

**THE USE OF HEALTH BELIEF MODEL TO DETERMINE THE COVID-19  
VACCINATION HESITANCY AND CONFIDENCE AMONG SELECTED FILIPINO  
ADULTS**

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**ABSTRACT**

The emergence of COVID-19 is dramatically taking its toll notwithstanding the fact that several vaccines are being rolled out in the market. In the face of this crisis, the Filipinos' willingness to be subjected to vaccination is an arising challenge in the achievement of herd immunity. The study aimed to use the Health Belief Model in determining the COVID-19 vaccination hesitancy and confidence among selected Filipino adults. Its extensive use is ideal in research designed for predicting behavioral changes. Descriptive quantitative method was utilized and the questionnaire was disseminated via Google Forms. The assessment of the respondents' willingness to receive COVID-19 vaccination and Health Belief Model derived items used a 5-point Likert scale for likelihood and agreement. Selection of 400 participants was completed through convenience sampling among Filipino adults from Batangas, Manila, Olongapo, Pangasinan, Rizal, and Tacloban City, ages 18-79 years old. The main statistical treatments used were Chi-square test and Multinomial logistic regression to analyze the positive correlates of vaccine confidence namely perceived susceptibility, perceived severity, perceived benefits, and cues to action, as well as the negative correlates such as perceived barriers contributing to vaccine hesitancy. Conclusively, Filipino adults have a higher confidence than hesitancy towards COVID-19 vaccination.

**KEYWORDS:** COVID-19, Vaccine, Vaccination, Hesitancy, Confidence, Health Belief Model.

**1. INTRODUCTION**

COVID-19 is an infectious disease belonging to a new strain of SARS-CoV-2 or Severe Acute Respiratory Syndrome Coronavirus. The first emergence was reportedly from the City of Wuhan, China, causing severe respiratory illness. The virus takes a 14-day incubation period where the infected patient can either be symptomatic or asymptomatic, depending on the affinity of the antibodies. As of April 20, the Philippines has 953,106 cumulative number of infected patients (Department of Health, 2021). Its outbreak is responsible for the global health crisis that has swept over hundreds of thousands of lives, encumbering the most vulnerable in society – the poor, the sick, the elderly, and the children.

Due to the novelty of the virus, no SARS CoV-2-specific treatments are currently available. Furthermore, the primary root of the situation's exacerbation is the availability of prophylactics, a treatment designed for disease prevention, causing the number of infected cases to amplify. According to President Duterte and other

health officials, a vaccine is the ultimate solution to eradicating COVID-19. Presently, the procurement and administration of the vaccines are only authorized by the government. The COVID-19 vaccines are not to be sold to the public until full market authorization is issued from the FDA (Department of Health, 2021). Thus, the government assured that the public would be treated equally, and that the country will move forward through a free vaccination program to ensure that no one will be left behind.

Now that 275 vaccine candidates have promising potential efficacy, the government has yet to answer its acceptability for public consumption (World Health Organization, 2020). On March 1, the Philippines officially started its COVID-19 vaccination roll-out shortly after the arrival of the first batch of vaccines from Sinovac. The government aims to vaccinate up to 70 million Filipinos by the end of the year (Department of Health, 2021). In an effort to increase vaccination rates in the country, the Department of Health launched the BIDA Solusyon sa COVID-19 and #resBAKUNA

campaigns.

Assuming that there would be a continuous uptake of the vaccines in the country, the Philippine government aims to achieve herd immunity against COVID-19 by 2023. Herd immunity can only be achieved when there is high confidence in the vaccine and the vaccination program. One of the underlying questions is whether there will be confidence and consistency with regard to vaccine compliance. In view of this, a study revealed that there had been a plummet in vaccine confidence in the Philippines, and it turned out that a 61% decrease in confidence from 2015-2018 was an impact of the Dengvaxia crisis (Larson, Hartigan-Go, and de Figueiredo, 2019).

The Dengvaxia scare last 2017 had incurred a social media hysteria that led to a catastrophic event in the history of immunization. Dengue is a mosquito-borne disease that has been rampantly infecting people residing from tropical countries for several decades. Sanofi Pasteur made swift progress towards formulating the first-ever vaccine for dengue – the Dengvaxia. Out of exuberance, the Philippines was one of the countries that implemented a mass vaccination engaging 800,000 schoolchildren (Fatima & Syed, 2018). A year later, Sanofi disclosed that Dengvaxia could induce a higher risk of severe dengue infection to those inoculated but have not been exposed to the virus. Hearsays and speculations as to what lies beyond the Dengvaxia dispute circulated the media. Politics, social media, and the people involved in the clinical trials allegedly fueled this predicament. This incident elicited fear and distress among parents of the victims, causing them to be reluctant about the other vaccines, even the ones that were proven to be safe and effective, thereby paving the way for the occurrence of vaccine hesitancy.

Vaccine hesitancy is defined as the delay in acceptance or refusal of vaccines despite the availability of vaccination services. Even today, 1 in 5 children worldwide fail to receive routine immunization, and about 1.5 million children die each year of diseases that could be prevented (SAGE Working Group on Vaccine Hesitancy, 2015). The World Health Organization has identified it as one of the global threats triggering the growth of morbidity rates associated with poor immunization coverage levels (Barello, Nania, Dellafiore, Graffigna & Caruso, 2020).

What most people know of the word vaccine is limited only to its ability to prevent acquiring diseases. Beyond that, they are either perplexed or misguided, thereby threatening the quality of life. Thus, determining the vaccination confidence of the public is a crucial step towards flattening the curve and is vital to the country's success in combating the crisis. Vaccine confidence implies trust in the vaccine, the product, trust in the health professional, the provider, and trust in the policymaker who make the decisions about vaccine

provision (Larson, Schulz, Tucker & Smith, 2015). This correlation is essential in gaining public trust as they constantly seek safety and effectiveness before subjecting themselves and their loved ones to immunization programs.

The Health Belief Model (HBM) posits six constructs that predict health behavior: risk susceptibility, risk severity, benefits to action, barriers to action, self-efficacy, and cues to action (LaMorte, 2019). Its extensive use is ideal in research designed for predicting behavioral changes. The key related components of HBM contribute to decision making as it requires collective action of health assessments, facilitates long and short-term interventions, and imparts consequences linked to various health issues.

Third-world countries such as the Philippines are behind the curve compared to developed countries in terms of financial resources and the advancement of research. The purpose of this study was to lay down the potential factors affiliated with vaccination hesitancy and confidence. Since there is an inadequate number of resources that can attest to the extent of public trust in vaccination, this study is of great importance in determining imperative measures that should be taken to address the issues of poor vaccine coverage in the country.

