

Access this article online
Quick Response Code:

Website: www.pogsjournal.org
DOI: 10.4103/pjog.pjog_63_24

Assessment of knowledge, attitudes, and practices on coronavirus disease 2019 vaccine among high-risk pregnant and lactating women: A cross-sectional study in a Philippine tertiary hospital

Iris A. Soria-Arikan¹, Valerie P. Tiempo-Guinto¹

Abstract:

BACKGROUND: Coronavirus disease 2019 (COVID-19) infection is still a problem in our country for the past 2 years. The pandemic severely affected the immunocompromised and high-risk group of patients, such as the pregnant and lactating women. Research shows that this group has higher risk of being critically ill as well as dying. However, there are only a few studies on how COVID-19 vaccine is perceived among this vulnerable group. Hence, this study aims to assess the knowledge, attitude, and practices on COVID-19 vaccine among high-risk pregnant and lactating women. Moreover, the results will be used in crafting health policies that affect this specific group of patients.

METHODOLOGY: A prospective cross-sectional study was conducted on high-risk pregnant and lactating women who sought antenatal consults at the High-Risk Clinic in a tertiary training hospital for a 1-month period. Participants were asked to answer a validated questionnaire assessing their knowledge, attitudes, and practices on COVID-19 vaccine. They were also asked about their sociodemographic characteristics, co-morbidities, history of COVID-19 infection, and vaccination status, as well as the source of their information regarding the vaccine. Descriptive statistics was used to summarize in this study. In addition, frequency and proportion were used for nominal variables, median and range for ordinal variables, and mean and standard deviation for interval or ratio variables. MINITAB 20 was used for data analysis.

RESULTS: A total of 323 high-risk pregnant and lactating women were enrolled in the study with an average age of 29 years old. Socio-demographic characteristics of the participants showed that they were high-school graduate, single, mostly financially disadvantaged, and resides in Cavite, Laguna, Batangas, Rizal and Quezon area. The majority have diabetes mellitus as their co-morbidity, were not infected with COVID-19 and had already been vaccinated. The significant source of information of vaccine information was mainly from social media. The study presented that more than 90% were aware that COVID-19 vaccine was recommended by professional organizations, however, only 55%–59% only agree that it is safe during pregnancy and breastfeeding. The result also conveyed a positive attitude toward vaccination as the pregnancy progresses, as well as during lactation. As to practices, 80% of the participants were told by their health care providers to get vaccinated and 72% of them reported vaccine side effects. Furthermore, 58% of the participants would recommend vaccination during pregnancy while only 54% will recommend it while breastfeeding.

CONCLUSION: Assessment of knowledge, attitudes, and practices of COVID-19 vaccine among high-risk pregnant and lactating women gave an understanding on how a vulnerable population perceives vaccination. In general, this research study presented high percentage COVID-19 vaccine awareness and acceptance; however, it can also be seen that there is a mixed perception regarding vaccine

¹Department of Obstetrics and Gynecology, Division of Maternal-Fetal Medicine, University of the Philippines-Philippine General Hospital, Manila, Philippines

Address for correspondence:

Dr. Valerie P. Tiempo-Guinto,
Department of Obstetrics and Gynecology, Division of Maternal-Fetal Medicine, University of the Philippines-Philippine General Hospital, Taft Avenue, Manila, Philippines.
E-mail: vptiempoguinto@up.edu.ph

Submitted: 21-Oct-2024

Revised: 11-Mar-2025

Accepted: 07-Sep-2025

Published: 29-Sep-2025

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Soria-Arikan IA, Tiempo-Guinto VP. Assessment of knowledge, attitudes, and practices on coronavirus disease 2019 vaccine among high-risk pregnant and lactating women: A cross-sectional study in a Philippine tertiary hospital. *Philipp J Obstet Gynecol* 2025;49:161-70.

safety during pregnancy and lactation. Strategies to improve health literacy which are evidenced based that can be carried out by a health care provider could be established to achieve maximum vaccination coverage among high-risk group of patients.

