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Original Article

Acceptance of COVID-19 Vaccine Among Unvaccinated Filipinos

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Abstract

Background: Access to COVID-19 vaccines was one of the global measures for containing the COVID-19 pandemic. However, it is still not known whether or not Filipinos accept vaccination. **Methods:** Cross-sectional study based on a modified version of the community COVID-19 vaccine acceptance survey, disseminated, and collected through Google Forms to Filipinos within the Philippines aged 18-65 years old. Multinomial logistic regression analysis was performed to determine the association between the willingness to be vaccinated and sociodemographic characteristics using odds ratios (OR) with 95% confidence intervals (95% CI). **Results:** Among the 1,011 participants, 79.5% were willing to accept the COVID-19 vaccine. Significant determinants ($p<0.05$) were age, region of residence, sex, profession, income, religion, practice of alternative medicine, and previous contact with COVID-19 positive individuals. Essential healthcare workers (OR=11.0, 95%CI=1.3-93.5), individuals practicing alternative medicine (OR=2.4, 95%CI=1.3-4.4), those with previous contact with a COVID-19 patient (OR=2.9, 95%CI=1.4-6.0), and females (OR=0.6, 95%CI=.3-1.0) were more likely to accept COVID-19 vaccination. 63.7% preferred Pfizer the most, and 54.4% preferred Sinovac the least. In contrast, married individuals, essential non-healthcare workers, and private/self-employed sectors were less likely to accept COVID-19 vaccines. Many individuals who refused to be vaccinated were unsure of its safety (59.70%) and had no trust in vaccines (56.50%). **Conclusion:** Despite a high prevalence of acceptance of the COVID-19 vaccine in our study, there were significant sociodemographic disproportions in vaccine acceptance. Better policies urging Filipinos to get vaccinated and more effective dissemination of unified information regarding vaccines from verified sources are recommended to boost vaccine confidence in the Philippines.

Key Words: COVID-19 Vaccines; Patient Acceptance of Health Care; Social Determinants of Health; Philippines (Source: MeSH-NLM).

Introduction

Coronavirus 2019 or SARS-CoV-19 (COVID-19) remains rampant, causing detrimental effects on health and the economy worldwide. Despite implementing preventive measures, such as utilizing facemasks, strict quarantine protocols, and social distancing, there are an estimated 97 million confirmed cases globally, while an estimated 510,000 in the Philippines as of January 24, 2021.[1] Consequently, the government authorities rely on potential vaccines to slow down and eventually minimize the spread of COVID-19.[2] With the development of vaccines against COVID-19 infection, various countries have started procuring and administering them, especially to high-risk groups consisting of frontline healthcare workers (HCWs) and the elderly.[3-4] The Food and Drug Administration is hopeful that the vaccines will be available in the Philippines by March 2021, after implementing new guidelines that permit administration of unregistered drugs for COVID-19 through emergency use.[5]

Due to the high exposure of COVID-19 to HCWs, newly developed COVID-19 vaccines, along with adherence to the aforementioned preventive measures, will play an essential role in providing optimum protection. These vaccines may also prevent further transmission of COVID-19, which will decrease morbidity and mortality rates, relieve the heavy burden on healthcare professionals and systems, recover the global economy, and allow the return of daily activities to pre-pandemic levels.[6] However, recent independent surveys in the Philippines have shown that only 66% of Filipinos throughout the country and an alarming 25% of Filipinos in Metro Manila were willing to receive a COVID-19 vaccine when available.[7] A survey across 19 countries, excluding the Philippines, revealed that only 47% of the participants ultimately agreed to COVID-19 vaccination when eligible, which is lower than the previously mentioned rate in the Philippines.[8] These may be due to multifaceted reasons, such as vaccine effectiveness and trust, potential short-term and unknown long-term adverse effects, and either government-subsidized or out-of-pocket expenditure of the vaccines.[9]

A study performed in the United States highlighted that socio-demographic characteristics, particularly gender, age, ethnicity,

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highest education achieved, and geographic differences, such as metropolitan or city areas, correlated with poorer vaccine acceptance.[10] A systematic review of vaccine acceptance has shown that most Asian countries, such as Malaysia (94.3%), Indonesia (93.3%), and China (91.3%) have a high vaccine acceptance compared to Western countries, such as Russia (54.9%), United States (56.9%), and France (58.9%).[11]

In the Philippines, there is a lack of studies that determine the exact percentage of Filipinos willing to be vaccinated and the determinants that may affect COVID-19 acceptance, especially since the administration of COVID-19 vaccines began. Therefore, this study aims to determine the factors of COVID-19 vaccine acceptance of Filipinos in the Philippines. This study also aims to determine the association between willingness to vaccinate and various factors, including age, region of residence, sex, marital status, current profession, household income, religion, education, belief in alternative medicine and presence of chronic diseases, as well as to identify the brand preference of COVID-19 vaccine, willingness to pay for COVID-19 vaccine, and reason(s) for unwillingness to vaccinate. These concerns remain relevant due to the continuous rise in COVID-19 cases and development of COVID-19 variants that cause faster transmission and higher infection rates. This study will increase the knowledge of probable determinants that could impede vaccine acceptance not only in Filipinos but also in other communities. This will aid the government and medical authorities in implementing necessary interventions to address these determinants for the effective administration of COVID-19 vaccines. Awareness campaigns may focus more on a region, workplace or particular population. Information on vaccines can be included in the curriculum across all school levels. Local government officials can be utilized to conduct seminars on vaccination safety. Appropriate actions and protocols may be applied to improve COVID-19 vaccine acceptance in the entire general Philippine population, leading to a decrease in COVID-19 morbidities and mortalities.

Methods

Study Design

We conducted an analytical, cross-sectional design via a web-based survey using a modified version of the community COVID-19 vaccine acceptance study in Indonesia acknowledged by the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) (see *Supplementary material*).[12]

Setting

The survey was conducted between April 11, 2021 to May 5, 2021. The study used an online platform, Google Forms, that was distributed through Facebook due to strict quarantine guidelines that limited face-to-face interactions. Dissemination of the survey was assisted by the Association of Philippine Medical Colleges (APMC) to different regions of the Philippines.

