
COVID-19 Vaccination: The Greater Manila Experience 2021

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Abstract

Introduction Almost half of adult Filipinos were unwilling to receive the COVID-19 vaccination in early 2021. This study aimed to describe the COVID-19 vaccination experience in the Greater Manila Area.

Methods An analytical cross-sectional study design was done where Filipinos aged 18-60 years old residing in the Greater Manila Area answered an online survey. Fisher's exact test was used to compute p-values for the association between participants' willingness or refusal to get vaccinated and their sociodemographic and clinical characteristics.

Results Among 1,248 respondents, 97.92% were willing to get vaccinated against COVID-19. The majority who refused strongly agreed that the vaccine could cause serious side effects (46.2%). Being a college graduate (OR = 3.03, p = 0.006) and high income (OR = 5.06, p = 0.003) had a statistically significant positive association with willingness to get vaccinated.

Conclusion There are more individuals willing to get vaccinated and there is a statistically significant association between educational attainment and monthly income with vaccine willingness or refusal.

Key words: COVID-19 vaccination, vaccine refusal, vaccine willingness

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The World Health Organization declared COVID-19 a pandemic on March 11, 2020.¹ To protect the public from severe disease, the WHO promoted the use of COVID-19 vaccines worldwide. Vaccine confidence became an issue in the Philippines when it dropped between 2015-2018, triggered by the Dengvaxia scare.² Poor immunization coverage led to vaccine-preventable outbreaks of measles and polio in 2019.³ OCTA Research reported that almost half of the adult Filipino population in January-February 2021 were not willing to receive the COVID-19 vaccine due to safety concerns.⁴ In March 2021, healthcare

workers also refused and protested about inoculation of a specific COVID-19 vaccine due to concerns on its efficacy compared to other vaccines.⁵

The Philippine government's target to achieve herd immunity was to have 90% of the country's over 105 million population vaccinated due to the spread of the delta variant.⁶ Willingness to receive the vaccine became a factor in achieving the government's vaccination target. To increase rates of vaccination, the Department of Health initiated "ResBakuna", a campaign to combat misinformation and to reach and encourage more Filipinos to get fully vaccinated against COVID-19.⁷ With the current status of the vaccination program and the numerous factors affecting the people's willingness or refusal to receive the COVID-19 vaccine, a more in-depth understanding of their reasons for willingness or refusal to receive the COVID-19 vaccine is necessary to combat this pandemic and achieve herd immunity.⁴

This study aimed to describe the COVID-19 vaccination experience in the Greater Manila Area. This was done by identifying the sociodemographic and clinical characteristics of Filipinos aged 18-60 years old residing in the Greater Manila Area (Metro Manila, Bulacan, Cavite, Laguna and Rizal) in 2021, determining the proportion who were willing or who refused to get vaccinated, identifying the reasons for willingness and for refusal to be vaccinated, describing the knowledge of COVID-19 vaccination, and determining the association between sociodemographic and clinical characteristics, and willingness or refusal to get vaccinated against COVID-19.

Methods

Using an analytical cross-sectional study design, Filipinos aged 18-60 years old living in the Greater Manila Area were surveyed online on their position regarding COVID-19 vaccination between August and September 2021. The study focused on sociodemographic and clinical characteristics as the independent variable and the respondent's willingness or refusal to get vaccinated against COVID-19 as the dependent variable. Researchers used online methods such as Facebook and Instagram as supplementary tools to recruit the participants from different cities and provinces within the Greater Manila Area. An online platform (Google Forms) was utilized to make the questionnaire convenient and accessible

for all participants. This study was approved by the UERMMMCI Research Institute for Health Sciences Ethics Review Committee. A sample size of 361 was computed by using a sample size calculation module (OpenEpi) with an assumed 62.5% anticipated percent frequency and a 95% confidence level. Filipinos aged 18-60 years old, residing in the Greater Manila Area, with a device that could connect to the internet and had access to the internet were recruited using convenience sampling.