Furthermore, the determined COVID-19 vaccination hesitancy and confidence of Filipinos are very timely considering the devastating illness brought by the COVID-19. The data is collected through convenience sampling in selected localities in the Philippines. This research filled the knowledge insufficiency on immunization, vaccine development, reasons behind vaccine hesitancy and confidence, and its potential impacts on health.

## 2. MATERIALS AND METHODS

### 2.1. Method of Research Used

Descriptive research is a quantitative research method that attempts to collect quantifiable information for statistical analysis of the population sample (Mertler, 2016). With the use of a descriptive quantitative method, it quantitatively described and interpreted the current status of individuals, settings, conditions, and events. It focuses on objectivity that permits the researchers to generalize the findings beyond the particular situation or setting (Mertler, 2016).

### 2.2. Setting of the Study

Six localities in the Philippines under the COVID-19 pandemic were selected, including Batangas, Manila, Olongapo, Pangasinan, Rizal, and Tacloban City. The selection of localities for the survey was determined based on the guidelines on implementing community quarantine set by the Inter-Agency Task Force on Emerging Infectious Diseases (IATF-EID) and the proximity and accessibility of the online survey.

As per the Republic of the Philippines Inter-Agency Task Force on Emerging Infectious Diseases (IATF-EID), Resolution No. 67, series of 2020, the enumerated localities were placed into two different types of community quarantine at the time of writing, whereby, Batangas, Manila, and Tacloban City were placed under General Community Quarantine (GCQ). While Olongapo, Pangasinan, and Rizal were placed under the Modified General Community Quarantine (MGCQ). As of August 30, 2020, the Philippines had recorded a number of 56, 473 COVID-19 active cases. Thus, beginning September 1, 2020, the community quarantine classification based on the epidemic risk level was adopted (IATF-EID, 2020).

Accordingly, the proximity and accessibility of the online survey were considered as well. Following the community quarantine guidelines, there were stringency measures set by the Inter-Agency Task Force on Emerging Infectious Diseases (IATF-EID) that confined the setting of data collection. It was worth noting that by the time of writing, the prevalence of COVID-19 infection was low aside from Manila, which was deemed a hotspot due to its recorded drastic number of cases.

### 2.3. Survey Instrument

A standard online questionnaire by Wong *et al.* was adapted with minimal modifications. Questions were presented bilingually in English and Filipino. Before administering the survey, the questionnaire was content validated and pilot tested by local experts with a Cronbach's alpha of 0.794 (acceptable reliability). It is a 28-item instrument that determined the respondents' sociodemographics and health profile. Willingness to receive COVID-19 vaccination used a one-item question answerable through a five-way response composed of 5-yes definitely, 4-yes probably, 3-yes possibly, 2-probably not, and 1-definitely not.

The Health Belief Model derived items probed perceived susceptibility to COVID-19 infection, perceived severity of COVID-19 infection, perceived benefits of a COVID-19 vaccine, perceived barriers to getting a vaccination against COVID-19, and cues to action using a 5-point Likert scale inclusive of 5-strongly agree, 4- agree, 3- neither agree or disagree, 2- disagree, and 1-strongly disagree.

### 2.4. Subject of the Study

Selected respondents met the exclusion and inclusion criteria like residence, age, citizenship. Specifically, the purposive respondents from Batangas, Manila, Olongapo, Pangasinan, Rizal, and Tacloban City met the following eligibility criteria which include between 18 to 79 years of age and a Filipino citizen (Filipino by birth, Filipino by naturalization, or dual citizen).

### 2.5. Sample Size and Sampling Technique

A total of 400 respondents from the six localities are computed using the Slovin's formula and distributed as

follows: 109 participants from Pangasinan, 107 from Rizal, 100 from Batangas, 66 from Manila, 9 from Olongapo and another 9 from Tacloban City.

The selection of respondents was made via convenience sampling. It is a type of nonrandom sampling wherein members of the desired population meet the qualifying criteria, namely, accessibility, geographical proximity, availability at a given time, or the willingness to participate in the research as a respondent (Etikan *et al.*, 2016). This technique ensured easy, swift, and economical collection of data from the qualified respondents, in light of the current situation brought about by the pandemic.

### 2.6. Data Collection Procedure

The collection of data solely relied on online dissemination of the instrument, developed to draw samples from the population of interest. The online questionnaire was disseminated through Google Forms via social network platforms such as Facebook and Google Mail. Development and presentation of the questionnaire were in English with a Filipino translation, the national language in the Philippines. Subsequently, the respondents were informed that their participation was voluntary, and consent was implied by completing the questionnaire. After the respondents keyed in their answers, Google Forms automatically collected, tallied, organized, and presented the responses through graphs. Respondents who completed the survey received a note encouraging them to disseminate the survey link to all their contacts who belong to the same locality and fall within the following age bracket qualification: younger adults (age 18–39), middle-aged adults (age 40–59), and older adults (age 60–79) (Boggero *et al.*, 2020).

### 2.7. Statistical Treatment

The Chi-square and Multinomial logistic regression analysis were the main statistical treatments in analyzing the data. The use of the Chi-square test was to compare nominal or categorical data such as sociodemographics. It determines whether an association or relationship between categorical variables in a sample is likely to reflect a real association in the population (Berenson, Levine, Szabat & Stephan, 2019). It was used to correlate COVID-19 vaccination hesitancy and confidence based on the sociodemographic and health profile of the respondents.

The use of the Multinomial logistic regression was to model multi-classification outcome variables. It is interpreted in three ways: Odds Ratio (OR), 95% Confidence Interval (CI), and p-value. Odds Ratio (OR) represents the effects of a variable, such as sociodemographics on the likelihood that an outcome occurs such as getting vaccinated. Intuitively, OR is the chances that a result will happen given a specific exposure versus the chances of the result happening without that exposure. Furthermore, the Odds Ratio is interpreted using a reference group, wherein an OR of <1

signifies a lower likelihood of getting vaccinated, while an OR of >1 conveys a higher likelihood of an intent to get vaccinated. As for the confidence interval (CI), if one (1) is not within the interval, it is considered significant, otherwise not. Lastly, a p-value of <0.05 is interpreted as significant.

Multinomial logistic regression was utilized to identify the considerable differences in willingness to get vaccinated among the respondents' various sociodemographic profiles, health factors, perceived health belief, and COVID-19 vaccination hesitancy and confidence among the selected Filipino adults based on the Health Belief Model constructs.

**2.8. Ethics Approval**

The Institutional Ethics Review Committee (IERC) of Centro Escolar University (CEU) approved the conduct of the study.

**3. RESULTS AND DISCUSSION**

**3.1. Sociodemographic Profile of the Study Respondents**

This section is composed of figures relative to the sociodemographic information provided by the respondents in the questionnaire. The sample size per locality was computed using Slovin's formula.