Keywords:

COVID-19 vaccine, health literacy, lactation, pregnancy

Introduction

Maternal immunization is part of antenatal care, which is a way to prevent infections during pregnancy and the postpartum period. The World Health Organization (WHO) recommends that pregnant women receive the following vaccines: influenza, tetanus-diphtheria (Td)/Td-acellular-pertussis, and Hepatitis A and B if with exposure or if at risk. However, postpartum women who are breastfeeding can receive routine vaccines as it is perceived safe. It is proven that vaccination is one way that can alleviate the burden of the disease. With the advent of Coronavirus disease 2019 (COVID-19) pandemic worldwide caused by Severe Acute Respiratory Syndrome Coronavirus 2, COVID-19 vaccine is advocated to this high-risk group. According to Centers for Disease Control and Prevention (CDC) 2022, risk factor for having severe COVID-19 outcomes are age and patients with underlying medical conditions. Defined as 'higher risk' were underlying medical conditions or risk factors such as diabetes, asthma, pregnancy, or recent pregnancy.

As of November 2022, there have been 643,847,295 confirmed COVID-19 cases globally according to the WHO since its first reported case from China on December 31, 2019. As of November 2022, there have been 643,847,295 confirmed COVID-19 cases globally. Philippine statistics show 4,027,479 cases with 64,500 individuals succumbing to death.^[1,2] The world was caught off guard by this pandemic. The global structure and national and local governments grappled to deal with the outbreak. The virus targets those who are vulnerable members of the population, especially people with co-morbidities. The unprecedented scale and alarming rate of contagion burden and overstretch the health care system of the country. Pregnant women have not been spared from the disease severity.

A seminal research in the Philippines involving 209 cases of pregnant women with COVID-19 conducted in one of the largest referral hospitals in the country, Philippine General Hospital, within the first 5 months of the spread of infection suggests a good prognosis for both pregnant women and neonates.^[3] Nevertheless, the extant global literature on COVID-19 and pregnancy shows that pregnant women are vulnerable to develop severe to critical COVID-19 symptoms leading to intensive care unit (ICU) admissions or death.

The CDC COVID-19 Response Pregnancy and Infant Linked Outcomes Team in its studies have consistently reported that pregnant women exhibit a higher risk of getting pneumonia, getting admitted to the ICU, receiving invasive ventilation and extracorporeal membrane oxygenation (ECMO) and even dying. Moreover, Martinez-Postilla *et al* in their most recent survey assert the same observations of higher death rate, pneumonia, and ICU admissions among pregnant women infected with COVID-19.^[3] These suggest that pregnant women need more protection from the virus.

In December 2020, various manufacturers released COVID-19 vaccines. Governments acknowledged their efficacy and approved of them to be a part of preventive measures against the virus. To mitigate the risks of adverse and side effects, pregnant women and children were initially excluded from the list of qualified vaccination recipients. However, clinical trials using animals showed COVID-19 vaccine to be safe and without adverse effects to mothers. As the vaccination programs were implemented all over the world, researchers and medical practitioners have collected enough evidence to recommend COVID-19 vaccines as safe for pregnant and lactating mothers and their children. The benefits of vaccination outweigh potential risks. For example, a COVID-19 vaccine does not directly cause miscarriage or induce preterm delivery or stillbirth. It lowers the risk of infection and severity of illness and even builds antibodies that protect babies in utero up until the first 6 months of their life after birth.^[4]

Vaccination guidelines evolved, and professional organizations recommended the COVID-19 vaccination among pregnant and lactating women. The American College of Obstetricians and Gynecologists (ACOG) and Society of Maternal Fetal Medicine (SMFM) strongly advocates for COVID-19 vaccination of pregnant and lactating women.^[5] The practice guideline has been further endorsed by the Philippine Obstetrical and Gynecological Society (POGS), the Philippines Infectious Disease Society for Obstetrics and Gynecology (PIDSOG), and the Philippine Society of Maternal and Fetal Medicine (PSMFM) (2022).^[6] Pfizer-BioNTech, or Moderna, which are mRNA COVID-19 vaccines, and Janssen Biotech, which is adenovirus-vector are preferred vaccines to be used in this population.

In the Philippines, the DOH launched "Resbakuna Kasangga ng Bida" last March 2021. Its target is to

achieve herd immunity by fully vaccinating 70% of the population or 77.1 million Filipinos against COVID-19 (DOH, 2021).^[2] To date (November 2022), there have been 73,713,884 fully vaccinated Filipinos inclusive of pregnant and lactating women. Despite the evidence on the safety and effectiveness of the vaccine and the recommendations from the professional organizations, there is still barriers toward its acceptance among pregnant and lactating women. This research study aims to explore the knowledge, attitudes and practices of this special population on COVID-19 vaccine. It also seeks to understand how some factors affect their decision-making towards vaccine acceptance and hesitancy. It will also guide physicians on how to appropriately counsel pregnant and lactating women. Moreover, the results of the study will recommend strategies or solutions to encourage more high-risk women to get vaccinated.