Willingness to get vaccinated against COVID-19 was defined as participants who had received the vaccine regardless of whether it was their first or second dose and/or those "willing" to get the vaccine but were currently waiting for a slot for vaccination. Refusal to get vaccinated against COVID-19 was defined as participants who did not intend to get any dose of the vaccine, even if they were eligible to get vaccinated.

Eligible participants were provided access to a validated four-part questionnaire via a link and QR code provided in the publication materials posted on social media. The questionnaire was adapted from an Indian study published in English.⁸ Considering the target population of this research, the authors modified the questions which were then translated to Filipino with certification granted by the Komisyon sa Wikang Filipino. Participants were initially asked their sociodemographic and clinical characteristics in Section A of the questionnaire before proceeding to Section B which was on vaccine acceptance, willingness, or refusal. Knowledge of COVID-19 vaccination was elicited in Section C.

IBM SPSS® (Statistical Package for the Social Sciences) version 25.0 and MedCalc® were utilized for statistical analysis. Descriptive statistics were used and the data for the sociodemographic and clinical characteristics (sex, highest educational attainment, monthly income, presence of chronic conditions and history of COVID-19 infection in the family) along with those for questions regarding vaccine willingness, refusal and knowledge were presented in both frequencies and percentages. Fisher's exact test was used to compute the significance of the association between the willingness to get vaccinated and the multiple sociodemographic and clinical characteristics. The relative risk (RR) and 95% confidence intervals were also computed. A two-tailed p-value of < 0.05 was used as the significance threshold in all statistical tests.

Results

A total of 1,248 complete survey responses were received. The sample had a predominance of females (76.1%), college graduates (71.6%), those with a monthly income of PHP 10,000.00 or less (60.8%), absence of comorbidities (74.7%), and a family history of COVID-19 (82.5%) as shown in Table 1. Four out of five of the 98% willing to get vaccinated had already received at least one dose.

As shown in Table 2, the 4 to 5 out of 10 participants willing to get vaccinated strongly agreed that the COVID-19 vaccines/getting vaccinated: caused no harm (43.4%); provided protection against COVID-19 infection (48.3%); were available without cost (55.3%); recommended by healthcare professionals/doctors (36.6%); outweighed the risk of harm (47.5%); was a social responsibility (47.9%); would help in eradicating COVID-19 infection (46.3%); and, were already taken by the participants' role models/political leaders/senior doctors/scientists (36.9%). Other reasons such as work-related or travel purposes, peer/societal pressures, avoidance of severe

Table 1. Sociodemographic and clinical characteristics of survey respondents aged 18-60 years old residing in Greater Manila Area.

		n (%)
Sex	Female	950 (76.1)
	Male	298 (23.9)
Educational attainment	College	894 (71.6)
	High school	354 (28.4)
Monthly income	≤ PHP10,000.00	759 (60.8)
	≥ PHP10,000.00	489 (39.2)
Comorbidities	Without	932 (74.7)
	With	316 (25.3)
Family history of COVID-19	Without	1029 (82.5)
	With	219 (17.5)

infection, living with a healthcare worker/senior citizens and avoidance of hospital admission and expenses were reported as the most common reasons for the participants to get the vaccine.

Table 2. Frequency distribution of reasons for willingness to get vaccinated against COVID-19 among survey respondents.