**3.1.1 Age**

The respondents are classified according to age bracket namely younger adults (18-39 years old), middle-aged adults (40-59 years old), and older adults (60-79 years old).

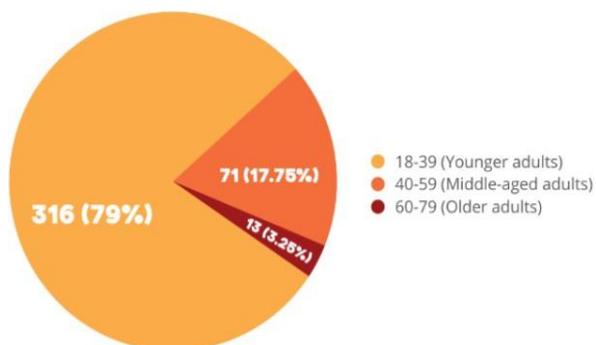


Figure 1.

**Distribution of Respondents Based on Age**

Figure 1 shows that out of 400 respondents, most are younger adults (316 or 79%), and the least are older adults (13 or 3.2%).

Accordingly, it is worth noting that these young adults under the generation of Millennials and Generation Z are born into a world where social media and digital technologies are prevalent in almost every area of their lives (Nop et al., 2020). Hence, the strong inclination to social media and the digital literacy became advantageous for them to find this study more accessible and easier for them to participate.

**3.1.2. Gender**

The gender of the Filipino adult respondents is divided into male and female categories. Gender analysis examines how men and women in vaccine acceptance and intent to receive the COVID-19 vaccine.

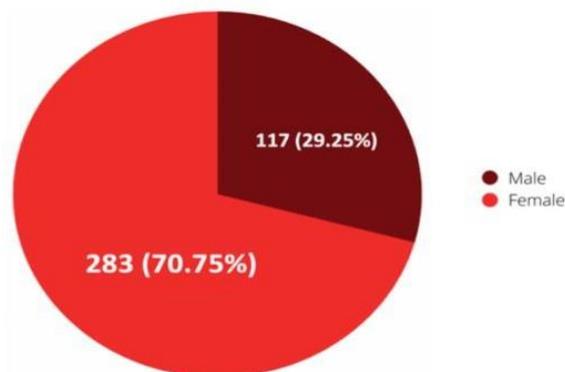


Figure 2: Distribution of Respondents Based on Gender.

Figure 2 shows that the majority of the respondents who participated in the study are female. Consequently, a Finnish population-based survey revealed that women are more proactively engaged in searching, obtaining, and sharing health-related information. They also tend to be more interested, active, seemingly better-informed decision-makers who pay more attention to possible threats when it comes to health (Ek et al., 2015).

**3.1.3. Filipino Citizenship**

The study participants are recognized as Filipino citizens, specifically Filipinos by birth, Filipinos by naturalization, and Filipinos with dual citizenship.

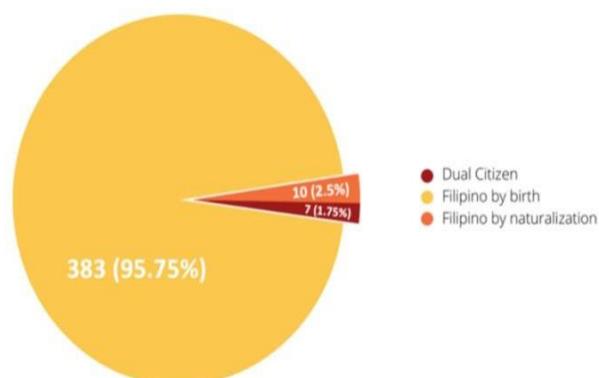


Figure 3: Distribution of Respondents by Filipino Citizenship.

Figure 3 shows that out of 400 respondents, the majority are Filipino citizens by birth, and few are Filipino by naturalization and dual citizens.

**3.1.4. Locality**

Six localities in the Philippines under the COVID-19 pandemic are selected as the setting of the study as per the IATF-EID community quarantine guidelines, whereby Batangas, Manila, and Tacloban City are placed under

General Community Quarantine (GCQ). Olongapo, Pangasinan, and Rizal are placed under the Modified General Community Quarantine (MGCQ) at the time of writing.

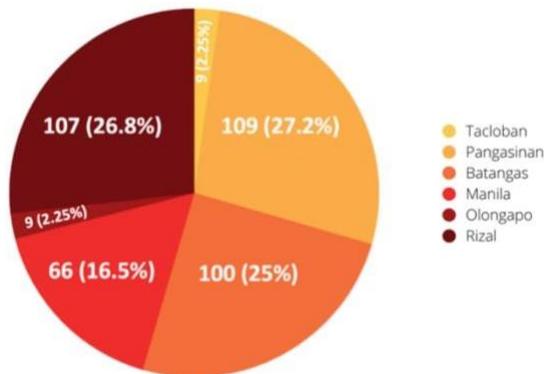


Figure 4: Distribution of Respondents by Locality.

Shown in Figure 4 is the sample size per locality wherein 109 (27.25%) respondents are from the province of Pangasinan, 107 (26.75%) from Rizal, 100 (25%) from Batangas, 66 (16.5%) from Manila, 9 (2.25%) from the City of Olongapo, and the remaining 9 (2.25%) from the City of Tacloban.

3.1.5. Religion

Religion contributes substantially to the formation of an individual’s rationality (Little, 2016). Different religious beliefs may account for varying approaches on many aspects, such as vaccination.

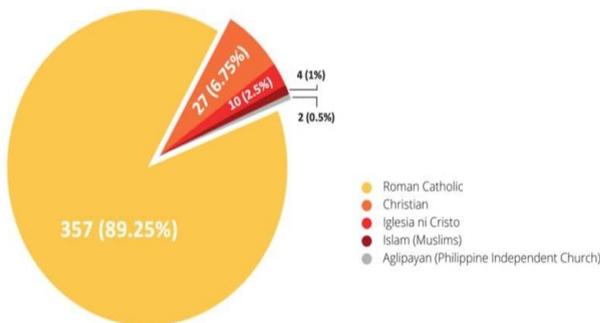


Figure 5: Distribution of Respondents by Religion.

Figure 5 shows that majority of the respondents are Roman Catholic (89.25%), and the vast minority are Christians (6.75%), Aglipayans (0.5%), adherents of Iglesia ni Cristo (2.5%), and Muslims (1%).

3.1.6. Highest Educational Attainment

Educational attainment pertains to the extent of education the respondents have fulfilled, such as elementary, high school, vocational, college, master’s degree, and doctor’s degree.