Participants

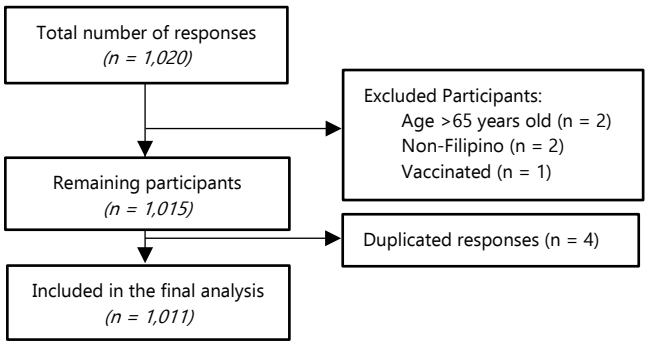
The Raosoft online sample size calculator was utilized to determine the required participant size. Confidence interval and margin of error was set at 95% and 5%, respectively. The minimum number of participants needed for the study was 377. A convenience sampling method was used online via social media to minimize contact and exposure risk of COVID-19. We gathered data when approximately 1-2% of the Philippine population was vaccinated. There were 1,011 study participants recruited from the Philippine general public after the study was disseminated online. The selection criteria for this study were as follows: a) must be a Filipino citizen residing in the Philippines who has not been previously vaccinated with any of the available COVID-19 vaccines, b) must be aged 18 and below 65, c) have internet access, and d) be able to read and write in English or Tagalog. Exclusion criteria included: a) foreign nationals residing in the Philippines, b) individuals vaccinated against COVID-19, c) aged below 18 and above 65 c) no access to electronic devices and/or internet, and d) unable to read and write in English or Tagalog. Individuals who qualified in the inclusion criteria and were willing to participate had access to the survey link that contained the consent form and questionnaire.

As seen in *Figure 1*, a total of 1,020 responses were collected. 1,015 remained after exclusion criteria were applied. Finally, 1,011 participants were included in the final analysis after removing duplicated responses.

Data Collection

This questionnaire consisted of socio-demographic questions that included age, current residence (region), gender, marital status, profession, household monthly income, religion, highest education achieved, and type of health insurance to access the determinants of COVID-19 vaccine acceptance. The questions included multiple-choice and "yes" or "no" types. The questionnaire took a maximum of 15 minutes to complete.

Figure 1. Flow Diagram of Study Participants.



The data was collected, collated and transferred from Google Forms to Microsoft Excel for data analysis using a password protected electronic folder for privacy and confidentiality. An existing email address was required to access the Google Forms. Three of six researchers accessed the results of the online survey to ensure confidentiality. The survey link was available for three weeks and upon the start of data gathering was no longer accessible on the internet.

Age, current residence (region), gender, marital status, profession, monthly household income, religion, highest education achieved, and type of health insurance were treated as independent variables. The dependent variables were the acceptance and willingness to pay for the vaccine. Other possible variables, such as family's influence, were not taken into account. Selection bias could influence the study's outcome; hence, the researchers decided to distribute the questionnaire through social media to maximize responses. Filipinos currently not living in the Philippines were also not included in the study to reduce other external variables.

Statistical Analysis

Descriptive statistics consisted of frequency and percentages that were used to generate summary tables for socio-demographic data and COVID-19 vaccine-related questions. The chi-square test was used to determine the relation between socio-demographic characteristics and willingness to get vaccinated. The researchers used multinomial logistic regression analysis to determine possible factors associated with COVID-19 vaccine uptake with a significance of $p<0.05$. Odds ratios (OR) with a 95% confidence interval (95%CI) were included for each factor. The Pearson goodness-of-fit test was used to assess the model fit of multinomial logistic regression analysis. All analyses were performed using SPSS Statistics 26.

Ethical Considerations

The protocol of this study was approved by the Saint Louis University Baguio City Ethics Committee (SLU-REC 2021-002). Participants were informed of specific details of the study (found on the first page of the online questionnaire) which also contained the consent form that had to be completed prior to commencement of the survey. Participation was voluntary and withdrawal possible at any time during the study. Furthermore, there were no foreseeable risks to participants; however, they were encouraged to contact any of the researchers if any issues occurred during the completion of the questionnaire.

Results

Socio-demographic Data

There was a total of 1,011 survey participants that completed the web-based survey. Sociodemographic characteristics of participants are shown in *Table 1*. The majority of participants were 18-25 years of age (64.4%), female (61.6%), residing in Cordillera Administrative Region (CAR) (18.5%), single either unmarried, separated or widowed (83.8%), without children (82.6%), either a student, retired or unemployed (71.5%), earning between P20,001–50,000 per month (31.5%), Roman Catholic (70.9%), university graduate (97.4%), using PhilHealth as health insurance (49.8%), practicing alternative medicine (67.9%), not diagnosed with any chronic diseases (85.2%), and having had no contact with any COVID-19 positive individuals (68.3%).

Among the participants, 79.5% were willing to accept COVID-19 vaccines, while 20.5% did not accept and were undecided about COVID-19 acceptance, respectively. Comparing acceptance vs. non-acceptance groups, the majority of participants were aged 18-25 years (70.3%) vs. 26-35 years (35.1%), females (64.3%) vs.

Table 1. Socio-Demographic Data of Questionnaire Participants.

