trials, and (f) conviction that all vaccines are safe. Like the scale for trust in government, this scale also asked the respondents to indicate their level of agreement or disagreement with each of the items. Like the previous scale, the data used in the statistical analysis was the mean scores of the respondents for all the items on the scale.

Meanwhile, access to vaccine-related information questions pertaining to access to information related to risks and benefits, access to vaccine-related information a month ago, access to vaccine-related

Table 1

Demographic Profile of the Respondents

Characteristics:	Frequency (n=1953)	Percentage
Sex		
Female	1170	59.91
Male	783	40.09
Age		
18-29 years old	1132	57.96
30-41 years old	517	26.47
42-59 years old	250	12.81
60 and above	51	2.62
No Answer	3	0.15
Median age	27	
Marital Status		
Married	461	23.67
Single	1437	73.58
Separated/Divorced	33	1.69
Widowed	22	1.13
Educational Attainment		
High Graduate or Lower	390	19.97
College Graduate or Higher	1563	80.02
Household Monthly Income		
Below 30, 000 pesos	1431	73.27
30,000 pesos and above	522	26.73
Intention to Get Vaccinated		
No	469	24.01
Yes	759	38.86
Maybe	725	37.12

information from a family member, a friend, a college, and from social media. In these items, respondents were asked to indicate either yes or no. Similarly, the respondents were also asked whether or not (yes or no) any family member has been vaccinated in the past five years, has been vaccinated for dengue in the past five years, and has been vaccinated with Dengvaxia in the past five years. In terms of the normality test results, all data have values suggesting that data is not normally distributed. All but two items have kurtosis beyond the acceptable value (i.e., read vaccine-related information from social media a month ago and family member who have availed of Dengvaxia). In terms of skewness, all the data or measures are not normally distributed. Despite this limitation, the number of respondents and the performance of chi-square test associations will hopefully guide the readers in ascertaining the robustness of the multinomial regression results.

Results

Personal Profile of the Respondents

Table 1 shows the personal profile of the respondents. Among the 1,953 respondents who accomplished the survey, more than half are female (60%), and a great majority of them are single (74%). With a median age of 27, they are relatively young, as many of them belong to the age bracket of 18 to 29 years old (58%). With regard to the highest educational attainment, many of them attained at least college level (80%). Many of the respondents receive less than 30,000 pesos (73%) monthly income.

Of the 1,953 respondents, 39% said that they are willing to vaccinate for COVID-19, while 37% are not sure. About a quarter (24%) of the respondents claimed to be unwilling to get vaccinated. Furthermore, when asked if they would be willing to get vaccinated for free, only 654 (33.49%) respondents said yes. Among those who want to push through despite the possibility of the vaccine not being free, the median price they are willing to pay for a COVID-19 vaccine is Php 1,000 (roughly 20 USD).

Trust in Government and Trust in Vaccines

Overall, the survey respondents have a moderate level of trust in the government, as evidenced by an overall mean of 2.9134 (5 as the highest possible score

indicating a high level of trust; see Table 2). They have the highest mean scores on satisfaction with the local government's way of handling COVID-19 (mean=3.280) and trust that the government can effectively decide which vaccine should be made available to the public (mean=3.068). They have the lowest mean scores for the items relating to satisfaction with the overall COVID-19 response of the country (mean=2.446) and confidence in the government's ability to come up with decisions regarding health remedies and interventions for the public interest (mean=2.843). Similarly, the respondents exhibited a moderate level of trust in vaccines, with an overall mean score of 3.2331 (see Table 2). The item with the highest score pertains to the efficacy of vaccines as a prevention measure (4.0317). The items with the lowest scores relate to vaccine safety and willingness to participate in clinical trials for the COVID-19 vaccine.

Access to Vaccine-Related Information

As earlier mentioned, the respondents were asked if they had read or heard any vaccine-related information from their significant others or from social media. Results suggest that the respondents have the practice of reading vaccine information related to risks and benefits (95% of them responded yes to the item, n=1,858). Many of them (88%) have read vaccine-related information through social media platforms. Less than 50% of the respondents had heard of vaccine-related information from a friend (49%, n=962), family member (4%, n=876), and a colleague (43%, n=849) a month prior to the survey.