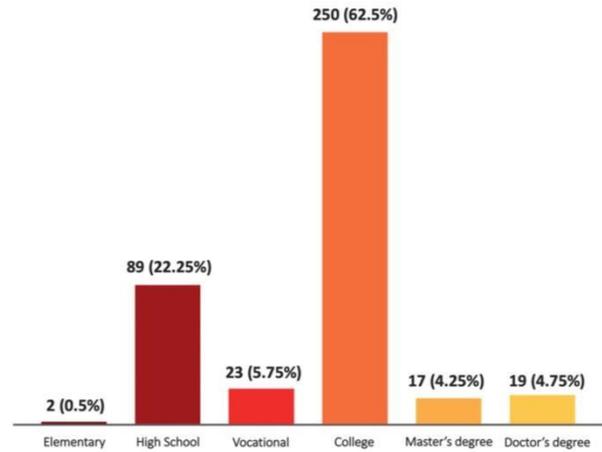


Figure 6: Distribution of Respondents by Highest Educational Attainment.

Figure 6 shows that the study respondents mainly consisted of college graduates with 62.5% and high school graduates with 22.3%. It is also noted that a significant number of respondents even reached the postgraduate degree, while only a few finished elementary.

3.1.7. Employment Status

Employment status plays a significant role in decision-making and a potential factor in the respondent’s willingness to get vaccinated.

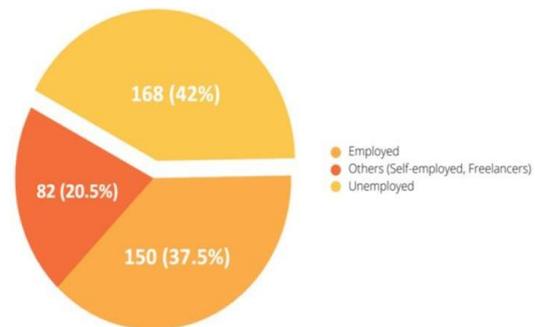


Figure 7: Distribution of Respondents Based on Employment Status.

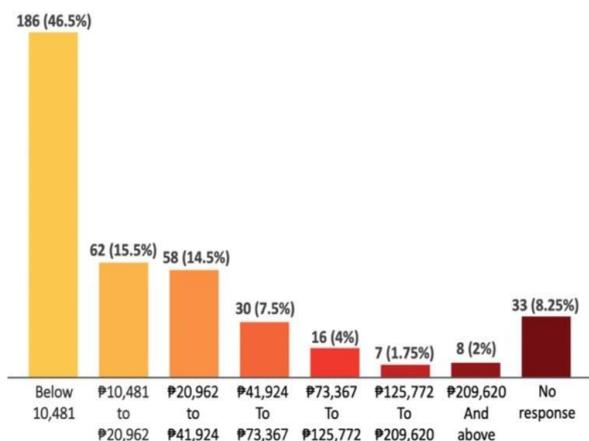
Figure 7 presents that the study respondents consisted of 42.1% unemployed, while 37.5% are employed, and 20.5% are either freelancers or independent workers. A vast proportion of the respondents are employed. It can be inferred that they have a higher risk of exposure while on the job.

As per the Occupational Safety and Health Act of 1970, employees are classified depending on the extent of occupational exposure which may vary according to the type of industry and demand for recurrent close contact to people who are infected or suspected to be infected (OSHA, 2020). Moreover, exposure to COVID-19 is prevalent in any working environment as it could be transmitted when travelling in a community known to have local transmission and at the workplace (World

Health Organization, 2020).

### 3.1.8. Monthly Income

The study utilized the 2020 Philippine Institute for Development Studies (PIDS) monthly income bracket to determine the respondents' monthly income.



**Figure 8: Distribution of Respondents Based on Monthly Income.**

Figure 8 presents that out of 400 respondents, the majority of the participants have a monthly income of below P10,481 and are classified as poor (Albert et al., 2020).

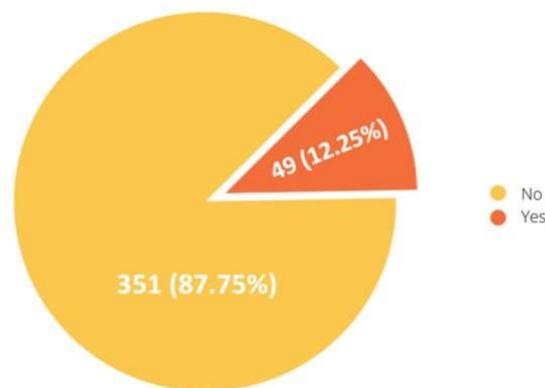
Presently, the procurement and administration of the vaccines are only authorized by the government. The COVID-19 vaccines are not to be sold to the public until full market authorization is issued from the FDA (Department of Health, 2021). Thus, the government assured that the public will be treated equally and that the country will move forward through a free vaccination program to ensure that no one will be left behind.

### 3.2. Health Profile of the Study Respondents

The respondents are also assessed by the presence of chronic diseases, overall health status, and knowledge of friends, neighbors, or colleagues infected with COVID-19 to determine their willingness to get vaccinated and identify potential factors that may contribute to their skepticism regarding COVID-19 immunization.

#### 3.2.1. Respondents' Diagnosed with Chronic Diseases

Individuals with pre-existing medical comorbidities are at a higher risk of getting severe COVID-19 disease (World Health Organization, 2020). Adults under the age of 65 diagnosed with the identified seven comorbidities, namely chronic respiratory disease, hypertension, cardiovascular disease, malignancy, diabetes mellitus, obesity, and chronic kidney disease, shall be prioritized for the vaccination programs (CNN Philippines, 2021). Thus, the presence of underlying chronic health conditions can be associated with vaccination uptake.

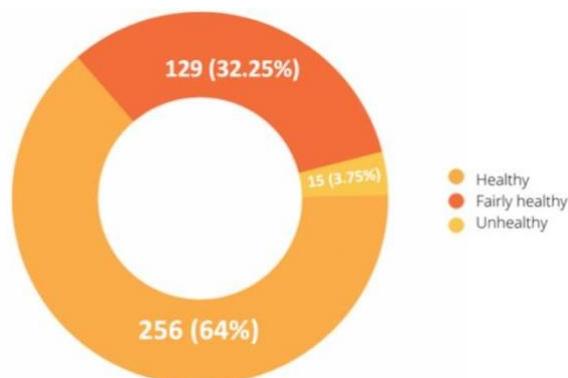


**Figure 9: Distribution of Respondents Diagnosed with Chronic Diseases.**

Figure 9 shows that 351 (87.75%) of the respondents are not diagnosed with chronic diseases, while 49 respondents (12.25%) have underlying chronic health conditions.

#### 3.2.2. Respondents' Overall Health Status

The perception of one's well-being is an indicator of one's overall health status, which influences an individual's decision about COVID-19 vaccination (Statistics Canada, 2016).