Review of related literature

The professional medical organizations recommend COVID-19 vaccination with booster dose at any point in pregnancy and to lactating women as well. Moreover, POGS practice bulletin showed the available booster doses and its suggested interval schedule among pregnant women.^[6] The benefits of having a COVID-19 vaccine, according to ACOG are: it protects the mother against the virus, decreases the severity of illness, and antibodies can be passed to the baby.^[7]

At the beginning of the pandemic in a Swiss study with 1551 study population, there were only 29.7% of pregnant and 38.6% of breastfeeding women who were willing to be vaccinated against COVID-19 if available during that time.^[8] Factors associated with vaccine acceptance were maternal age above 40 years old, higher educational attainment, history of influenza vaccination, in the third trimester of pregnancy, and prenatal care done by obstetrician. One hundred sixty-three out of 1551, or 10.5% of the participants fear of adverse effects for their baby or themselves from the vaccination, such as teratogenicity or congenital malformations. Other factor for vaccine reluctance were concerns regarding safety and effectiveness, lack of recommendation by healthcare professional, and lack of compliance by pregnant women.

In a study by Skjefte *et al* in 2022, conducted in 16 countries, including the Philippines, with 17,871 participants inclusive of 5294 pregnant women, it showed that 90% of pregnant women will get vaccinated if it has a 90% efficacy.^[9]

To date, there are no local studies that examine the knowledge, attitudes, and practices of high-risk pregnant and lactating women regarding COVID-19 vaccine. This study aims to assess vaccine knowledge of high-

risk patients as well as to understand their attitudes and practices in getting vaccinated. Table 1 shows the COVID-19 booster dose recommended among pregnant women adapted from POGS.

Objectives of the study

General objective

To assess the knowledge, attitudes, and practices of COVID-19 vaccine among high-risk pregnant and lactating women in a tertiary hospital.

Specific objectives

1. To describe the socio-demographic characteristics of patients seeking high-risk antenatal care
2. To determine the co-morbidities of the study population and their COVID-19 vaccine history
3. To evaluate the knowledge on COVID-19 vaccine of high-risk patients
4. To identify attitudes affecting women's decision-making regarding COVID-19 vaccine
5. To determine the practices regarding COVID-19 vaccine among high-risk women.

Table 1: Sociodemographic characteristics of the study population

	Number of respondents (%)
Educational attainment	
Grade school (grade 1–6)	8 (2.48)
High school (year 1–4)	150 (46.44)
College undergraduate	65 (20.12)
College graduate	71 (21.98)
Vocational course	24 (7.43)
Postgraduate school	5 (1.55)
Marital status	
Single	115 (35.60)
Married	108 (33.44)
Widowed	0
Divorced/separated	1 (0.31)
Common-law partner	99 (30.65)
Employment status	
Employed	81 (25.08)
Unemployed	242 (74.92)
Monthly household income	
<Php 20,000	288 (89.16)
Php 20,000–50,000	31 (9.60)
More than Php 50,000	4 (1.24)
Residence	
First district (Manila)	83 (25.70)
Second district (Mandaluyong, Marikina, Pasig, Quezon City, San Juan)	23 (7.12)
Third district (Caloocan, Malabon, Navotas, Valenzuela)	25 (7.74)
Fourth district (Las Pinas, Muntinlupa, Paranaque, Pasay, Pateros, Taguig)	79 (24.46)
Calabarzon (Batangas, Cavite, Laguna, Quezon, and Rizal)	101 (31.27)
Others	12 (3.72)

Methodology

A prospective cross-sectional study was conducted only among high-risk pregnant and lactating patients at the wards and outpatient clinic of the University of the Philippines-Philippine General Hospital for a month in October 2022. Patients with co-morbidities and who sought antenatal consult from the High-Risk Clinic were recruited in the study. Patients who have contraindications to the vaccine, do not know Filipino or English, or not available for an interview were excluded. The questionnaire was administered face to face while patients were waiting for their prenatal check-ups. Telephone interviews were also conducted to collect data base from the healthcare organization registry of patients.