Socio-demographic characteristics	Acceptance, n (%) (n= 804)	Non-acceptance, n (%) (n= 148)	Total*, n (%) (n= 1,011)
Age, years			
18 - 25	565 (70.3)	38 (25.7)	651 (64.4)
26 - 35	182 (22.6)	52 (35.1)	239 (23.6)
36 - 45	17 (2.1)	31 (20.9)	50 (4.9)
46 - 55	19 (2.4)	12 (8.1)	32 (3.2)
56 - 65	21 (2.6)	15 (10.1)	39 (3.9)
Gender			
Male	287 (35.7)	88 (59.4)	388 (38.4)
Female	517 (64.3)	60 (40.6)	623 (61.6)
Region			
NCR	93 (11.6)	40 (27.0)	141 (13.9)
CAR	140 (17.4)	28 (18.9)	187 (18.5)
Region I	141(17.5)	9 (6.1)	151 (14.9)
Region II	49 (6.1)	1 (.7)	55 (5.4)
Region III	91 (11.3)	15 (10.1)	113 (11.2)
Region IV-A	102 (12.7)	8 (5.4)	111 (11.0)
Region IV-B	0 (.0)	2 (1.4)	2 (.2)
Region V	7 (.9)	7 (4.7)	15 (1.5)
Region VI	12 (1.5)	5 (3.4)	17 (1.7)
Region VII	37 (4.6)	7 (4.7)	44 (4.4)
Region VIII	9 (1.1)	4 (2.7)	13 (1.3)
Region IX	15 (1.9)	1 (.7)	25 (2.5)
Region X	68 (8.5)	13 (8.9)	88 (8.7)
Region XI	1 (.1)	3 (2.0)	4 (0.4)
Region XII	16 (2.0)	2 (1.4)	18 (1.8)
Region XIII	13 (1.6)	2 (1.4)	15 (1.5)
BARMMM	10 (1.2)	1 (.7)	12 (1.2)
Marital status			
Married	74 (9.2)	77 (52.0)	164 (16.2)
Single (unmarried/separated/widowed)	730 (90.8)	71 (48.0)	847 (83.8)
With children	85 (10.6)	76 (51.4)	176 (17.4)
Current profession			
Essential healthcare worker	82 (10.2)	1 (.7)	86 (8.5)
Essential non-healthcare worker	39 (4.9)	22 (14.9)	70 (6.9)
Private/Self-employed	40 (5.0)	84 (56.8)	132 (13.1)
Student/Retired/Unemployed	643 (79.9)	41 (27.6)	723 (71.5)
Monthly income			
<10,000	62 (7.7)	31 (20.9)	102 (10.1)
10,001-20,000	156 (19.4)	56 (37.8)	223 (22.1)
20,001-50,000	248 (30.8)	42 (28.4)	318 (31.5)
50,001-100,000	192 (23.9)	18 (12.2)	218 (21.6)
>100,000	146 (18.1)	1 (.7)	150 (14.8)
Religion			
Roman Catholic	592 (73.6)	103 (69.5)	717 (70.9)
Iglesia ni Kristo	23 (2.9)	4 (2.7)	27 (2.7)
Islam	20 (2.5)	1 (.7)	30 (3.0)
Hinduism	3 (.4)	1 (.7)	4 (0.4)
None	9 (1.1)	1 (.7)	10 (1.0)
Others	157 (19.5)	38 (25.7)	223 (22.1)
Highest education			
Never went to school	2 (.3)	0 (.0)	2 (.2)
Junior high school	0 (.0)	13 (8.8)	0 (.0)
Senior high/vocational school	11 (1.4)	135 (91.2)	24 (2.4)
University	791 (98.4)	0 (.0)	985 (97.4)
Health insurance			
PhilHealth	375 (37.1)	103 (69.6)	503 (49.8)
Private	57 (5.6)	3 (2.0)	62 (6.1)
Both	127 (12.6)	24 (16.2)	167 (16.5)
None	245 (24.2)	18 (12.2)	279 (27.6)
Practice of alternative medicine	543 (53.7)	92 (62.2)	686 (67.9)
Existence of chronic disease	121(12.0)	23 (15.5)	150 (14.8)
Contact with COVID-19 positive	282 (27.9)	22 (14.9)	320 (31.7)

males (59.4%), residing in Region I (17.5%) vs. National Capital Region (NCR) (27.0%), single (90.8%) vs. married (52.0%), without children (89.4%) vs. with children (51.4%), students/ retired/unemployed (79.9%) vs. private/self-employed (56.8%), with a monthly income of P20,001-50,000 (30.8%) vs. 10,001-20,000 (37.8%), Roman Catholic (73.6% vs. 69.5%), university (98.4%) vs. senior high/vocational school graduate (91.2%), had PhilHealth as health insurance (37.1% vs. 69.6%), practiced alternative medicine (53.7% vs. 62.2%), had no existing chronic disease (88% vs. 84.5%) and had no previous contact with a COVID-19 positive individual (72.1% vs. 85.1%), respectively. As shown in *Table 2*, out of the 79.5% participants who had the intention of getting vaccinated, 63.7% preferred Pfizer followed by Moderna (12.9%) and AstraZeneca (10.9%). Sinovac was least preferred by 54.4% of the group, followed by Gamaleya (29.0%) and AstraZeneca (6.1%).

Table 2. Vaccine Preference of Acceptance Group.

Brands (Country of origin)	Most Preferred N (%)	Least Preferred N (%)
Pfizer (US)	512 (63.7)	36 (4.5)
Moderna (US)	104 (12.9)	23 (2.9)
AstraZeneca (UK)	88 (10.9)	49 (6.1)
Sinovac (China)	64 (8.0)	437 (54.4)
Novavax (US)	16 (2.0)	20 (2.5)
Gamaleya (Russia)	6 (0.7)	233 (29.0)
Others	14 (1.7)	6 (0.7)

Legend: N frequency, % percentage, US United States, UK United Kingdom.

Willingness to Pay and Reasons for Unwillingness to Accept COVID-19 Vaccines

Vaccine-related questions with responses sorted by acceptance and non-acceptance groups are summarized in *Table 3*. For the acceptance group, 70.3% and 21.0% were willing and unwilling to pay for the vaccine, respectively. Around 38.8% of responders were also willing to pay Php 1-1,000 for the COVID-19 vaccine, followed by Php 1,001-2000 (29.2%). As for the non-acceptance group, 59.7% of responders were not willing to be vaccinated due to uncertainty in safety, while 56.5% and 40.9% did not trust the vaccines and were unsure of vaccine effectiveness, respectively. Other reasons specified by 11.0% of non-accepters included: denial of COVID-19 existence, and misinformation or lack in knowledge about COVID-19 and its vaccines (e.g., vaccine had no protection against COVID-19 variants, COVID-19 vaccine was unnecessary or insignificant due to previous COVID-19 diagnosis, and use of face-shield and facemask, herd immunity, and Ivermectin as preferred protection against COVID-19). Furthermore, when responders in the non-acceptance group were asked whether their overall perception had changed after healthcare workers were vaccinated with Sinovac or AstraZeneca, 86.5% responded "no", followed by "yes (positive perception)" (7.4%) and "yes (negative perception)" (6.1%). Lastly, the majority (48.5%) in both acceptance and non-acceptance groups selected "Social media (e.g. Facebook, Instagram, Twitter, WhatsApp or TikTok)" as the preferred source of information for COVID-19 vaccine, and 23.2% had chosen "Print and electronic media (e.g. TV or newspaper)".

Determinants of COVID-19 Vaccine Acceptance

Determinants of COVID-19 vaccine acceptance among Filipinos were examined and those that were found to be significant were shown in *Table 4*. These determinants included age (p<0.001),