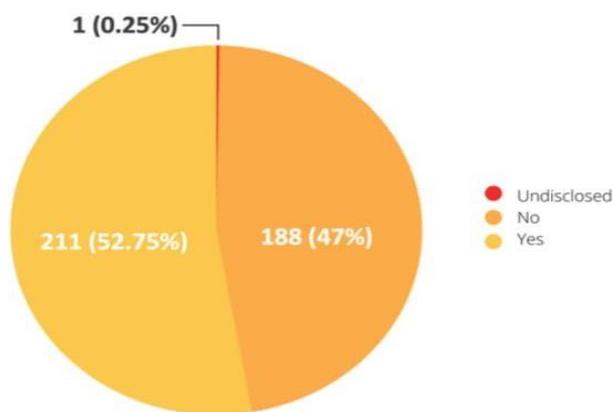


**Figure 10: Distribution of Respondents Diagnosed with Chronic Diseases.**

Figure 10 shows that based on overall health status, 64% of the respondents perceived that they are significantly healthy, 32.25% are fairly healthy, and 3.75% are unhealthy. Despite the subjective nature of the self-assessment of one's health, indicators of perceived general health are a good predictor of people's future health care use and mortality (Palladino, 2016).

#### 3.2.3. Respondents' Knowledge of Friends, Neighbors, or Colleagues Who Have Been Infected with COVID-19

The respondents' contacts, such as friends, neighbors, and colleagues inflicted with COVID-19, are influencers of the willingness and reluctance to get vaccinated.



**Figure 11: Distribution of Respondents Based on Knowledge of Friends, Neighbors, or Colleagues Infected with COVID-19.**

Figure 11 presents that out of 400 respondents, 211 (52.9%) know friends, neighbors, or colleagues who have been infected with COVID-19, 188(47.1%) do not, while one respondent preferred to abstain.

When people are at low risk of contracting COVID-19, they are less likely to receive vaccination. However, the sense of fear, worry, and anticipated regret is linked to accepting the offer of vaccination (World Health Organization, 2020).

**3.3. Respondents’ Willingness for COVID-19 Vaccination**

Ascertainment of the respondents’ vaccination intent determines the decision and overall willingness to accept the COVID-19 vaccine.

**Table 1: Distribution of Respondents Based on Willingness for COVID-19 Vaccination.**

WILLINGNESS TO GET VACCINATED AGAINST COVID-19	f	%
Definitely not	39	9.75
Probably not	64	16
Yes, possibly	121	30.25
Yes, probably	77	19.25
Yes, definitely	99	24.75
<b>TOTAL</b>	<b>400</b>	<b>100</b>

Table 1 shows that among the 400 responses, 121 (30.25%) participants responded ‘Yes, possibly’, while only 39 (9.75%) responded ‘Definitely not’. By a more specific breakdown, 99 (24.75%) participants answered ‘Yes, definitely’, followed by 77 (19.25%) who answered ‘Yes, probably’, while the remaining 64 (16%) participants answered ‘Definitely not’. Findings indicate that majority of the study participants are possibly willing to receive the COVID-19 vaccination, followed by those who are definitely willing. However, there are still those expressed absolute refusal. As a result, the respondents expressed relative confidence with regards to accepting vaccination against COVID-19.

participants who are likely to get vaccinated. According to Malaya, vaccine confidence in numerous localities grew from a staggering 67% to 83% after the conduct of the first DILG webinar with the Luzon Cluster of the Bureau of Fire Protection and the Bureau of Jail Management and Penology (Department of Interior and Local Government, 2021).

This coincides with the statement of the Department of Interior and Local Government (DILG) interior spokesperson Jonathan Malaya, who announced on the 7th of March that there is an increasing trend in

**3.4. Respondents’ Perceived Health Belief on COVID-19 Vaccine Based on the Health Belief Model (HBM) Constructs**

Ascertainment of the respondents’ vaccination intent determines the decision and overall willingness to accept the COVID-19 vaccine.

**3.4.1. Respondents’ Perceived Susceptibility to COVID-19.**

**Table 2: Respondents’ Perceived Susceptibility to COVID-19.**

STATEMENT	MEAN	STANDARD DEVIATION	VERBAL INTERPRETATION
I am NOT worried about getting infected with COVID-19	1.81	1.083	Disagree
I am NOT likely to be infected with the COVID-19 virus within the next few months	2.91	1.244	Neither agree nor disagree
Getting COVID-19 is currently NOT a possibility for me.	2.92	1.344	Neither agree nor disagree
<b>AVERAGE WEIGHTED MEAN</b>	<b>2.55</b>	<b>0.983</b>	<b>Disagree</b>

\* Average Weighted Mean Parameters for Verbal Interpretation: (4.21 - 5.00) strongly agree; (3.41 - 4.20) agree; (2.61 - 3.40) neither agree nor disagree; (1.81 - 2.60) disagree; and (1.00 - 1.80) strongly disagree.

Table 2 reflects a weighted average of 2.55, which denotes that the respondents are anxious about getting infected with COVID-19, indicating a widely perceived vulnerability towards the virus. This can be supported by the sudden surge in daily cases in the Philippines, with

over 63,536 active cases recorded just over a week, tallied from March 24 to March 30, 2020 (Department of Health, 2020). The daily positivity rate nationwide exceeded 20 percent, the highest for the country.

### 3.4.2. Respondents' Perceived Severity of COVID-19

**Table 3: Respondents' Perceived Severity of COVID-19.**

STATEMENT	MEAN	STANDARD DEVIATION	VERBAL INTERPRETATION
Complications from COVID-19 are NOT serious.	1.67	0.980	Strongly disagree
I will NOT be very sick if I get COVID-19.	2.28	1.136	Disagree
I am NOT afraid of getting COVID-19.	1.71	1.040	Strongly disagree
<b>AVERAGE WEIGHTED MEAN</b>	<b>1.89</b>	<b>0.852</b>	<b>Disagree</b>

\* Average Weighted Mean Parameters for Verbal Interpretation: (4.21 - 5.00) strongly agree; (3.41 - 4.20) agree; (2.61 - 3.40) neither agree nor disagree; (1.81 - 2.60) disagree; and (1.00 - 1.80) strongly disagree.

Table 3 presents that the respondents' perceived severity of COVID-19 has an average weighted mean of 1.89, which means that the study respondents have a high perceived severity and recognize the seriousness of the effects and complications of the COVID-19 infection.

consequences and complications brought about by COVID-19 (Prasetyo, 2020). Thus, heightened perceptions of severity can emerge as a predictor of engagement with health-protective behaviors such as vaccination resulting in a positive impact on the respondents' acceptance of the COVID-19 vaccine.