Family Members' Past Experience With Vaccination

The respondents were asked if any of their family members have experienced receiving a vaccine in the past five years. Results revealed that a little more than half of them (53.4%) mentioned that one of their family members indeed had been vaccinated (any type). Meanwhile, only 15.5% (n=303) of the respondents reported that a family member had been vaccinated for dengue in the past five years. Only 8.8% of the respondents (n=171) indicated that a family member had been given Dengvaxia five years preceding the survey.

Table 2

Level of Trust in Government and in Vaccines

Statements	Mean	Interpretation
Trust in Government		
I am quite satisfied with the way the local government handles the COVID-19 pandemic in our locality.	3.280	Moderate
I trust that our government can decide effectively regarding which vaccine should be made available to the public.	3.068	Moderate
I trust that our government will be able to manage the COVID-19 pandemic in the country effectively.	2.930	Moderate
I am confident that the government can make decisions that are in the best interest of the public when it comes to what health remedies/interventions to offer for COVID-19 patients.	2.843	Moderate
I am quite satisfied with the way the government has handled the COVID-19 pandemic in the country.	2.446	Moderate
Average	2.9134	Moderate
Trust in Vaccines		
I firmly believe that vaccines are very important for preventive care.	4.0317	High
I do not agree with some groups of people who are against any kind of vaccine patients.	3.5361	Moderate
I believe, through a vaccine, we will be able to stop the spread of COVID-19.	3.4659	Moderate
Once a COVID-19 vaccine is available, I will immediately have myself vaccinated.	3.0405	Moderate
I am willing to participate in clinical trials for COVID-19 vaccination if these are held in the country and I am qualified.	2.6877	Moderate
I am convinced that all vaccines are safe.	2.6365	Moderate
Average	3.2331	Moderate

Scoring: 4.0-5.00 (High), 2.0-3.99 (Moderate), 1.0-1.99 (Low)

Perception of Risk Exposure and Current Health Status

About 62% (n=1204) of the respondents perceived themselves to be of low risk of COVID-19 exposure. This means that they perceived themselves to have not been in contact with people suspected of or confirmed to have COVID-19. Only about 11% (n = 213) of them thought that they had been highly exposed, while about 27% of them (n = 536) reported that they were moderately exposed to the risk. In terms of perceived current health status, about 68% (n = 1321) of the respondents reported that they are healthy. Meanwhile, 18% of them perceived themselves to be very healthy (n=357). Only 275 respondents reported that they were either not so healthy or very unhealthy.

Personal Demographics and Intention to Vaccinate for COVID-19

To be able to see the association of variables, chi-square tests were performed. As can be seen in Table 3, the results of the analysis indicate that all the personal demographic variables are associated with the intention to get vaccinated. This means that there is a difference in the willingness to get vaccinated among the respondents when classified according to sex ($\chi 2$ = 49.7, p = <.001), marital status ($\chi 2$ = 18.4, p = .005), educational attainment ($\chi 2$ = 7.99, p = .020), and household monthly income ($\chi 2$ = 34.1, p = <.001).

Access to Information on Vaccines and Past Experience With Vaccination and Intention to Vaccinate for COVID-19

An analysis was also done to see the association between the different indicators of access to COVID-19-related information from various sources and the intention to vaccinate. The analysis suggests that all of the variables did not yield a significant association with the intention to vaccinate. This denotes that intention to get vaccinated, at least among the respondents, is not shaped by the information they have read or heard about the vaccine. This paper also sought to examine the association between family members' past experiences with vaccination and the intention to vaccinate for COVID-19. Results of the study reveal that only having a family member who has been vaccinated in the past five years yielded significant results ($\chi 2$ =15.5, p= <.001; see Table 4). This means that difference in intention could vary depending on the presence of a family member who has been vaccinated in the past five years preceding the survey.

Perception of Risk Exposure and Health Status and Intention to Vaccinate for COVID-19

Using the chi-square test of independence, this study examined the association between two perception-related variables and the intention to vaccinate for COVID-19. The first variable relates to one's perceived risk exposure (high, moderate,

Table 3

Chi-square Test of Independence Results (Personal Demographic Characteristics and Intention to Get Vaccinated)

| Variable | Indicators | Intention to get Vaccinated | | | Total | x | df | P |
		No	Yes	Maybe				
Sex	Male	151	378	254	783	49.7	2	<.001
	Female	318	381	471	1170			
Marital Status	Married	131	150	180	461			
	Single	318	592	527	1437	18.4	6	.005
	Separated/Divorced	11	10	12	33			
	Widowed	9	7	6	22			
Educational Attainment	High Graduate or Lower	92	131	167	390	7.99	2	.020
	College Graduate or Higher	377	628	558	1563			
Household Monthly Income	Below 30, 000 pesos	375	502	554	1431	34.1	2	<.001
	30,000 pesos and above	94	257	171	522			