Sample size was based from 715 high-risk clinic first visits in the year 2021. The sample size considered was computed using the following formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where, n is the sample size to be determined
 N is the population size
 e is the estimated margin of error.

Margin of error equivalent to 0.05 was assumed; hence, the sample size needed was 257. However, the computed sample size was adjusted since participants may withdraw or fail to complete the survey in the middle of the study. The adjusted sample size was computed using the following formula:

$$n^* = \frac{n}{1 - w}$$

Where, n^* is the adjusted sample size
 W is expected percentage of non-completion or withdrawal.

It was assumed that a withdrawal/non-completion rate will be 10% hence, the adjusted sample size was 286.

A validated questionnaire with four parts was used in the study. Part I is a five-item question which asked about the demographic characteristics of the participants, such as age, highest educational level, marital status, employment status, annual household income, and area where they reside. Part II was a three-item question which asked about the medical problems of the participants, history of COVID-19 infection, and vaccination status. Part III asked about the sources of COVID-19 vaccine information. Part IV was a 38-item question subdivided into three parts, which asked about

knowledge, attitudes, and practices regarding COVID-19 vaccine. Questions on the attitude were adapted from the study entitled, COVID-19 vaccine acceptance among pregnant, breastfeeding, and nonpregnant reproductive-aged women by Sutton *et al.*^[10]

The English questionnaire was translated into Filipino for the purposes of this study. Both were pilot tested for validation among 30 patients at the high-risk clinic, which was administered by the researcher. Suggestions and feedback were incorporated in the questionnaire.

Data analysis

Descriptive statistics were used to summarize the sociodemographic characteristics of the respondents. Frequency and proportion were used for nominal variables, median and range for ordinal variables, and mean and standard deviation for interval/ratio variables. Descriptive statistics were used to summarize the sociodemographic characteristics of the respondents, co-morbidities, and their COVID-19 vaccine history, as well as their knowledge, attitude, and practices on COVID-19 vaccine. Frequency and proportion were used for nominal variables, median and range for ordinal variables, and mean and standard deviation for interval/ratio variables. All valid data were included in the analysis. Missing variables were neither replaced nor estimated. MINITAB 20 was used for data analysis.

Ethics approval

This study was approved by the University of the Philippines Manila Research Ethics Board. English or Filipino informed consent was obtained from the respondents thru face to face or online platform.

Results

A total of 323 pregnant and lactating patients were recruited in the study. Of the 323, 234 were pregnant and 89 patients were breastfeeding. Most of the high-risk pregnant women were in their third trimester. Participants of this study were found to be between 18 and 43 years old. The average age is 29.69 years old. A great number of the participants were high school graduate (46.44%), single (30.65%), unemployed (74.92%), and with a household income of <20,000 (89.16%). Patients of the high-risk clinic comes mostly from Cavite, Laguna, Batangas, Rizal, and Quezon (CALABARZON) at 31.27%, respectively. Table 1 summarizes the sociodemographic characteristics of the study participants.

Participant comorbidities were also gathered during the study. Diabetes mellitus tops the list of comorbidities, with 98 or equivalent to 30.34% of the 323 respondents. This is followed by hypertension at 20.74% or a total of

67 respondents. Other comorbidities such as asthma, thyroid disorder, etc., are below 20%. Data about co-morbidities are shown in Figure 1. At the time of the data collection, 64% of the participants had not tested positive for COVID-19 since the pandemic started, while 16% said that they had already tested positive to the virus. Still, 20% of the respondents are unsure if they were infected by COVID-19.

The majority of the respondents have already availed of the COVID-19 vaccine. There is a total of 301 vaccinated respondents, which is equivalent to 93% while 22 patients or 6.81% are unvaccinated. Among those who are vaccinated, 57% are fully vaccinated, which means they already have the first and second doses (when applicable) of the COVID-19 vaccine. Furthermore, 40% of the respondents already have their booster dose. A small number are partially vaccinated at 3%. Table 2 presents the COVID-19 infection and vaccine history of the participants.

For vaccine sources of information, it shows that 242 or 74.9% of the respondents got their information from social media or the Internet. It is followed by mass media such as television, radio, and newspaper at 59.8% or 193 responses. About 35.9% (116 responses) and 31.3% (101 responses) got their COVID-19 vaccine information from healthcare workers and other sources like family/friends, respectively. It can be noted that

only a small number (70 responses or 21.7%) got their information from health brochures. Data about source of information regarding the COVID-19 vaccine are presented in Figure 2.