Accordingly, a high perceived level of severity of COVID-19 shows an extensive understanding of the

### 3.4.3. Respondents' Perceived Benefits of COVID-19 Vaccination.

**Table 4: Respondents' Perceived Benefits of COVID-19 Vaccination.**

STATEMENT	MEAN	STANDARD DEVIATION	VERBAL INTERPRETATION
Vaccination is NOT a good idea for prevention because it does NOT make me feel less worried about catching COVID-19.	2.37	1.175	Disagree
Vaccination does NOT decrease my chance of getting COVID-19 or its complications.	2.48	1.146	Disagree
<b>AVERAGE WEIGHTED MEAN</b>	<b>2.43</b>	<b>1.072</b>	<b>Disagree</b>

\* Average Weighted Mean Parameters for Verbal Interpretation: (4.21 - 5.00) strongly agree; (3.41 - 4.20) agree; (2.61 - 3.40) neither agree nor disagree; (1.81 - 2.60) disagree; and (1.00 - 1.80) strongly disagree.

Table 4 reflects an average weighted mean of 2.43, which infers that the respondents have a high perception of the benefits of COVID-19 vaccination. The respondents generally believe that being vaccinated reduces the likelihood of contracting the virus and suffering from serious complications. Based on a study,

95% reported that vaccination decreases the chance of infection and makes them feel less worried. Vaccination benefits were found to have the highest significant odds of a definite intention to take the vaccine (Wong et al., 2020).

### 3.4.4. Respondents' Perceived Barriers on COVID-19 Vaccination.

**Table 5: Respondents' Perceived Barriers on COVID-19 Vaccination.**

STATEMENT	MEAN	STANDARD DEVIATION	VERBAL INTERPRETATION
I am NOT worried about the possible side-effects of the COVID-19 vaccine and that it would interfere with my usual activities.	2.07	1.082	Disagree
I am NOT concerned about the efficacy of the COVID-19 vaccine.	1.89	1.007	Disagree
I am NOT concerned about the	1.88	1.006	Disagree

<b>safety</b> of the COVID-19 vaccine.			
I am NOT concerned about the <b>price or cost</b> of the COVID-19 vaccine.	2.28	1.214	Disagree
I am NOT concerned of my <b>ability to purchase</b> the COVID-19 vaccine.	2.44	1.202	Disagree
I am NOT concerned if the new COVID-19 vaccine is a <b>halal- certified product</b> .	2.87	1.218	Neither agree nor disagree
<b>AVERAGE WEIGHTED MEAN</b>	<b>2.24</b>	<b>0.793</b>	<b>Disagree</b>

\* Average Weighted Mean Parameters for Verbal Interpretation: (4.21 - 5.00) strongly agree; (3.41 - 4.20) agree; (2.61 - 3.40) neither agree nor disagree; (1.81 - 2.60) disagree; and (1.00 - 1.80) strongly disagree.

Table 5 presents an average weighted mean of 2.24, which signifies the respondents’ pervasive concern about the possible side-effects, efficacy, safety, cost, and ability to purchase the COVID-19 vaccine. This can be supported by a local social listening, wherein 27.3% of the

respondents expressed hesitancy due to concerns about the possible side effects of the vaccine, medical reasons such as comorbidities, and securing of medical clearance from primary care providers, and worry about the rolled out brands of vaccine (Department of Health, 2021).

**3.4.5. Respondents’ Cues to Action Towards the COVID-19 Vaccination.**

**Table 6: Respondents’ Cues to Action Towards the COVID-19 Vaccination.**

STATEMENT	MEAN	STANDARD DEVIATION	VERBAL INTERPRETATION
I will NOT take the COVID-19 vaccine even if I was given adequate information about it.	2.36	1.127	Disagree
I will NOT take the COVID-19 vaccine even if it is taken by many in the public.	2.37	1.121	Disagree
<b>AVERAGE WEIGHTED MEAN</b>	<b>2.37</b>	<b>1.067</b>	<b>Disagree</b>

\* Average Weighted Mean Parameters for Verbal Interpretation: (4.21 - 5.00) strongly agree; (3.41 - 4.20) agree; (2.61 - 3.40) neither agree nor disagree; (1.81 - 2.60) disagree; and (1.00 - 1.80) strongly disagree

Table 6 shows that the average weighted mean of 2.37 means that respondents prefer to obtain external cues such as receiving adequate information and the public’s engagement towards vaccination in triggering the decision to accept COVID-19 vaccination.

(Lin et al., 2020).

It can be inferred that necessary cues or stimuli are critical for prompting engagement in health-promoting actions such as vaccination. This can be attributed to social norms wherein the perception of “everyone is doing it” increases the intention to act and follow (Kahan, 2014). Additionally, participants have a higher definite intention to be vaccinated if the COVID-19 vaccine is taken and tested by many in the community

**3.5. Correlation of the Respondents’ Sociodemographic and Health Profile to COVID-19 Vaccination Hesitancy and Confidence**

The COVID-19 vaccination hesitancy and confidence of the respondents are assessed in correlation with their sociodemographic information to determine their willingness to get vaccinated and the factors that contribute to their skepticism regarding COVID-19 immunization. The Chi-square test was utilized to correlate the nominal or categorical data, such as the sociodemographic and health profile of the respondents.

**Table 7: Data of Chi-Square Analysis of Sociodemographic Profile and COVID-19 Vaccination Hesitancy and Confidence.**

Sociodemographics	$\chi^2$	p-value	Verbal Interpretation
Age	16.139	0.0404	Significant
Gender	8.187	0.0850	Not significant
Filipino Citizenship	17.932	0.0218	Significant
Locality	28.244	0.1038	Not significant
Religion	31.193	0.0127	Significant
Highest Educational Attainment	29.121	0.0854	Not significant
Employment Status	16.862	0.0316	Significant
Monthly Income	32.361	0.1183	Not significant

\* a p-value of <0.05 indicates significance

Table 7 presents the p values of sociodemographic and health factors significant at alpha = 0.05. Hence, significant differences in COVID-19 vaccination hesitancy and confidence are found among citizenship, age, employment status, and religion.

Accordingly, age was statistically significant towards

vaccine acceptability (Mesch & Schwirian, 2015). Moreover, employment status was found to be a factor with significant affiliation with vaccination (Wang, 2021). Lastly, religion is closely correlated with every dimension of vaccine trust (Eriksson & Vartanova, 2021).

**Table 8: Data of Chi-Square Analysis of Health Factors and COVID-19 Vaccination Hesitancy and Confidence.**

Health Factors	$\chi^2$	p-value	Verbal Interpretation
Diagnosed with chronic diseases	8.249	0.0829	Not significant
Perceived Overall Health Status	21.596	0.0057	Significant
Know any friends, neighbors, and colleagues infected with COVID- 19	11.145	0.0250	Significant

\* a p-value of <0.05 indicates significance

Table 8 presents the p values of sociodemographic and health factors significant at alpha = 0.05. Hence, significant differences in COVID-19 vaccination hesitancy and confidence are found among perceived health status and knowing any friends, neighbors, and colleagues infected with COVID-19.