	Frequency of responses by participants [(n (%))]			
	Strongly disagree	Disagree	Agree	Strongly agree
I think there is no harm in taking COVID-19 vaccine.	206 (16.9)	72 (5.9)	414 (33.9)	530 (43.4)
I believe COVID-19 vaccine will be useful in protecting me from the COVID-19 infection.	210 (17.2)	53 (4.3)	369 (30.2)	590 (48.3)
COVID-19 vaccine is available free of cost.	212 (17.3)	48 (3.9)	311 (25.5)	651 (55.3)
My healthcare professional/ doctor has recommended me.	196 (16.0)	165 (13.5)	414 (33.9)	447 (36.6)
I feel the benefits of taking the COVID-19 vaccine outweighs the risks involved.	200 (16.4)	73 (6.0)	369 (30.2)	580 (47.5)
I believe that taking the COVID-19 vaccine is a societal responsibility.	205 (16.8)	83 (6.8)	349 (28.6)	585 (47.9)
There is sufficient data regarding the vaccine's safety and efficacy released by the government	194 (15.9)	150 (23.6)	454 (37.2)	424 (34.7)
Many people are taking the COVID-19 vaccine.	196 (16.0)	124 (10.1)	475 (38.9)	427 (34.9)
I think it will help in eradicating COVID-19 infection.	209 (17.1)	72 (5.9)	375 (30.7)	566 (46.3)
My role models/ political/ leaders/ senior doctors/ scientists have taken COVID-19 vaccine.	212 (17.3)	139 (11.4)	420 (34.4)	451 (36.9)
Other reasons for getting the COVID-19 vaccine	<ul style="list-style-type: none"> • Work-related or travel purposes • Peer/ family/ societal pressure • Avoiding severe sequelae of the virus infection • He/ she is living with a healthcare worker or with senior citizens • Avoidance of hospital admission or hospital-related expenses 			

Participants who refused to be vaccinated strongly agreed that the vaccine might cause immediate serious side effects (46.2%) and/or unforeseen side effects in the future (34.6%). They also strongly disagreed that vaccines might not be easily available to them (42.3%). The majority also disagreed that the vaccines were being promoted for the commercial gains of the pharmaceutical companies. A third of respondents (34.6%) agreed that COVID-19 vaccines might be faulty or fake. Other reasons for the refusal to get vaccinated were pregnancy/breastfeeding, strong immune system, not going out of the house and

presence of comorbidities and/or allergies as seen in Table 3.

More than half (54.2%) answered correctly when asked if there was a legal mandate to take the COVID-19 vaccine. At least 50% of the respondents were able to correctly categorize 4 out of 8 groups of people as to their eligibility to get vaccinated. Half of the respondents incorrectly categorized children and adolescents < 18 years of age as eligible to receive the COVID-19 vaccine at the time the survey was conducted. These findings are shown in Table 4. More than 80% of participants answered correctly

Table 3. Frequency distribution of reasons for refusal to get vaccinated against COVID-19 among survey respondents.

	Frequency of responses by participants [(n (%))]			
	Strongly disagree	Disagree	Agree	Strongly agree
COVID-19 vaccine might not be easily available to me	11 (42.3)	3 (11.5)	9 (34.6)	3 (11.5)
I might have immediate serious side effects after taking COVID-19 vaccine.	5 (19.2)	3 (11.5)	6 (23.1)	12 (46.2)
COVID-19 vaccine may be faulty or fake.	7 (26.9)	4 (15.4)	9 (34.6)	6 (23.1)
COVID-19 vaccine was rapidly developed and approved.	7 (26.9)	7 (26.9)	7 (26.9)	5 (19.2)
I might have some unforeseen future effects of the COVID-19 vaccine.	5 (19.2)	4 (15.4)	8 (30.8)	9 (34.6)
COVID-19 vaccine is being promoted for commercial gains of pharmaceutical companies	5 (19.2)	9 (34.6)	6 (23.1)	6 (23.1)
Other reasons for not getting the COVID-19 vaccine:	<ul style="list-style-type: none"> Breastfeeding/Pregnant Patient believes they have strong immune system He/she is not going out of the house Presence of comorbidities and/or allergies 			

Table 4. Knowledge of respondents on eligibility for COVID-19 vaccine.

	Frequency (%)		
	Correct	Incorrect	Don't know
Infants < 1 year of age	945 (75.7)	141 (11.3)	162 (13.0)
Children and adolescents < 18 years	503 (40.3)	631 (50.6)	114 (9.1)
Pregnant and lactating mothers	637 (51)	416 (33.3)	195 (15.6)
Patients with chronic diseases like diabetes, hypertension, and heart diseases	838 (67.1)	271 (21.7)	139 (11.1)
Persons having active COVID-19 infection	543 (43.5)	483 (38.7)	222 (17.8)
Persons recovered from COVID-19 infection	1068 (85.6)	90 (7.2)	90 (7.2)
Persons allergic to food items/drugs	581 (46.6)	437 (35)	230 (18.4)
Immunocompromised patients (e.g., AIDS, cancer patient undergoing chemotherapy)	622 (49.8)	359 (28.8)	267 (21.4)

by disagreeing that they do not need to follow preventive measures, such as wearing a mask and social distancing, anymore after getting vaccinated.