Knowledge on coronavirus disease 2019 vaccine

People's awareness of the COVID-19 vaccine plays an important role in its rollout, accordingly above 90% of the respondents are aware that COVID-19 vaccine is recommended by professional organizations (94%) and health care providers (93%). Most of the participants also agree that it is common to feel side effects (fever, discomfort, pain) after getting a COVID-19 vaccine (92%), and these side effects are only minimal (90%).

Generally, 59% of the participants affirmed that COVID-19 vaccine is safe during pregnancy, 55% said that it is safe during breastfeeding, and 57% of patients said that it is safe if with co-morbidities. They believed that the vaccine will not give them coronavirus but will decrease the severity of COVID-19 infection. Moreover, the majority agree that the vaccine provides protection to their babies, themselves, family, and community as well as it is one of the preventive measures and solution in resolving the pandemic.

Overall, most of the respondents answered that the vaccine will not cause infertility at 65% and antibodies will be passed through breastmilk at 61%. Furthermore,

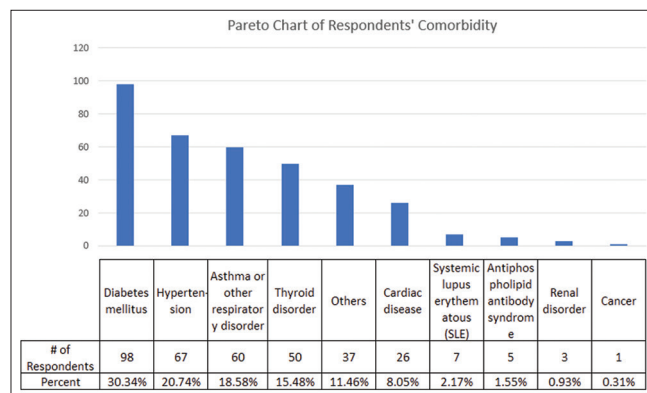


Figure 1: Co-morbidities of the study population. Patients were allowed to choose more than one response if applicable

Table 2: Coronavirus -2019+ test and Coronavirus -2019 vaccine history

	Number of respondents (%)
COVID-2019+ test	
No	208 (64.40)
Yes	51 (15.79)
Unsure	64 (19.81)
COVID-2019+ vaccine	
Vaccinated	301 (93.19)
Unvaccinated	22 (6.81)
COVID-2019+ vaccine history	
Partially vaccinated	8 (2.66)
Fully vaccinated (1 st and 2 nd doses)	173 (57.48)
With booster dose	120 (39.87)
COVID-2019: Coronavirus-2019	

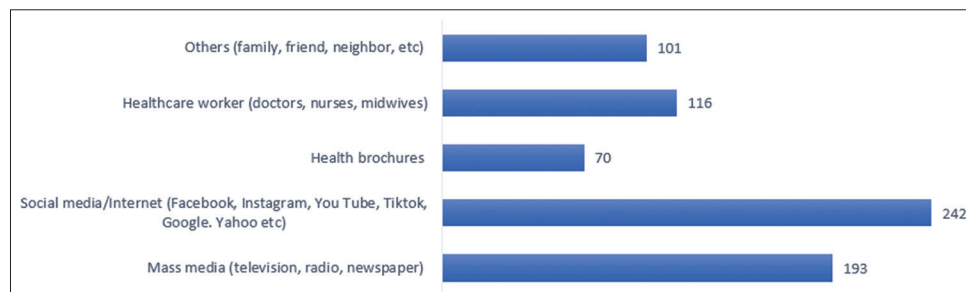


Figure 2: Sources of information on coronavirus disease 2019 vaccine. Patients were allowed to choose more than one response. COVID-19: Coronavirus disease 2019

patients expressed that effects of vaccine toward pregnant or lactating women are well-researched. They are also aware that 2 doses (if applicable) are considered fully vaccinated, and booster dose is recommended.

In addition, participants were unsure of COVID-19 vaccine safety pregnancy (33%), on lactating women (39%), and on those with comorbidities (35%). They are also unsure if the vaccine will be pass antibodies through breastmilk (36%), or if they will get COVID-19 infection after vaccination (30%) or if the vaccine not cause infertility (25%). Table 3 summarizes the findings on the knowledge of COVID-19 vaccine of the participants.