Table 3. Vaccine Questions for Acceptance and Non-Acceptance Groups

Responses	n (%)
Acceptance group	
Are you willing to pay for the vaccine?	
Yes	565 (70.3)
No	169 (21.0)
Unsure	62 (7.7)
How much are you willing to pay if there is such provision (In Php)?	
1-1,000	219 (38.8)
1,001-2,000	165 (29.2)
2,001-3,000	112 (19.8)
3,001-4,000	25 (4.4)
>4,000	42 (7.4)
Non-acceptance group	
Why will you not accept the COVID vaccine? (choose at least one)	
Not sure of safety	92 (59.7)
No trust in vaccine	87 (56.5)
Not sure of effectiveness	63 (40.9)
Fear of side effects such as fever and pain	36 (23.4)
Religious belief	14 (9.1)
Political belief	7 (4.6)
Other (specify)	17 (11.0)
Did vaccination of the healthcare workers and/or government authorities change your overall acceptance of the COVID-19 vaccine?	
No, I still do not want to be vaccinated	126 (85.1)
Yes, I now want to be vaccinated	6 (4.1)
Yes, but I no longer want to be vaccinated	1 (.7)
Did vaccination with Sinovac/AstraZeneca among the healthcare workers change your overall perception of the Sinovac/AstraZeneca vaccine?	
No	128 (86.5)
Yes (positive)	11 (7.4)
Yes (negative)	9 (6.1)
Acceptance and non-acceptance groups	
How would you like to get more information about the COVID-19 vaccine?	
Social media (e.g., Facebook, Instagram, Twitter, WhatsApp or TikTok)	490 (48.5)
Print and Electronic media (e.g., TV or newspaper)	235 (23.2)
Online platforms (e.g., Zoom, Google Meet or Skype)	111 (11.0)
Telecommunication (e.g., SMS or phone call)	84 (8.3)
Others	45 (4.5)
Not interested	46 (4.5)

Legend: N frequency, % percentage, Php Philippine.

Table 4. Socio-Demographic Data for Acceptance Vs. Non-Acceptance.

Determinants	Model Fitting Criteria	Likelihood Ratio Tests	
	-2 Log Likelihood of Reduced Model	Chi-Square	p-value
Age	647.4	38.2	<0.001
Region	703.5	94.3	<0.001
Sex	629.5	20.3	<0.001
Marital status	614.8	5.6	0.06
With children	614.4	5.3	0.072
Current profession	689.6	80.4	<0.001
Monthly income	656.7	47.5	<0.001
Religion	661.7	52.5	<0.001
Highest education	615.9	6.7	0.152
Insurance type	620.1	10.9	0.092
Alternative medicine practice	633.4	24.2	<0.001
Chronic disorder	614.4	5.2	0.073
Contact with COVID-19 positive	620.0	10.8	0.004
Nagelkerke	0.9		

region of residence (p<0.001), sex (p<0.001), current profession (p<0.001), monthly income (p<0.001), religion (p<0.001), practice of alternative medicine (p<0.001), and previous contact with COVID-19 positive individuals (p=0.004). Marital status, having children, highest education achieved, insurance type and presence of a chronic disorder were found to be statistically insignificant.

Influence of determinants on vaccine acceptance was also calculated through odds ratio that are shown in ***Table 5***. Individuals aged 18-25 years were 132 times more likely to accept COVID-19 vaccines compared to other age groups (OR=132.6, 95%CI=5.2-3388.5, p=0.003). Those aged 46-55 and 26-35 years were also 55 and 41 times more likely to accept these vaccines as protection for COVID-19, respectively (OR=55.3, 95%CI=1.5-2105.2, p<0.05; OR=41.9, 95%CI=1.5-1186.5, p<0.05). In addition, participants who were essential healthcare workers were 11 times more likely to accept COVID-19 vaccination (OR=11.0, 95%CI=1.3-93.5, p<0.05) than essential non-healthcare workers, students, private/self-employed, unemployed, and retired individuals. Furthermore, individuals who practiced alternative medicine and those with previous contact with a COVID-19 positive person were more likely to accept the vaccination for COVID-19 compared to those who did not practice alternative medicine or have a history of COVID-19 positive contact (OR=2.4, 95%CI=1.3-4.4, p=0.005; OR=2.9, 95%CI=1.4-6.0, p=0.005, respectively). Males were half as likely as woman to accept COVID-19 vaccinations (OR=0.6, 95%CI=0.3-1.0, p<0.05). Moreover, married individuals were less likely to accept COVID-19 vaccines compared to single individuals (OR= 0.2, 95%CI=0.0-1.0, p<0.05). Also, those who were essential non-healthcare workers and individuals within the private/self-employed sector were less likely to accept COVID-19 vaccines (OR=0.2, 95%CI=0.1-0.6, p=0.005; OR=0.1, 95%CI=0.0-0.2, p<0.001, respectively).

Table 5. Determinants Influencing Vaccination Acceptance Between Acceptance Vs. Non-Acceptance Groups.

Socio-demographic characteristics	OR	95% CI	p-value
Age (years)			
18 - 25	132.6	5.2-3388.5	0.003*
26 - 35	41.9	1.5-1186.5	0.029*
36 - 45	21.4	0.6-708.0	0.086
46 - 55	55.3	1.5-2105.2	0.031*
56 - 65	6.6	0.2-262.7	0.315
Gender: Male	0.6	0.3-1.0	0.040*
Region			
NCR	0.3	0.0-3.4	0.336
CAR	1.9	0.2-20.7	0.615
Region I	4.1	0.3-50.0	0.270
Region II	13.2	0.5-329.0	0.115
Region III	1.3	0.1-14.8	0.848
Region IV-A	4.4	0.3-61.9	0.269
Region IV-B	-	-	-
Region V	0.8	0.0-12.5	0.842
Region VI	3.6	0.2-63.1	0.387
Region VII	1.3	0.1-17.5	0.855
Region VIII	0.7	0.0-12.2	0.789
Region IX	4.7	0.1-164.0	0.389
Region X	1.8	0.2-19.4	0.644
Region XI	0.4	0.0-15.6	0.631
Region XII	0.9	0.0-16.8	0.943
Region XIII	3.6	0.1-92.8	0.446
BARMMM	1	-	-
Marital Status: Married	0.2	0.0-1.0	0.045*
With children	2.3	0.4-14.1	0.378
Current profession			
Essential healthcare worker	11.0	1.3-93.5	0.028*
Essential non-healthcare worker	0.2	0.1-0.6	0.005*
Private/Self-employed	0.1	0.0-0.2	<0.001*
Student/Retired/Unemployed	1	-	-
Monthly income: >100,000	1	-	-
<10,000	0.0	0.0-0.2	0.001*
10,001-20,000	0.0	0.0-0.3	0.004
20,001-50,000	0.0	0.0-0.3	0.002*
50,001-100,000	0.1	0.0-0.7	0.024*
Religion: Others	1	-	-
Roman Catholic	1.2	0.6-2.4	0.647
Iglesia ni Kristo	0.5	0.1-2.5	0.393
Islam	0.9	0.9-10.0	0.956
Hinduism	0.1	0.0-6.6	0.308
None	2.2	0.2-26.8	0.549
Highest education			
Never went to school	-	-	-
Junior high school	-	-	-
Senior high/vocational school	0.3	0.1-1.2	0.080
University	1	-	-
Health insurance			
PhilHealth	1.6	0.7-3.6	0.238
Private	2.2	0.5-9.9	0.315
Both	1.5	0.5-4.2	0.490
None	1	-	-
Practice of alternative medicine	2.4	1.3-4.4	0.005*
Existence of chronic disease	2.9	1.0-8.4	0.053
Contact with COVID-19 positive	2.9	1.4-6.0	0.005*

Legend: OR odds ratio, CI confidence interval. * p-value less than 0.05

Discussion

Determining significant factors contributing to vaccine acceptance is vital as countries aim to vaccinate most citizens. This can lessen strict COVID-19 protocols to return to pre-pandemic functioning and activities, such as removing mandatory utilization of face masks and quarantines, and reopening of affected economic sectors, particularly involving travel and business. This study aimed to understand contributing factors to vaccine acceptance by Filipinos. With the country's relatively high COVID-19 vaccine hesitancy and low vaccination coverage,[7] it is critical to understand vaccine acceptance in the Philippines.