Majority of the participants claimed that healthcare providers (67.0%), news from national TV/radio (58.8%), government agencies (53.9%), social media (54.5%), and discussion among friends and family (50.1%) had a very significant effect in influencing their opinion regarding the COVID-19 vaccine as seen in Table 5. The most preferred vaccine was CoronaVac (Sinovac), while the least preferred vaccine was the Bharat BioTech (Table 6). Level of education and income had a significant positive association with willingness to get vaccinated. Those who are willing were three times more likely to be a college graduate (OR = 3.03, $p = 0.006$), and five times more likely to have an income of more than PHP 10,000 (OR = 5.06, $p = 0.003$) as seen in Table 7.

Discussion

The study revealed that more people were willing to get vaccinated (97.92%) than those who refused. Among those who were willing, 79.21% had been vaccinated with at least one dose. This contrasted with the results of a survey conducted by Pulse Asia between November 23 to December 2, 2020, which revealed that out of 2,400 responses, 47% refused the vaccine due to safety concerns.⁹ The findings of this study may reflect a change in attitude among the people.¹⁰

Most of the reasons that were attributed towards the COVID-19 vaccines were heavily influenced by the participants' perceptions about the safety, effectiveness, and the availability of the vaccines. Awareness may also have affected the decision to be vaccinated. The lack of sufficient credible information drove people to question the benefits of the vaccine.¹¹ Personal beliefs such as the possibility of immediate and serious

Table 5. Impact of sources of information that influenced that participant's willingness or refusal to take the COVID-19 vaccine.

	Responses of participants (n (%))		
	Insignificant effect	Somewhat significant effect	Very significant effect
6.1 News from National TV/Radio	149 (11.9)	365 (29.2)	734 (58.8)
6.2 Government agencies	166 (13.3)	409 (32.8)	673 (53.9)
6.3 Social media (Facebook, Instagram, Twitter, Viber, WhatsApp, and/or others)	164 (13.1)	404 (32.4)	688 (54.5)
6.4 Discussion among friends and family	158 (12.7)	465 (37.3)	625 (50.1)
6.5 Healthcare provider	118 (9.5)	294 (23.6)	836 (67.0)
6.6 If there is any other source of information: Please specify: _____	<ul style="list-style-type: none"> • Most common: • Research/Clinical article • Billboards • Magazines 		

Table 6. Frequency distribution of vaccine preference among survey respondents.

	Frequency
Pfizer-BioNTech	353
Oxford-AstraZeneca	368
CoronaVac (Sinovac)	612
Gamaleya Sputnik V	64
Johnson & Johnson/ Janssen	225
Bharat BioTech	35
Moderna	256
Novavax	49

Table 7. Association between sociodemographic and clinical characteristics with willingness or refusal to get vaccinated among survey respondents.

Characteristic	Willing	Refused	OR (95% CI)	p-value
Gender				
Male	293	5	1.33	0.816
Female	929	21	(0.50, 3.25)	
Education				
College	882	12	3.03	0.007
High school	340	14	(1.39, 6.58)	
Income (PHP)				
≥ 10,000	486	3	5.06	0.004
≤ 10,000	736	23	(1.51, 16.09)	
Comorbidities				
With	312	4	1.89	0.361
Without	910	22	(0.70, 5.11)	
Family history of COVID-19				
With	218	1	5.43	0.069
Without	1004	25	(0.73, 56.39)	

effects negatively influenced the willingness to get the COVID-19 vaccine.