Attitude on coronavirus disease 2019 vaccine

For this study, the attitude affecting the decision-making on COVID-19 vaccine for both pregnant and postpartum respondents were also gathered. Those who are pregnant were asked if they are worried that the vaccine would hurt their baby, and results show that 33% are not worried at all but 27% are extremely worried.

Results also show that more respondents are not worried at all in getting the COVID-19 vaccine during the first trimester (38%), second trimester (37%), and third trimester (42%). While it cannot be denied that those who are extremely worried in getting the COVID-19 vaccine while pregnant is also high, it can be noted that the percentage is decreasing as the pregnancy progresses.

Based on the gathered data, 21% are extremely worried to get the COVID-19 vaccine during the first trimester, 19% during the second trimester and 17% during the third trimester.

Pregnant respondents are also generally not worried on getting the COVID-19 vaccine while breastfeeding (38%) and they are also not worried that they can pass the virus to their baby (30%).

More than one-third of the survey respondents are not worried that the COVID-19 vaccine will make them sick (44%), that the vaccine will give them COVID-19 (54%), doctors' experimenting on them (46%), and vaccine will affect their existing medical illness (38%). Those who signified that they are extremely worried are <20% of the total number of respondents.

Furthermore, out of the 22 unvaccinated respondents, 17 or approximately 77% signified that they are willing to take the COVID-19 vaccine when they are able. While it is remarkable that nobody responded that they are not going to take the vaccine, there are still 5 or 23% who are unsure of being vaccinated.

In summary, the data shows that perception on the effects of COVID-19 vaccine is generally positive as indicated by the percentages presented and by the number of vaccinated respondents (93%). Table 4 presents the

Table 3: Knowledge on coronavirus-2019 vaccine

	Yes, number of respondents (%)	No, number of respondents (%)	Unsure, number of respondents (%)
COVID-2019 vaccine is recommended by my healthcare provider	299 (93)	12 (4)	12 (4)
COVID-2019 vaccine is recommended by professional organizations	305 (94)	8 (2)	10 (3)
COVID-2019 vaccines are safe during pregnancy	191 (59)	25 (8)	107 (33)
COVID-2019 vaccines are safe for breastfeeding women	178 (55)	19 (6)	126 (39)
COVID-2019 vaccines are recommended and safe to patients with co-morbidities	183 (57)	27 (8)	113 (35)
COVID-2019 vaccine will not give me coronavirus	170 (53)	57 (18)	96 (30)
COVID-2019 vaccine will protect my baby, myself, family and community against coronavirus	280 (87)	3 (1)	40 (12)
The vaccine will decrease the severity of COVID-2019 illness	288 (89)	4 (1)	31 (10)
The vaccine will not cause infertility	211 (65)	32 (10)	80 (25)
After getting the COVID-2019 vaccine, the antibodies made by my body will be passed through breastmilk and may help protect my baby from the virus	197 (61)	11 (3)	115 (36)
COVID-2019 vaccine has minimal side effects (fever, pain, discomfort)	290 (90)	7 (2)	26 (8)
I know that we have enough research or knowledge on how the vaccine affects pregnant and lactating women	219 (68)	34 (11)	70 (22)
It is common to feel side effects (fever, discomfort, pain) after getting a COVID-2019 vaccine	296 (92)	12 (4)	15 (5)
If I have history of allergic reaction from previous vaccinations, I should inform my health care provider before getting the COVID-2019 vaccine	273 (85)	27 (8)	23 (7)
I should receive 2 doses to be considered fully vaccinated except for Janssen (1 dose only)	287 (89)	10 (3)	26 (8)
It is recommended to have booster dose after being fully vaccinated	270 (84)	18 (6)	35 (11)
Vaccination is one of the preventive measures and solution in resolving the pandemic	283 (88)	5 (2)	35 (11)

COVID-19: Coronavirus-19

attitudes affecting women's decision-making regarding COVID-19 vaccine.

Practices regarding coronavirus disease 2019 vaccine

Among those who are vaccinated, 72% said that they reported side effects such as injection site pain, fever, discomfort, and chills, while only 28% of the vaccinated respondents did not report any side effects.

Based on the results of the study, 74% of the participants discussed vaccine information with their health care providers, and 80% of them were specifically instructed to get their COVID-19 vaccine. Most of them had done vaccine research through social media at 76% while 24% did not.