Table 4

Chi-Square Test of Independence Results (Past Experience With Vaccination and Intention to Get Vaccinated)

Statements	Past Experience with Vaccination	Intention to get Vaccinated				x	df	p
		No	Yes	Maybe	Total			
Has any member of your family been vaccinated in the past five years?	No	239	312	360	911	15.5	2	<.001
	Yes	230	447	365	1042			
Has any member of your family been vaccinated for dengue in the past five years?	No	397	638	615	1650	.180	2	.914
	Yes	72	121	110	303			
Did any member of your family avail of Dengvaxia in the past five years?	No	430	690	662	1782	.224	2	.894
	Yes	39	69	63	171			

or low). The second variable pertains to perceived health status (very healthy to very unhealthy). Results of the analysis show that both variables are significantly associated with the intention to vaccinate. This means that intention to vaccinate could thus vary, depending on one's perception of risk exposure ($\chi2 = 10.6$, $p = .031$) and current health status ($\chi2 = 26.3$, $p = <.001$).

Predictors of Intention to Vaccinate Using Multinomial Regression

As the main focus of this paper, trust in government and trust in vaccines were examined in relation to the intention to vaccinate. Through multinomial regression, the results reveal that trust in government and vaccines could predict intention to vaccinate. The variations in the dependent variable based on the model ranged from 18% (McFadden) to 24% (Nagelkerke). The multinomial regression model yielded significant results ($X^2(4)=770$, p. value of <.001). Lastly, we also performed multinomial regression to examine which variables will predict the intention to vaccinate for COVID-19. Results of the analysis reveal that trust in vaccines, sex, monthly income, family members' experience with vaccination in the past five years, perceived risk exposure, and perceived health status predict intention to vaccinate (see Table 5). The variations in the dependent variable based on the model ranged from 21% (McFadden) to 27% (Nagelkerke). The multinomial regression model yielded significant results ($X^2(28)=870$, p. value of <.001).

The results of the multinomial regression suggest the following: the odds of females vaccinating is 1.8 times higher than males. The results also suggest that a decrease in trust in vaccines will likely decrease the intention to vaccinate. The odds of single individuals vaccinating is 6.5 times higher than those who are married. The odds of those whose income is higher or equal to 30,000 pesos vaccinating is 4.3 times more than those receiving less than 30,000 pesos. In addition, the odds of those who view themselves as high risk to vaccinate is 4.9 times higher than those who think they are of low risk. The odds of those with family members vaccinated in the past five years to vaccinate is 7.2 times higher than those without. Meanwhile, the odds of those who think of themselves as very healthy to vaccinate are 5.5 times higher than those who think they are not so healthy.

When comparing the results of those who had the intention to vaccinate and those who are unsure of receiving one, the results of the multinomial regression suggest the following: the odds of females vaccinating is 1.6 times higher than their male counterparts. The results also suggest that a decrease in trust in vaccines will make individuals uncertain about vaccination. The odds of those receiving income higher or equal to 30,000 pesos to vaccinate is 6.1 times higher than those receiving less than 30,000 pesos. In addition, the odds of vaccinating among those who viewed themselves to be of high risk is 4.9 times higher than those who think that they are of low risk. The odds of those with family members vaccinated in the past five years to vaccinate is 7.4 times higher than those without. Meanwhile, the odds of those who think of themselves as very healthy to vaccinate is 5.5 times higher than those who think that they are very not healthy.