In contrast, most participants who were willing to accept the vaccines agreed that these vaccines could protect them from the possible effects of COVID-19. Participants also believed that it was their social responsibility to be vaccinated not just to protect themselves but also the vulnerable people surrounding them. Travel needs also influenced the attitude of participants to get the vaccine after the opening of many countries to fully vaccinated individuals.¹² Also, businesses were slowly starting to open which likely encouraged people to get vaccinated. This is due to the prerogative of the private sector to mandate the vaccination of all employees to protect not just themselves but also to protect their clients/customers.¹³ Role models, political leaders and health care workers were able to encourage people to participate in the vaccination program for COVID-19. Enhancing public trust through the examples of authorities in high positions in advocating the benefits and effectiveness of the COVID-19 vaccines is critical in enhancing the trust of the public.¹⁴ This is because the government and those people with great influence over the public can effectively communicate the principles and benefits of vaccination. The enhanced, coherent and proactive releasing of information regarding vaccination

strategies likely influence, and eventually encourage the public to take the initiative to be vaccinated.

Fear about the immediate side effects and the unforeseen effects of the vaccine were the main reasons for refusing the COVID-19 vaccine. Thus, enhancing vaccination campaigns and strategies will not just influence the public to get vaccinated but also to correct the misconceptions that the general public has.¹⁵ The majority of the participants who refused also strongly agreed (34.6%) that the COVID-19 vaccine might be fake or faulty. This may be attributed to reports of vaccine malpractices or that the COVID-19 vaccine is being promoted for commercial gains of the pharmaceutical companies.¹⁶ However, even with the concerns regarding the vaccine itself, many still believed that the benefits of taking COVID-19 vaccine outweighed the risks as evidenced by the responses of 47.5% of participants. Most participants agreed that getting the vaccine would also help eradicate COVID-19, which further supports that participants believed in the effectiveness of the vaccines against COVID-19.

The knowledge of the participants regarding the COVID-19 vaccination was assessed by the researchers. Based on the results, most of the participants correctly answered that receiving COVID-19 vaccine is not legally mandated by the Philippine government. This

is supported by the Department of Health (DOH) wherein they stated that vaccination is not mandatory, but it is highly encouraged by the government to be protected against vaccine-preventable diseases.¹⁷ Majority of the participants believed that certain groups of people such as children and adolescents < 18 years of age; adults greater than or equal to 18 years of age; pregnant and lactating mothers; patients with chronic diseases like diabetes, hypertension, and heart diseases; people recovered from COVID-19 infection; persons allergic to food items/drug; and immunocompromised patients are eligible to receive the COVID-19 vaccine while infants < 1 year of age and persons having active COVID-19 infection are not eligible to get vaccinated. The majority had categorized the groups of people correctly except for the group of children and adolescents < 18 years of age wherein most of the participants answered that they are eligible to receive the COVID-19 vaccine, which was incorrect. The latter finding is because during the time of the roll out of the survey, children and adolescents < 18 years of age were not eligible to receive the COVID-19 vaccine. Recently, the DOH recommended that adolescents 12-17 years old be vaccinated against COVID-19. Likewise, pregnancy has never been a contraindication against COVID-19 vaccination; the Philippine Obstetrical and Gynecological Society (POGS) has recommended that pregnant women be vaccinated.¹⁸ The vaccination guidelines and practices of the DOH may have contributed to the respondents' knowledge regarding COVID-19 vaccination. Overall, 87% of the participants correctly answered that they still needed to follow preventive measures such as wearing a mask, sanitation, and social distancing even after getting vaccinated. This means that proper hygiene campaigns of the DOH may be effective.

The researchers also asked the participants what brand of vaccine they were given or were willing to receive. The vaccine that garnered the highest number of "yes" responses was CoronaVac (Sinovac). As of October 10, 2021, 21.04% of the total Philippine population had been fully vaccinated and many had received Sinovac.¹⁹ Dissemination of valid and reliable information is very crucial especially during this pandemic. Many of the participants claimed that sources of information such as national TV/radio news, government agencies, social media, discussion among friends and family, and healthcare providers had a significant influence on their opinions (i.e., their willingness or refusal) regarding COVID-19

vaccination. This finding emphasizes the importance of getting information from reliable sources only and the need for public health communication strategies to avoid false information.