Fifty-five percent of the respondents will not delay vaccination until they give birth and will recommend vaccination to other pregnant women (58%) and lactating women (54%). However, for the booster dose, the recommendation of the participants is even for the pregnant (50%) and lactating women (50%). It can also be seen that more than 40% of women does not recommend vaccination while pregnant or lactating. This means that there is still a mixed perception on the effects/benefits of COVID-19 vaccine to pregnant and lactating women. Further, 58% of the participants prefers a vaccine brand while 49% are willing to pay should the vaccine is not for free. Table 5 sums up the practices regarding COVID-19 vaccine among high-risk women.

Discussion

High-risk pregnant and lactating women are more susceptible in contracting COVID-19 infection, hence

international and local professional organizations recommend vaccination as one of the preventive measures in combating the pandemic as well as decreasing the severity of the disease. The pandemic itself cause a lot of anxiety and fear among pregnant women as the infection potentially harms the mother and their fetus.^[11] Hence, this study examined the knowledge, attitude, and practices on COVID-19 vaccine among high-risk pregnant and lactating women.

There were a total of 323 study participants with an average age of 29 years old. Socio-demographic characteristics of the participants showed that they were high-school graduate, single, unemployed, and resides in CALABARZON area. The median age of mothers is comparable to Philippine Statistics Record for 2019 which is 27 years old.^[12] It can also be noted that most respondents belong to a household income of <20,000 pesos, which depicts the findings of the Preliminary Results of Family Income and Expenditure Survey (FIES) in 2021 that poverty incidence is at 18.1% or 19.99 million Filipinos live below the poverty threshold of about Php 12,030 per month for 5 members.^[13] A large percentage of the participants also came from CALABRAZON area, this can be explained by the hospital's being a tertiary referral center in Metro Manila and nearby provinces. However, this study did not associate sociodemographic factors with the participant's KAP on COVID-19 vaccine; therefore, future studies may be done to have in-depth analysis of socio-demographic variables to find out how it can affect their KAP.

As to the participant's co-morbidities, 30.34% or majority have diabetes mellitus which is similar to the Midyear Perinatology Statistics report last November 2022 that 41% or 87 patients have diabetes mellitus. Accordingly,

Table 4: Attitude affecting women's decision-making regarding coronavirus -19 vaccine

	0 - not worried	1	2	3	4 - extremely worried	Undisclosed
I am worried that the vaccine could hurt my baby (pregnant only)	77	29	34	32	65	0
I am worried about getting the vaccine in first trimester (pregnant only)	89	29	36	30	50	3
I am worried about getting the vaccine in second trimester (pregnant only)	87	30	42	29	46	3
I am worried about getting the vaccine in third trimester (pregnant only)	99	27	41	29	41	0
I am worried about getting the vaccine while breastfeeding (pregnant only)	90	35	37	30	43	2
I'm worried that I could pass on COVID-2019 to my baby (pregnant only)	72	28	35	27	74	1
I am concerned the vaccine will make me sick or hurt me	143	49	52	28	51	0
I am worried that the vaccine could give me COVID-19	174	60	43	17	29	0
I am worried because I've heard stories of doctors experimenting on people like me	147	51	46	30	49	0
I'm worried that having COVID-2019 vaccine could affect my medical illness	124	52	48	39	60	0

COVID-2019: Coronavirus-2019

Table 5: Practices regarding coronavirus -2019 vaccine among high risk women

	Yes, number of respondents (%)	No, number of respondents (%)	Unsure, number of respondents (%)
Have you talked with your healthcare provider regarding COVID-2019 vaccine?	239 (74)	57 (18)	27 (8)
For the unvaccinated, do you plan on taking the COVID-2019 vaccine when you are able to?	17 (77)	0	5 (23)
Did your health care provider tell you to get the vaccine?	260 (80)	61 (19)	2 (1)
Do you recommend COVID-2019 vaccination to other women while pregnant?	188 (58)	135 (42)	0
Do you recommend COVID-2019 vaccination to other women while breastfeeding?	174 (54)	149 (46)	0
Do you recommend COVID-2019 vaccine BOOSTER dose to other regnant/lactating women?	161 (50)	162 (50)	0
I research vaccine information thru social media	247 (76)	76 (24)	0
I report vaccine side effects such as pain, fever, discomfort, and chills?	216 (72)	85 (28)	0
I will delay vaccination until I give birth	143 (44)	179 (55)	1 (0)
I prefer a brand of vaccine	187 (58)	135 (42)	1 (0)
I am willing to pay for the vaccine if it is not free	158 (49)	165 (51)	0