Service occupation, self-employment, along with perceived overall health status, expressed a significantly higher proportion of COVID-19 vaccine confidence (Lin et al., 2020). On the other hand, a previous study conveyed that knowing friends, neighbors, and colleagues infected with COVID-19 is significantly associated with the intent to get vaccinated (Mercadante & Law, 2020).

**3.6. Respondents’ Apparent Willingness to Get Vaccinated Based on Sociodemographics**

Multinomial logistic regression was utilized to identify the considerable differences in willingness to get vaccinated among the respondents' various sociodemographic profiles and health factors. It is used to model multi-classification outcome variables where p-value, Confidence Interval (CI), and Odds Ratio (OR) were utilized for interpretation. P-values can be interpreted as significant if the value results in <0.05. As for the confidence interval, if 1 is not within the interval, it is significant, otherwise not. Whereas the Odds Ratio exceeding the value of 1 indicates a higher likelihood of getting vaccinated against COVID-19, while values below 1 indicate a lower vaccination acceptance.

**Table 9: Data of Multinomial Logistic Regression Analysis on Respondents Willingness to Get Vaccinated and Locality.**

Sociodemographics	Willingness to get vaccinated			Verbal Interpretation
	Odds Ratio (OR)	95% CI	p-value	
Manila	(ref)	(ref)	(ref)	--
Batangas	1.056	0.7123–1.5658	0.7862	Not significant
Olongapo	1.129	0.4671–2.7283	0.7879	Not significant
Pangasinan	0.943	0.6398–1.3884	0.7646	Not significant
Rizal	1.561	1.0581–2.3023	0.0253	Significant
Tacloban	1.129	0.4671–2.7283	0.7879	Not significant

\* an odds ratio of <1 denotes a lower likelihood of getting vaccinated, whereas an odds ratio of >1 signifies a higher likelihood; a confidence interval that does not include 1 is significant; a p-value of <0.05 indicates significance

Table 9 infers that only Rizal as a locality is statistically significant to have an impact on willingness to get vaccinated among the six target settings. It was also found to have the highest significant odds of a definite intention to take the vaccine. However, only Pangasinan

has a lower likelihood of getting vaccinated, while respondents from Batangas, Olongapo, Rizal, and Tacloban expressed a higher likelihood of getting immunized against COVID-19, with Manila being the reference group.

**Table 10: Data of Multinomial Logistic Regression Analysis on Willingness to Get Vaccinated and Citizenship.**

Willingness to get vaccinated				
Sociodemographics	Odds Ratio(OR)	95% CI	p-value	Verbal Interpretation
Filipino by birth	(ref)	(ref)	(ref)	--
Filipino by naturalization	1.866	0.8354–4.1186	0.1234	Not significant
Dual citizen	0.249	0.0967–0.6390	0.0041	Significant

\* an odds ratio of <1 denotes a lower likelihood of getting vaccinated, whereas an odds ratio of >1 signifies a higher likelihood; a confidence interval that does not include 1 is significant; a p-value of <0.05 indicates significance

Table 10 reflects that among the forms of Filipino citizenship, dual citizenship has a substantial influence on willingness to get vaccinated despite having the least percentage of respondents. Specifically, they expressed a

lower tendency to get vaccinated. In contrast, naturalized Filipino citizens conveyed a higher likelihood of getting vaccinated against COVID-19, with Filipino by birth citizenship serving as the reference group.

**Table 11: Data of Multinomial Logistic Regression Analysis on Willingness to Get Vaccinated and Age.**

Willingness to get vaccinated				Verbal Interpretation
Sociodemographics	Odds Ratio (OR)	95% CI	p-value	
18-39 (younger adults)	(ref)	(ref)	(ref)	--
40-59 (middle-aged adults)	1.047	0.7535–1.4550	0.7840	Not significant
60-79 (older adults)	1.035	0.5092–2.1024	0.9250	Not significant

\* an odds ratio of <1 denotes a lower likelihood of getting vaccinated, whereas an odds ratio of >1 signifies a higher likelihood; a confidence interval that does not include 1 is significant; a p-value of <0.05 indicates significance

Table 11 presents no considerable difference among the given age groups on willingness to receive immunization. As a matter of fact, individuals of all ages are possible to contract the COVID-19 infection (World

Health Organization, 2020). Accordingly, while the younger adults serve as the reference group, both the middle-aged adults and older adults were found to have a greater likelihood of receiving COVID-19 vaccination.

**Table 12: Data of Multinomial Logistic Regression Analysis on Willingness to Get Vaccinated and Gender.**

Willingness to get vaccinated				
Sociodemographics	Odds Ratio (OR)	95% CI	p-value	Verbal Interpretation
Female	(ref)	(ref)	(ref)	--
Male	0.747	0.5685–0.9826	0.0376	Significant

\* an odds ratio of <1 denotes a lower likelihood of getting vaccinated, whereas an odds ratio of >1 signifies a higher likelihood; a confidence interval that does not include 1 is significant; a p-value of <0.05 indicates significance

Table 12 shows that manhood significantly affects willingness to get vaccinated, and they expressed a lower

inclination to be subjected to COVID-19 vaccination.

**Table 13: Data of Multinomial Logistic Regression Analysis on Willingness to Get Vaccinated and Highest Educational Attainment.**

Willingness to get vaccinated				Verbal Interpretation
Sociodemographics	Odds Ratio (OR)	95% CI	p-value	
Elementary	(ref)	(ref)	(ref)	--
High school	4.382	0.7428–25.8523	0.1036	Not significant
Vocational	4.108	0.6591–25.6112	0.1310	Not significant
College	2.933	0.5035–17.0861	0.2321	Not significant
Master's degree	2.799	0.4377–17.9045	0.2776	Not significant
Doctor's degree	2.383	0.3765–15.0858	0.3569	Not significant

\* an odds ratio of <1 denotes a lower likelihood of getting vaccinated, whereas an odds ratio of >1 signifies a higher likelihood; a confidence interval that does not include 1 is significant; a p-value of <0.05 indicates significance

Table 13 shows no notable difference among the levels of completed education on willingness to be vaccinated against COVID-19. With elementary as the reference group, respondents expressed a higher COVID-19 vaccine acceptance regardless of educational attainment. A study showed that other factors for vaccination

willingness matter more than the level of education, but more than 75% of the 6,200 U.S. participants with a university degree had participated in the COVID-19 immunization when the vaccines were made available in the market (HealthDay News, 2021).