Table 5

Multinomial Regression of Predictors of Intention to Get Vaccinated for COVID-19 (Get Vaccinated, No Intention, or Maybe)

Intention to Get Vaccinated	Predictors	Estimate	Lower	Upper	S.E.	Z	p	Odds ratio
No-Yes	Intercept	9.36947	8.177	10.5615	0.6082	15.406	<.001*	11724.8446
	Trust in Government	0.07386	-0.101	0.2482	0.0890	0.830	0.406	1.0767
	Trust in Vaccine	-3.02780	-3.315	-2.7402	0.1467	-20.636	<.001*	0.0484
	Sex: Female – Male	0.58784	0.279	0.8963	0.1574	3.735	<.001*	1.8001
	Marital Status:							
	Single – Married	-0.42007	-0.776	-0.0638	0.1818	-2.311	0.021*	0.6570
	Separated – Married	-0.30397	-1.426	0.8178	0.5723	-0.531	0.595	0.7379
	Widowed – Married	0.80354	-0.522	2.1295	0.6765	1.188	0.235	2.2334
	Highest Level of Education Completed							
	College Level or Higher – High School Graduate or Lower	0.17389	-0.202	0.5495	0.1917	0.907	0.364	1.1899
	Household Monthly Income							
	Above 30,000 or below 30,000	-0.83872	-1.195	-0.4820	0.1820	-4.608	<.001*	.4323
	Perceived Risk Exposure							
	Moderate-Low	-0.15233	-0.485	0.1806	0.1698	-0.897	0.370	0.8587
	High-Low	-0.70228	-1.190	-0.2149	0.2487	-2.824	0.005*	.4955
	Family member with vaccination in the past 5 years Yes-No	-0.32331	-0.622	-0.0249	0.1522	-2.124	0.034*	0.7237
	Perceived Current Status							
	Healthy-Very Healthy	-0.20369	-0.583	0.1760	0.1937	-1.051	0.293	0.8157
	Not So Healthy-Very Healthy	-0.59603	-1.140	-0.0523	0.2774	-2.149	0.032**	0.5510
	Very Unhealthy-Very Healthy	0.83991	-2.191	3.8705	1.5463	0.543	0.587	2.3162
Maybe-Yes	Intercept	5.06374	4.120	6.0080	0.4818	10.511	<.001*	158.1811
	Trust in Government	0.00997	-0.120	0.1401	0.0664	0.150	0.881	1.0100
	Trust in Vaccine	-1.41751	-1.626	-1.2089	0.1064	-13.319	<.001*	0.2423
	Sex: Female – Male	0.47170	0.239	0.7045	0.1188	3.971	<.001*	1.6027
	Marital Status:							
	Single – Married	-0.22971	-0.513	0.0534	0.1444	-1.590	0.112	0.7948
	Separated – Married	-0.29459	-1.215	0.6253	0.4694	-0.628	0.530	0.7448
	Widowed – Married	-0.16639	-1.400	1.0671	0.6294	-0.264	0.791	0.8467
	Highest Level of Education Completed							
	College Level or Higher – High School Graduate or Lower	-0.12532	-0.414	0.1635	0.1474	-0.850	0.395	0.8822
	Household Monthly Income							
	Above 30,000 or below 30,000	-0.48317	-0.745	-0.2217	0.1334	-3.622	<.001*	0.6168
	Perceived Risk Exposure							
	Moderate-Low	-0.12016	-0.378	0.1378	0.1316	-0.913	0.361	0.8868
	High-Low	-0.61196	-0.985	-0.2387	0.1904	-3.213	0.001*	0.5423
	Family member with vaccination in the past 5 years Yes-No	-0.29758	-0.529	-0.0657	0.1183	-2.515	0.012*	0.7426
	Perceived Current Status							
	Healthy-Very Healthy	0.11714	-0.196	0.4301	0.1596	0.734	0.463	1.1243
	Not So Healthy-Very Healthy	0.24614	-0.166	0.6582	0.2103	1.171	0.242	1.2791
	Very Unhealthy-Very Healthy	2.35944	0.169	4.5498	1.1176	2.111	0.035*	10.5850

Discussion

In summary, the results of the analysis point to the idea that the intention to vaccinate for COVID-19 among the respondents is a function of trust in vaccines, sex, income, perception of risk exposure, perception of current health status, and past experience of a family member with vaccination. As mentioned, the survey on which this paper is based was conducted in August of 2020. At that time, information related to the vaccine was not yet widespread. The vaccination program in the country only started in the first quarter of 2021. Given the uncertainty surrounding the vaccines, it is somewhat expected that people will be anxious about safety and efficacy concerns. This implies that communication strategies regarding vaccines should focus on safety and efficacy to remove doubts, rumors, and fears and build people's confidence to vaccinate. This also calls for the need to focus vaccine advocacies on individuals who are uncertain or need enough information to arrive at an informed choice and to save them from falling into the skeptical trap. Targeting vaccine Luddites may be futile, as some of them may have already set their minds not to avail of any vaccine, including those for COVID-19. The study of Paul et al. (2020) suggested indeed that individuals who are not sure about getting the vaccine should be treated as the "stronger group for potential (communication) intervention" (p. 6).