Willingness to Vaccinate Against COVID-19

Vaccination against COVID-19 infection may cause a decline in COVID-19 infection and mortality rates. The distribution of the vaccine is futile unless individuals are willing to be vaccinated. This study aimed to determine the willingness of Filipinos to get vaccinated against COVID-19, as well as potential factors that influence COVID-19 vaccine acceptance in the Philippines. In our study, we found that the majority (79.5%) of unvaccinated adult Filipinos are willing to be vaccinated. This is considered significant when compared to vaccination rates of other countries world-wide, particularly in the Mediterranean and Western regions where vaccination rates range between 29% to 57%. However, this is lower in comparison to other Asian nations, where vaccination rates are mostly above 90%.[11]

In March 2021, the first batch of CoronaVac, a Chinese-made COVID-19 vaccine also known as Sinovac, was procured by the Philippine government for rapid inoculation of A1 group priority. Composed of frontline healthcare workers, this was the first group of individuals to be vaccinated.[13] According to the OCTA Research survey study that was conducted throughout the Philippines from January to February 2021, only 15% of adult Filipinos were willing to be vaccinated, while 46% and 35% of adult Filipinos were unwilling and undecided to obtain COVID-19 vaccinations, respectively.[14] However, another national survey was performed from April to May 2021 by Social Weather Stations, a non-profit social research institution, that showed an increase in up to 35% of adult Filipinos who were willing to be vaccinated and an 11% decrease of those who were unwilling.[15] In our study, the willingness of Filipinos to be vaccinated has increased dramatically possibly due to influences of vaccinated healthcare workers, greater knowledge and dissemination of information regarding COVID-19 vaccines, and adverse effects rarely experienced post-COVID-19 vaccination.

Acceptance of COVID-19 Vaccine and Its Determining Factors

This study identified determinants that may predict COVID-19 vaccine acceptance and may affect individuals' willingness to be vaccinated. Age, region (of residence), sex, current profession, monthly income, religion and practice of alternative medicine (all $p<0.001$), and contact with a COVID-19 positive individual ($p<0.05$) were found to be significant determinants. Within the age demographic, individuals between 18 to 55 years old were 41 to 132 times more likely ($p<0.05$) to accept COVID-19 vaccination. This may be due to a higher literacy rate within these age groups as compared to older age groups (56-65 years), resulting in better knowledge about COVID-19 and its vaccines.[16] However, our study results differed from two studies that showed higher vaccine acceptance within older adults (≥55 years) compared to younger adults.[9,17] Essential healthcare workers were also 10 times more likely to accept the vaccine ($p<0.05$) compared to other professions, particularly essential non-healthcare workers and private/self-employed ($p<0.05$; $p<0.001$). Another study conducted by Harapan et al. showed that healthcare workers and those who had a higher perceived risk of COVID-19 infection were associated with higher acceptance of the COVID-19 vaccines than civil servant retirees.[12] These findings may suggest that higher knowledge and perceived risk of infection, transmission, and prevention against COVID-19 may be associated with higher vaccine acceptance. Furthermore, those who practiced alternative medicine and who had previous contact with COVID-19 positive individuals were 2-3 times more likely to obtain the vaccine ($p<0.005$). Education and awareness should be targeted among those with inadequate understanding of COVID-19 infection and lower level of education.

On the other hand, males and married individuals were less likely to accept the vaccines (OR=0.6, $p<0.05$; OR=0.2, $p<0.05$, respectively). The findings also showed that males are half as likely to accept vaccination as females (OR=0.6). A similar result was seen in the study by Malik et al. showing males (72%) and college and/or graduate degree holders (75%) were more likely to accept the vaccine.[9]

With this data on possible sociodemographic determinants of COVID-19 vaccine acceptance, the government, healthcare workers, and other trusted organizations may educate and encourage vaccination, targeting the non-acceptance groups. For instance, the local government may invite essential non-healthcare workers and private/self-employed individuals to address any misinformation. They can also release transparent and coherent information that is easily understandable to the public. Figures or infographics can be beneficial to those who did not have the opportunity for an education.

Willingness to Pay for COVID-19 Vaccine

From the group of respondents who were willing to accept the vaccination offered by the Philippine government, around 70% of them were willing to pay. According to Wong, et. al, the average national income, price of the vaccine, and severity of the pandemic should be considered[19] for policymakers to offer financial assistance to those in the lower-income bracket. With that in mind, another proposition was to include the COVID-19 vaccine in the national immunization program, which would likely increase the number of people vaccinated.[19] From our assessment, most respondents who were willing to pay were ready to pay a maximum of Php1,000 for the vaccine. One of the

most likely justifications was the minimum wage in the Philippines, which ranges from 230 pesos to 430 pesos, depending on the region.[20] Respondents who were willing to pay the highest amount may have been influenced by their perception of the quality of the vaccine. Just like the general population's common perception about medicines, it was frequently mistaken that the cost of vaccines was associated with their quality and effectiveness.[21] This may also reflect on the value people placed in avoiding risks related to the vaccine.[22]

Vaccine Brand Preference

Results from clinical trials may have influence on an individual's preference for one brand over the other.[23] According to data from clinical trials, the vaccines by Pfizer-BioNTech and Moderna have a 95% efficacy rate, and should be taken in 2 doses with an interval of 21-28 days after the first dose. AstraZeneca also reported that their vaccine has a 70% efficacy rate and should be taken in 2 doses, 28 days apart. In comparison, Sinovac had varying results with a 51% to 91.25% efficacy rate. In general, the side effects of all COVID-19 vaccines include fatigue, muscle pain, headache, chills, fever, nausea and a risk of severe anaphylaxis in individuals who had a previous allergic reaction to vaccines.[24] To eliminate vaccine preference, the government can implement initiatives to increase vaccination knowledge and awareness, community engagement, and vaccine availability in convenient and accessible locations.[25] With the known information on the public's preference for specific brands, the government can increase the availability of Pfizer-BioNTech and AstraZeneca vaccines to encourage people with a preference to be inoculated.