**Table 14: Data of Multinomial Logistic Regression Analysis on Willingness to Get Vaccinated and Employment Status.**

Willingness to get vaccinated				Verbal Interpretation
Sociodemographics	Odds Ratio (OR)	95% CI	p-value	
Employed	(ref)	(ref)	(ref)	--
Unemployed	0.863	0.6534–1.1398	0.2998	Not significant
Others (Self-employed, Freelancers)	1.449	1.0314–2.0364	0.0331	Significant

\* an odds ratio of <1 denotes a lower likelihood of getting vaccinated, whereas an odds ratio of >1 signifies a higher likelihood; a confidence interval that does not include 1 is significant; a p-value of <0.05 indicates significance

Table 14 presents that being self-employed or freelancers significantly affects the acceptance of COVID-19 vaccination. With the employed group as the reference,

the self-employed group conveyed a higher likelihood for vaccination, while those unemployed showed a lower likelihood of getting the COVID-19 vaccine.

**Table 15: Data of Multinomial Logistic Regression Analysis on Willingness to Get Vaccinated and Monthly Income.**

Willingness to get vaccinated				Verbal Interpretation
Sociodemographics	Odds Ratio(OR)	95% CI	p-value	
Below ₱10,481	(ref)	(ref)	(ref)	--
₱10,481 to ₱20,962	0.927	0.6415–1.3409	0.6892	Not significant
₱20,962 to ₱41,924	1.023	0.7013–1.4936	0.9044	Not significant
₱41,924 to ₱73,367	0.657	0.4010–1.0781	0.0974	Not significant
₱73,367 to ₱125,772	1.130	0.5871–2.1753	0.7145	Not significant
₱125,772 to ₱209,620	0.231	0.0876–0.6070	0.0032	Significant
₱209,620 and above	0.471	0.1901–1.1676	0.1050	Not significant

\* an odds ratio of <1 denotes a lower likelihood of getting vaccinated, whereas an odds ratio of >1 signifies a higher likelihood; a confidence interval that does not include 1 is significant; a p-value of <0.05 indicates significance

Table 15 presents that the monthly income of the respondents affects their willingness and hesitancy to get vaccinated in terms of ability to purchase the vaccine. It was also stated that having a low annual personal income level had the greatest odds in the likelihood of receiving a COVID-19 vaccine (Machida et al., 2021). A monthly income of ₱125,772 to ₱209,620 is statistically significant in receiving COVID-19 vaccination.

Accordingly, respondents with a monthly income of ₱10,481 to ₱20,962, ₱10,481 to ₱20,962, ₱125,772 to ₱209,620, and ₱209,620 and above have a lower likelihood of getting COVID-19 vaccine. On the other hand, those with an income of ₱20,962 to ₱41,924 and ₱73,367 to ₱125,772 have a higher likelihood of getting the COVID-19 vaccine with an income of below ₱10,481 as the reference group.

**Table 16: Data of Multinomial Logistic Regression Analysis on Willingness to Get Vaccinated and Religion.**

Willingness to get vaccinated				
Sociodemographics	Odds Ratio (OR)	95% CI	p-value	Verbal Interpretation
Roman Catholic	(ref)	(ref)	(ref)	--
Christian (Seventh-day Adventists, United Church of Christ, United Methodists, Episcopal Church in the Philippines, Bible Baptist Church, Jehovah’s Witnesses, and The Church of Jesus Christ of Latter-day Saints)	0.934	0.5677–1.5361	0.7880	Not significant
Aglipayan (Philippine Independent Church)	2.314	0.3948–13.5604	0.3530	Not significant
Muslim	3.815	1.0889–13.3663	0.0370	Significant
Iglesia ni Cristo	0.770	0.3462–1.7134	0.5230	Not Significant

\* an odds ratio of <1 denotes a lower likelihood of getting vaccinated, whereas an odds ratio of >1 signifies a higher likelihood; a confidence interval that does not include 1 is significant; a p-value of <0.05 indicates significance

Table 16 illustrates that religion significantly affects the willingness to accept vaccination against COVID-19. Among the religions, Aglipayans and Muslims have a higher likelihood to receive the COVID-19 vaccine than Christians and members of Iglesia ni Cristo. However, this result is not that reliable because only four respondents were Muslims, and two were Aglipayans, compared to the 357 respondents that were Catholics.

**3.7. COVID-19 Vaccination Hesitancy and Confidence Among the Selected Filipino Adults Based on the Health Belief Model Constructs**

Determining and understanding the trends of vaccine hesitancy and confidence through exploring significant HBM constructs is crucial for the success of immunization programs. It is of great significance in tailoring interventions for increasing vaccine acceptance and confidence in global public health.

**Table 17: Data of Multinomial Logistic Regression Analysis of Health Belief Model Constructs and Willingness to Get Vaccinated.**

Health Belief Model Constructs	Willingness to get vaccinated			Verbal Interpretation
	Odds Ratio(OR)	95% CI	p-value	
Perceived Susceptibility	1.345	1.1885–1.5232	3.8E-06	Significant
Perceived Severity	1.293	1.1181–1.4941	0.0006	Significant
Perceived Benefits	1.657	1.4910–1.8423	<2.0E-16	Significant
Perceived Barriers	0.618	0.5317–0.7187	1.0E-09	Significant
Cues to Action	1.947	1.7665–2.1465	<2.0E-16	Significant

\* an odds ratio of <1 denotes a lower likelihood of getting vaccinated, whereas an odds ratio of >1 signifies a higher likelihood; a confidence interval that does not include 1 is significant; a p-value of <0.05 indicates significance

Table 17 presents that all p-values are significant at alpha = 0.05. Regression analyses revealed that all Health Belief Model constructs carried significant associations, where perceived benefits and cues to action were the strongest driving factors for willingness to get vaccinated. Perceived susceptibility, perceived severity, perceived benefits, and cues to action were positive correlates of vaccination acceptance; whereas, perceived barriers were negative correlates contributing to vaccine hesitancy. Findings demonstrate a higher confidence than hesitancy towards the COVID-19 vaccine.

A COVID Vaccine Sectoral Survey conducted by the Health Promotion Bureau found that 63.29% of the health care frontliners, 56.50% of the non-health care frontliners, and 58.50% of senior citizens expressed willingness to receive COVID-19 vaccination. Additionally, the majority of the total respondents are confident and very willing to get vaccinated, considering that it is free, deemed safe, effective, and approved for use (Department of Health, 2021).

#### 4. CONCLUSION

Findings show that Filipino adults expressed a higher confidence than hesitancy towards COVID-19 vaccination based on the Health Belief Model constructs. Moreover, the use of the Health Belief Model has a significant difference in determining the COVID-19 Vaccination Hesitancy and Confidence among Selected Filipino Adults. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted.

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