Finally, the analysis revealed that there is a statistically significant association between educational attainment and monthly income with vaccine willingness or refusal. College graduates and Filipinos with a monthly income above PHP 10,000 showed greater willingness as compared to their counterparts (i.e., high school graduates and monthly income of PHP 10,000 or less, respectively). A global survey and a similar study in Japan reported parallel results wherein people from low-income levels were less likely willing to get vaccinated.^{20,21} In terms of chronic conditions, those with comorbidities were more likely to get vaccinated, and this could be partially attributed to the fact that Filipinos with comorbidities are categorized under the A3 priority group as per DOH's COVID-19 Vaccine Prioritization Framework.²² Lastly, the researchers found out that those with a positive family history of COVID-19 were more likely to be vaccinated. The CDC urges the public to get their vaccine shots despite having a previous COVID-19 infection as vaccination still offers a higher degree of protection.²³

The findings of the study reveal that there are more individuals willing to get vaccinated due to the vaccines' safety. In general, more than the majority were able to correctly answer items on the autonomy of people to take the vaccine, knowing who the eligible individuals are, and the need to follow preventive measures after getting vaccinated. The findings of the study also revealed a significant statistical association between educational attainment and monthly income with vaccine willingness or refusal.

References

1. World Health Organization. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020 [Internet]. 2020 March [cited 2021 Oct 16]; Available from: <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>
2. de Figueiredo A, Simas C, Karafillakis E, Paterson P, Larson HJ. Mapping global trends in vaccine confidence and investigating barriers to vaccine uptake: A large-scale retrospective temporal modelling study. *The Lancet* [Internet]. c2020 Sep [cited 2021 Oct 16]; 396(10255): 898-908. Available from: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)31558-0/fulltext#seccestitle130](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31558-0/fulltext#seccestitle130)