Interestingly, the other variable which had a significant result is the perception of risk exposure. As espoused by the health belief model, perception of susceptibility can somehow influence a person's intention to do a particular action. The study of Wong et al. (2020), for instance, examined the intention to receive a vaccine in relation to the perception of risk. Their operationalization defined perceived susceptibility as one's belief or assessment of their likelihood of contracting the disease. This was defined as being anxious or worried about getting the virus, the perceived likelihood of being infected, and the perception of the possibility of acquiring the virus. In this paper, it was revealed that many of the respondents did not see themselves being highly exposed to COVID-19. However, subjective as it is, this result must be taken with caution, given that testing for COVID-19 in the Philippines is not aggressive, and the country is doing relatively fewer tests per population than many others. This means that at that time, people are not certain who in their community and family are actually COVID-19 carriers. Given the limited testing and limited public knowledge on how transmission actually occurs (e.g., airborne transmission), many people who imagine themselves at low risk are likely to be underestimating their actual risk of exposure. The result suggests that if individuals view themselves to be of high risk, they will likely submit themselves for vaccination. This then suggests that communication strategies need to heighten the feeling of high-risk exposure among the population at a level that is commensurate to the actual risk to encourage them to vaccinate. Perception of risk is also related to trust. This means that when one thinks that one is highly exposed to the virus, one is likely to rationalize the need to be vaccinated. As maintained by Castelfranchi and Falcone (2011), "the greater the perceived risk, the greater the need for trust" (p. 60).

The findings of this study likewise revealed that perceived health status also influenced the intention to vaccinate. This paper sees the value of looking at how people view their health status and how this perceived health status shapes their intention to vaccinate. We assumed that individuals who view themselves to be healthy are keener in getting the vaccine as they may likely believe that they will not experience serious side effects. People who have existing health conditions may think twice as they may be afraid of the serious side effects of the vaccine. Misinformation regarding the side effects of vaccines could trigger people not to get vaccinated because of fear that it may further aggravate their conditions. This then calls for communication strategies to focus on the benefits, side effects, and contraindications so that people will be able to come up with informed and rational choices. Providing scientific information to the public regarding the vaccine's side effects will likely increase the public trust in vaccines as well. Another factor that was seen to be significantly related to the intention to vaccinate is the past experience of a family member with vaccination. The presence of a family member with past experiences with vaccination may potentially boost the confidence of other family members to vaccinate for COVID-19.

Conclusions

This paper demonstrates that trust in vaccines is a significant predictor of intention to vaccinate. Apart from trust in vaccines, this paper concludes that the following variables could influence vaccination decision-making: sex, income, perceived risk exposure, perceived current health status, and family members' past experience with vaccination. In summary, predictors of vaccination intention insofar as this study is concerned can be summarized into three themes. The first theme refers to the influence of perceptions of risk exposure and health status on the intention to vaccinate. The second theme pertains to the role of confidence or trust in vaccines in vaccine intention. The third theme pertains to the influence of significant others based on past experiences with vaccination to vaccine intention.

The results of this study offer practical information regarding the appropriate health messages that have to be cascaded to the public. First, the result suggests that the government needs to work double-time to build trust in vaccines so that Filipinos will be willing to submit themselves to COVID-19 vaccination with confidence. Trust building needs to emphasize the efficacy and safety of the vaccine. Second, there is a need to communicate to the public that COVID-19 could be anyone's disease. Educating the public and improving risk awareness may encourage the public to get vaccinated to free themselves from worries and fears. Third, it is also important that messages to be communicated to the public shall provide empirical findings regarding safety, efficacy, benefits, side effects, and contraindications in order to erase doubts regarding the ill effects of the vaccine. The results of the study resonate with the contention of the health belief model, which maintains that perception regarding susceptibility may influence the decision to vaccinate. Theoretically, this paper extends such a model by also looking into social factors like trust in the vaccine that may also shape one's decision to vaccinate.

Acknowledgment

Declaration of Ownership

This report is our original work.

Conflict of Interest

The authors of this article declare no conflict of interest.

Ethical Clearance

This study was approved by the institution.

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