Reasons for Not Accepting COVID-19 Vaccine by Non-Acceptance Respondents

Most of the respondents who were unwilling to accept the vaccine have expressed their distrust of the vaccine (56.5%) and were not sure of its safety (59.7%). This should show a possible correlation between the vaccine and its perceived effectiveness.[19] This was further elaborated in a study by Bond and Nolan, which discussed the lack of perceived risk and severity for the infection leading to decreased perception for urgency in getting a vaccine.[26] Another reason may be attributed to the conflicting news made by the Department of Health (DOH), other agencies and news outlets on the safety of vaccines, which creates an ambience of contradictions and leads to a negative effect on the level of trust in these institutions.[19] As most of the vaccines were still in Phase 3 of clinical trials, their efficacy was not yet final at the time of this study. Most likely, waiting for further results of Phase 4 clinical trials to assure safety would decrease the non-acceptance among the public regarding COVID-19 vaccines, which will be similar to WHO's findings in their report on vaccine hesitancy.[27] Since most of the reasons for not accepting the vaccines were related to doubt of the vaccine, trusted organizations, such as medical student organizations, and healthcare workers can help assure the public of the vaccines' efficacy and safety with first-hand experiences.

Change of Perception of the Non-Acceptance Group Due to Vaccination of Government Health Care Workers and Authorities

From the group of respondents who were unwilling to accept vaccines, only less than 5% were willing to be vaccinated when the government healthcare workers and authorities were immunized. A position to consider was the controversy surrounding past vaccination programs, most notably the Dengvaxia® vaccine, attributing to a decreased vaccine confidence.[14] Generally, the continued non-acceptance of vaccines can be primarily attributed to mistrust of the institutions that provide them, in this case, the Philippine Government; thus, a possible solution would be to focus on trust-building policies and practices between the public and the government.[28]

Preferred Source of Information of Respondents

Overall, the survey respondents preferred to be informed through social media (48.5%) followed by print and electronic media (23.2%). The twenty-first century is considered to be the electronic age. With the rise of manufactured smartphones as well as phone applications, it has become easier for everyone to receive news or information from their own phones. It is much easier and accessible to find news on the internet rather than through print.[29] This result is beneficial for policymakers who can give updates on social media. However, detrimental to this may be the increasing amount of fake news. The instantaneous sharing of information limits adequate fact-checking, contributing to the spread of false information.[30] Thus, the researchers highly recommend following verified accounts on social media for easier dissemination of credible information.

According to WHO on Vaccine Hesitancy (2014), there is no universally accepted cause for the increasing number of people who are hesitant to vaccinate.[27] However, it is an increasingly recognizable problem that affects every country in the world. The only notable difference is that the discovered causes vary in each country. In effect, solutions are relatively unique by country. In the case of the Philippines, it is mandatory to prioritize the level of trust in the government, offer better strategies in disseminating information regarding vaccine effectiveness, as well as educate the public on the outcomes of having severe COVID-19 infection, with the goal of increasing the sense of urgency to be vaccinated and highlight the importance of budgeting for vaccines in every household. But, most importantly, literature on vaccine hesitation should be considered, and used as a guide in creating such strategies and policies.[27]

The study was limited to the perceptions of unvaccinated individuals. Selection bias could influence conclusions drawn about the acceptance of the COVID-19 vaccine if vaccinated individuals were excluded from the study. Furthermore, the authors believe that the generalizability of the current study may be impacted by the sampling method and the mode of distribution. We mostly relied on the Facebook app; therefore, we may have missed individuals from lower socioeconomic classes,

those who were illiterate, and those who did not have access to the platform. The study was also conducted when limited data was available about the vaccines. A follow-up study should be conducted with the availability of vaccine information.

Conclusion

The vaccine's effectiveness influences unvaccinated Filipinos' acceptance. When the Philippine government subsidizes the vaccination, acceptance is fairly high. According to previously reported data, the study participants intended to take the COVID-19 vaccine; nonetheless, the participants' perceived risk and trust in the health system were found to be significant predictors of ultimate COVID-19 vaccine uptake in the Philippines. If the COVID-19 vaccine proves ineffective, governments will be forced to adopt more vaccination strategies. Furthermore, because COVID-19 acceptance is linked to community perceptions of risk, it is critical to enhance the public's risk awareness. Our findings should be confirmed with public health publicity actions in the future. Multiple sociodemographic categories may be targeted for health initiatives.

Summary – Accelerating Translation

PAMAGAT: Pagtanggap ng Bakuna sa COVID-19 sa mga Pilipinong Hindi Nabakunahan

PANGUNAHING PROBLEMA

Ang COVID-19 (Coronavirus 2019 o SARS-CoV-19) ay nananatiling laganap, na nagdudulot ng masamang epekto sa kalusugan at ekonomiya sa buong mundo. Ang mga awtoridad ng gobyerno ay nagpatupad ng mga hakbang sa pag-iwas, tulad ng paggamit ng mga face-mask at mahigpit na quarantine protocol gayunpaman, ang pagbibigay ng mga bakuna ay nagsimula upang mapabagal at mabawasan ang pagkalat ng COVID-19. Ang mga independyenteng survey ay nagpakita ng mababa hanggang katamtamang antas ng pagpayag na mabakunahan sa Pilipinas, na maaaring dahil sa maraming dahilan tulad ng pagiging epektibo at tiwala ng bakuna, masamang epekto at gastusin ng mga bakuna na may subsidyo ng gobyerno o mula sa bulsa. Kulang din ang mga pag-aaral na tumutukoy sa eksaktong porsyento ng mga Pilipinong gustong magpabakuna at ang mga determinant na maaaring makaapekto sa pagtanggap ng COVID-19.

LAYUNIN NG PAG-AARAL

Ang pag-aaral na ito ay naglalayong matukoy ang kaugnayan sa pagitan ng pagpayag na magpabakuna at mga posibleng determinant na kinabibilangan ng: edad, rehiyon ng paninirahan, kasarian, katayuan sa pag-aasawa, kasalukuyang propesyon, kita ng sambahayan, relihiyon, edukasyon, paniniwala sa alternatibong gamot at pagkakaroon ng mga malalang sakit. Higit pa rito, para matukoy ang gustong brand ng bakuna para sa COVID-19, kagustuhang magbayad para sa bakuna, at mga rason para sa hindi kagustuhang magpabakuna.