3. Department of Health. DOH identifies vaccine hesitancy as one of the reasons for measles outbreak [Internet]. c2018 [cited 2021 Oct 16]. Available from: <https://doh.gov.ph/node/16721>
4. Lalu GP. 46% of adult Filipinos unwilling to get COVID-19 vaccine; only 19% willing. Inquirer [Internet]; c2021 Feb [cited 2021 Oct 18]. Available from: <https://newsinfo.inquirer.net/1399844/only-19-of-adult-pinoys-ok-with-getting-covid-19-vaccines-46-not-willing>
5. Gutierrez J. The Philippines begins its inoculation campaign, but public distrust runs deep. The New York Times [Internet]; c2021 March [cited 2021 Oct 18]. Available from: <https://www.nytimes.com/2021/03/01/world/the-philippines-begins-its-inoculation-ca>
6. CNN Philippines. Govt experts increase herd immunity estimate to 90%. CNN Philippines [Internet]. c2021 [cited 2021 Oct 16]. Available from: <https://cnnphilippines.com/news/2021/9/4/govt-experts-increase-herd-immunity-estimate.html>
7. Department of Health. Resbakuna na: DOH teams up with Lazada Philippines for COVID-19 vaccination program: Department of Health Website [Internet]. c2021 [cited 2021 Oct 16]. Available from: <https://doh.gov.ph/press-release/RESBAKUNA-NA-DOH-TEAMS-UP-WITH-LAZADA-PHILIPPINES-FOR-COVID-19-VACCINATION-PROGRAM>
8. Kumari A, Ranjan P, Chopra S, et al. Development and validation of a questionnaire to assess knowledge, attitude, practices, and concerns regarding COVID-19 vaccination among the general population. *Diabetes Metab Syndr* [Internet]. 2021 May-Jun; 15(3): 919-25. doi: 10.1016/j.dsx.2021.04.004. Epub 2021 Apr 20.
9. Less than a third of Filipinos open to COVID-19 jabs - survey. Reuters. Thomson Reuters [Internet]; 2021 [cited 2021 Oct 19]. Available from: <https://www.reuters.com/article/health-coronavirus-philippines-poll-idINKBN29C1QD>
10. Macaraan WER. From hesitancy to confidence: Filipinos' shifting attitude toward COVID-19 vaccination program [Internet]. *J Public Health* 2021 [cited 2021 Oct 19]; 44(2): e323-e324. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8344455/>
11. Lau LL, Hung N, Go DJ, et al. Knowledge, attitudes and practices of COVID-19 among income-poor households in the Philippines: A cross-sectional study. *J Glob Health* 2020 June [cited 2021 Oct 16]; 10(1): 011007. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7294392/>
12. Danabal KGM, Magesh SS, Saravanan S, Gopichandran V. Attitude towards COVID-19 vaccines and vaccine hesitancy in urban and rural communities in Tamil Nadu, India – A community based survey. *BMC Health Serv Res* [Internet]. 2021 Sep 21 [cited 2021 Oct 16]; 21(1): 994. Available from: <https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-021-07037-4>
13. World Health Organization: WHO. Joint COVAX Statement on Supply Forecast for 2021 and Early 2022 [Internet]. WHO.int. World Health Organization: WHO; 2021 [cited 2021 Oct 16]. Available from: <https://www.who.int/news/item/08-09-2021-joint-covax-statement-on-supply-forecast-for-2021-and-early-2022>
14. Enhancing public trust in COVID-19 vaccination: The role of governments. OECD [Internet]. 2021 [cited 2021 Oct 19]. Available from: <https://www.oecd.org/coronavirus/policy-responses/enhancing-public-trust-in-covid-19-vaccination-the-role-of-governments-eae0ec5a/>
15. Lin Y, Hu Z, Zhao Q, Alias H, Danaee M, Wong LP. Understanding COVID-19 vaccine demand and hesitancy: A nationwide online survey in China. *PLOS Negl Trop Dis* [Internet]. 2020 Dec 17 [cited 2021 Oct 19]; 14(12): e0008961. Available from: <https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0008961>
16. Business leaders want mandatory vaccination for employees. *BusinessWorld Online* [Internet]. 2021 [cited 2021 Oct 19]. Available from: <https://www.bworldonline.com/business-leaders-want-mandatory-vaccination-for-employees/>
17. Department of Health. FAQs:VACCINES [Internet]. 2021 [cited 2021 Oct 17]. Available from <https://doh.gov.ph/faqs/vaccines>
18. Philippine Obstetrical and Gynecological Society: POGS Practice Bulletin. COVID-19 Vaccination or Pregnant and Breastfeeding Women [Internet]. 2021 [cited 2021 Oct 17]. Available from <https://pogsinc.org/wp-content/uploads/2021/02/POGSPPracticeBulletin1.pdf>
19. Department of Health. COVID-19 tracker [Internet]. 2021 [cited 2021 Oct 17]. Available from <https://doh.gov.ph/covid19tracker>
20. Machida M, Nakamura I, Kojima T, et al. Acceptance of a COVID-19 vaccine in Japan during the COVID-19 pandemic. *Vaccines* [Internet]. 2021 Mar 3 [cited 2021 Oct 19]; 9(3): 210. Available from: <https://pubmed.ncbi.nlm.nih.gov/33802285/>
21. Lazarus JV, Ratzan SC, Palayew A, et al. A global survey of potential acceptance of a COVID-19 vaccine. *Nat Med* [Internet]. 2020 Oct [cited 2021 Oct 19]; 27(2): 225-8. Available from: <https://www.nature.com/articles/s41591-020-1124-9>
22. Department of Health. When will the COVID-19 vaccines be available to me? Department of Health [Internet]. 2021 [cited 2021 Oct 20]. Available from: <https://doh.gov.ph/Vaccines/when-will-the-COVID-19-available-to-me>
23. New CDC Study: Vaccination offers higher protection than previous COVID-19 infection. Centers for Disease Control and Prevention [Internet]. 2021 [cited 2021 Oct 19]. Available from: <https://www.cdc.gov/media/releases/2021/s0806-vaccination-protection.html>