PAMAMARAAN

Ginamit ang analytical, cross-sectional na disenyo sa pamamagitan ng web-based na survey gamit ang binagong bersyon ng community COVID-19 vaccine acceptance vaccine study sa Indonesia na kinikilala ng World Health Organization (WHO) at United Nations Children's Fund (UNICEF). Isinagawa ang survey sa pagitan ng Abril 11, 2021 hanggang Mayo 05, 2021 sa pamamagitan ng Google Forms. Mayroong 1,011 kalahok sa pag-aaral ang na-recruit mula sa pangkalahatang publiko ng Pilipinas pagkatapos maipalaganap ang pag-aaral online. Ang mga pamantayan sa pagpili para sa pag-aaral na ito ay ang mga sumusunod: a) dapat ay isang mamamayang Pilipino na naninirahan sa Pilipinas na hindi pa nabakunahan ng alinman sa mga magagamit na bakuna para sa COVID-19, b) kailangang may edad na 18 pataas, c) may internet, at d) marunong bumasa at sumulat sa Ingles o Tagalog.

Ang talatanungan na ito ay binubuo ng mga sosyo-demograpikong tanong na kinabibilangan ng edad, kasalukuyang paninirahan (rehiyon), kasarian, katayuan sa pag-aasawa, posisyon sa trabaho, buwanang kita ng sambahayan, relihiyon, pinakamataas na edukasyon na nakamit at segurong pangkalusugan upang matugunan ang mga determinant ng pagtanggap ng bakuna sa COVID-19. Kasama sa mga tanong ang mga uri ng multiple-choice at "oo" o "hindi".

Ang data ay kinolekta, tinipon at inilipat mula sa Google Forms patungo sa Microsoft Excel para sa pagsusuri ng data gamit ang isang electronic folder na protektado ng password para sa privacy at pagiging kumpidensyal. Isinagawa ang istatistikal na pagsusuri gamit ang socio-demographic na data at mga tanong na may kaugnayan sa bakuna sa COVID-19, at mga ugnayan sa pagitan ng mga determinant at pagpayag na kunin ang bakunang COVID-19 sa pamamagitan ng SPSS Statistics 26. Kinokolekta ang mga form ng pahintulot bago ang pagsisimula ng questionnaire.

RESULTA

May kabuuang 1,1011 kalahok na nakakumpleto ng survey. Karamihan sa mga kalahok sa pag-aaral ay 18-25 taong gulang, mga babae, naninirahan sa Cordillera Administrative Region, walang asawa (walang asawa, hiwalay o balo), walang anak, estudyante/retirado/walang trabaho, kumikita sa pagitan ng P20,000 – 50,000 kada buwan, Roman Catholic, nagtapos sa unibersidad, ginamit ang PhilHealth bilang health insurance, nagpraktis ng alternatibong gamot, hindi na-diagnose na may anumang malalang sakit at walang kontak sa sinumang positibo sa COVID-19 na indibidwal.

Karamihan sa mga kalahok ay handang tumanggap ng mga bakuna laban sa COVID-19. Kabilang sa mga kalahok na handang magpabakuna ay nasa edad 18-25 taong gulang, mga babae, naninirahan sa Rehiyon I, binata, walang anak, estudyante/retirado/walang trabaho, na may buwanang kita na P20,001-50,000, Romano Katoliko, unibersidad nagtapos, gumagamit ng Philhealth, nagpraktis ng alternatibong gamot, hindi na-diagnose na may malalang sakit, at walang dating contact sa isang COVID-19 positive na indibidwal. Karamihan sa mga ginustong bakuna ay ang mga sumusunod: Pfizer (US), Moderna (US), AstraZeneca (UK), Gamaleya (Russiaa) at panghuli, Sinovac (China). Karamihan sa acceptance group ay handang magbayad para sa mga bakuna at karamihan ay magbabayad ng P1-1,000.

Ang pinakakaraniwang dahilan sa hindi pagtanggap ng bakuna sa COVID-19 ay dahil sa kawalan ng katiyakan sa kaligtasan ng bakuna na sinusundan ng kawalan ng tiwala at kawalan ng katiyakan sa pagiging epektibo ng mga bakuna. Kasama sa iba pang tinukoy na dahilan ang pagtanggi sa pagkakaroon ng COVID-19, maling impormasyon o kawalan ng kaalaman tungkol sa COVID-19 at ang mga bakuna nito (hal., walang proteksyon ang bakuna laban sa mga variant ng COVID-19, hindi kailangan ang bakuna sa COVID-19 dahil sa nakaraang pagsusuri sa COVID-19, at paggamit ng face-shield at face-mask, herd immunity, at Ivermectin bilang mas gustong proteksyon laban sa COVID-19).

Natuklasan ng pag-aaral na ito na ang mga makabuluhang determinant ng pagtanggap ng bakuna sa COVID-19 sa mga Pilipino ay kinabibilangan ng edad, rehiyon ng paninirahan, kasarian, kasalukuyang propesyon, buwanang kita, relihiyon, pagsasagawa ng alternatibong gamot, at dating pakikipag-ugnayan sa mga indibidwal na positibo sa COVID-19. Bukod dito, ipinakita na ang mga indibidwal na may edad na 18-25 taon ay 132 beses na mas malamang na tumanggap ng mga bakuna sa COVID-19. Ang mga mahahalagang manggagawa sa pangangalagang pangkalusugan ay 10 beses na mas malamang na tumanggap ng pagbabakuna sa COVID-

19. Ang mga indibidwal na nagsagawa ng alternatibong gamot at ang mga may dating contact sa isang taong positibo sa COVID-19 ay dalawa o tatlong beses na mas malamang na tumanggap ng pagbabakuna para sa COVID-19.

KONKLUYSON

Ang pagbabakuna ay kinakailangan upang makontrol ang COVID-19. Ang pag-aaral na ito ay nagpakita na karamihan sa mga Pilipino ay tumatanggap at handang kumuha ng mga bakuna laban sa COVID-19. Gayunpaman, maraming Pilipino ang nagdududa sa mga bakuna, lalo na sa pagiging epektibo at kaligtasan nito. Samakatuwid, kailangang tugunan ng mga awtoridad ng gobyerno ang mga isyung ito partikular na ang mga makabuluhang determinant na nakakaimpluwensya sa pagtanggap ng bakuna sa COVID-19 upang mapataas ang kahandaang mabakunahan laban sa COVID-19.

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Author Contributions

Conceptualization: PP, AP; Formal Analysis: AP; Funding Acquisition: PP, AP, MO, FV, DV; Investigation: PP, AP, MO, FV, DV; Methodology: MO, FV; Project Administration: PP; Resources: PP, AP, MO, FV, DV; Supervision: RD; Visualization: PP, AP; Writing – Original Draft Preparation: PP, AP, MO, FV, DV; Writing – Review & Editing: PP, AP, MO, FV, DV, RD.

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Supplementary Material

FULL QUESTIONNAIRE

[Informed Consent Form for Filipinos]

Dear participant,

We would like to invite you to participate in our research entitled, "Acceptance of COVID-19 Vaccine among Healthcare Workers in the Philippines," because we feel that your experience as a health care worker can contribute much to our understanding and knowledge of the topic.

This consent form asks you to allow researchers to record, view, and analyze your answers to enhance understanding of the topic. Your participation in this research study is voluntary. You may choose not to participate. If you decide to participate in this research survey, you may withdraw at any time.

We would like to confirm that all information provided here will be kept confidential. All data will be stored in a password protected electronic folder. To help protect your confidentiality, the surveys will not contain information that will personally identify you, and will be used only for research purposes.

By submitting this form you are indicating that you have read the description of the study, are over the age of 18, and that you agree to the terms as described.

The procedure involves filling an online survey that will take approximately 5 minutes. Your participation in completing this survey is highly appreciated.

This proposal has been reviewed and approved by the Saint Louis University – Research Ethics Committee (SLU-REC), which is a committee whose task it is to make sure that research participants are protected from harm. If you wish to find out more about the SLU-REC, contact DR. ELIZABETH H. BAUTISTA, Chair of the SLU-REC, 444-8246 Local 387.

Please select your choice below. Clicking on the "agree" button below indicates that:

1. You have read the above information
2. You voluntarily agree to participate

1. What is your age?
   - A. 18 - 25 years
   - B. 26 - 35 years
   - C. 36 - 45 years
   - D. 46 - 55 years
   - E. 56 - 65 years
   - F. >65 years

2. Which region do you currently live in?
   - A. NCR
   - B. CAR
   - C. Region I
   - D. Region II
   - E. Region III
   - F. Region IV-A
   - G. Region IV-B
   - H. Region V
   - I. Region VI
   - J. Region VII
   - K. Region VIII
   - L. Region IX
   - M. Region X
   - N. Region XI
   - O. Region XII
   - P. Region XIII
   - Q. BARMM

3. Sex:
   - A. Male
   - B. Female

4. Ethnicity
   - A. Filipino
   - B. Non-Filipino

5. What is your marital status?
   - A. Married
   - B. Single (unmarried/separated/widowed)

6. Do you have any children?
   - A. Yes
   - B. No

7. What is your current profession?
   - A. Essential Healthcare worker
   - B. Essential Non-healthcare worker (Bank and Financial services, Communications and information technology, Education, First responders, Food, Agriculture and Goods provision, Government and Public services, Hazardous material management, Military/Police/Security, Transportation and logistics, Utility services (Electricity, Water, and Sanitation)
   - C. Private/Self-employed (Airline industry, Building and construction, Entertainment and Fitness industry, Hospitality/food (hotel, restaurant, bar/club), Online businesses, Retail services)
   - D. D. Others (Retired/Student/Unemployed)

8. What is your household's monthly income on an average (in Php)?
   A. <10,000 C. 20,001-50,000 E. ≥100,001
   B. 10,001-20,000 D. 50,001- 100,000

9. What is your religion?
   A. Roman Catholic C. Islam E. Buddhism
   B. Iglesia ni Kristo D. Hinduism F. I don't have a religion
   G. Others (e.g. Other Christian denomination- Jehovah's Witness, Latter Day Saints or Adventist)

10. What is your highest education?
   A. Never went to school D. Junior High School F. University
   B. Did not finish elementary school E. Senior High School/ Vocational School
   C. Elementary school

11. Information about your health insurance?
   A. Philhealth B. Private C. Both D. No insurance

12. Do you believe in or practice alternative medicine?
   A. Yes B. No

13. Do you have an existing chronic disease (e.g., cancer, cardiovascular disease, and/or diabetes)
   A. Yes B. No C. Unsure

14. Have you or any of your family members or others (e.g friends, colleagues, neighbors) whom you interact closely had COVID-19?
   A. Yes B. No C. Not sure

15. If the Philippine/ local government offers you COVID 19 vaccine, will you take it for yourself and your family members?
   A. Yes B. No C. Not decided yet

If response to Q 15 is yes, ask the following questions, 16-19:

16. If your response to Q 15 is Yes, without considering the price for the COVID-19 vaccine, which brand of vaccine would you prefer the MOST?
   A. Novavax (United States) C. AstraZeneca (United Kingdom) E. Sinovac (China)
   B. Moderna (United States) D. Pfizer (United States) F. Gamaleya (Russia)

17. If your response to Q 15 is Yes, without considering the price for the COVID-19 vaccine, which brand of vaccine would you prefer the LEAST?
   A. Novavax (United States) C. AstraZeneca (United Kingdom) E. Sinovac (China)
   B. Moderna (United States) D. Pfizer (United States) F. Gamaleya (Russia)

18. Are you willing to pay for the vaccine?
   A. Yes B. No C. Don't know.

19. If Q 18 is yes, how much will you pay utmost to get a vaccine if there is such provision (In Php)?
   A. 1 - 1,000 C. 2,000 - 3,000 E. 4,001 and above
   B. 1,000-2,000 D. 3,000 - 4,000

20. If response to Q 15 is No, why will you not accept COVID vaccine (choose at least one):
   A. Not sure of safety C. Fear of side effects such as fever, pain E. Political belief
   B. Not sure of effectiveness D. No trust in vaccine F. Religious belief
   G. Other (specify)

21. If your answer to Q15 is "NO", did vaccination of the healthcare workers and/or government authorities change your overall acceptance of the COVID-19 vaccine?
   A. Yes, I now want to be vaccinated
   B. Yes, but I no longer want to be vaccinated
   C. No, I still don't want to be vaccinated

22. Did the vaccination of Sinovac/AstraZeneca among the Healthcare workers change your overall perception of the Sinovac/AstraZeneca vaccine?

A. Yes (positive perception) B. Yes (negative perception) C. No

23. If your answer to Q22 is yes, which of the vaccines are you now willing to be vaccinated?

A. Novavax (United States)
B. Moderna (United States)
C. AstraZeneca (United Kingdom)
D. Pfizer (United States)
E. Sinovac (China)
F. Gamaleya (Russia)

24. How would you like to get more information about COVID-19 vaccine? (Choose only one.)

A. Social media (e.g. Facebook, Instagram, Twitter, WhatsApp or Tiktok)
B. Through telecommunication (e.g. SMS or phone call)
C. Online platforms (e.g. Zoom, Google Meet or Skype)
D. Print and Electronic media (e.g. TV or newspaper)
E. Face to face communication
F. Other
G. No, I'm not interested