COVID-19: Coronavirus-19

diabetes topped as a co-morbidity concomitant with having COVID-19 infection among obstetric patients admitted last January–June 2022 at the Philippine General Hospital (PGH). Higher morbidity and mortality can be attributed to increased susceptibility of diabetic patients of having severe COVID-19 disease. In a study by Azar *et al.*, possible mechanisms of increased susceptibility to infection of patients with diabetes include elevated ACE2 expression, which facilitates viral entry and its replication and elevated basal levels of cytokines which causes hyperinflammation.^[14] The other diseases that affect pregnancy, such as hypertension, asthma, and thyroid disorders, is similar to the results reported by the Division of Maternal-Fetal Medicine.

Significant findings can be seen on the participant's COVID-19 status and vaccine history. Most of the respondents were not infected with COVID-19 at 64.40% in contrast to 15.79% infected participants. This minimal percentage of infection can be attributed to a high vaccination rate at 93.19% among high-risk pregnant and lactating women. Nonetheless, only 39.87% had booster shots, which is unforeseen considering the high vaccination roll-out. In the Philippine General Hospital, there were a total of 1294 obstetric admissions of which 413 women were infected with COVID-19, accounting to 31.9% of the patients. Most cases were asymptomatic, and only 4% were classified as moderate to critical. However, the midyear report did not mention the vaccination status of these infected patients. Factors exploring vaccine hesitancy may be subjected to future studies since 6.81% of the study group were unvaccinated individuals.

In addition, there are various platforms in spearheading vaccine information to the public. In this study, 74.92% of the participants accessed health information through social media or the Internet which was followed by mass media.

It is noteworthy that the same results were demonstrated in the study by Berdida *et al.*, wherein primary source for vaccine information was social media at 54.5% through Facebook.^[15] The findings are in contrast to the study done by Roldan-Gan *et al.* wherein the Filipino study sample received their information regarding the pandemic from traditional or television mass media, followed by social media platforms. However, our study has shown similar findings that only few participants received information directly from healthcare workers.^[16] These findings implicate social media's powerful influence on health information. Therefore, the government should use this platform for massive health education to strengthen the vaccine campaign.

Findings of the study showed that most high-risk pregnant and lactating women were aware that the vaccine is recommended by their health care provider and professional organizations. Most were well-informed that to be fully immunized, 2 doses with a booster dose were recommended, and they were knowledgeable about the minimal vaccine side effects. These may be attributed to the widespread use of the Internet or social media to access health information.

More than 30% of the participants were unsure regarding the safety of the vaccine to pregnant, lactating or those with co-morbidities. Furthermore, only 68% said that there was enough vaccine research affecting pregnant and lactating women. Reason for this is that pregnant and lactating women were excluded on vaccine clinical trials. However, for vaccine side effects, patterns of reactogenicity between pregnant and non-pregnant women were observed at V-safe Surveillance System and Pregnancy registry, and Vaccine Adverse Event Reporting System (VAERS) but the system cannot prove that the vaccine causes the problem. Currently, there is an ongoing research that evaluates obstetric, neonatal and

infant outcomes among vaccinated pregnant women, but it will only be completed by year 2026 thru COVID-19 Vaccines International Pregnancy Exposure Registry.^[17] Despite this, participants believed that vaccination is a source of protection against the virus, as well as it lowers severity of infection.

Among high-risk pregnant women, a positive attitude towards the vaccine was evident as the pregnancy progresses, especially in the third trimester and during lactation. It can be attributed to more encounters with health care providers during prenatal check-ups, advising them to get vaccinated. They may also be more concerned with their pregnancy and the baby as pregnancy advances in the third trimester. These findings were similar to the outcome of a study done in Czech Republic wherein third trimester pregnant women have a higher acceptance level of COVID-19 vaccine compared in the first trimester.^[18] Most participants were not worried that the vaccine will harm their babies, themselves or affect their medical condition. This is in contrast to a study done in Jordan wherein participants have a high level of fear about the side effects of the vaccine toward them and their fetus.^[11] Only a small number of respondents were extremely worried about healthcare providers “experimenting” on them hence demonstrating that the majority trust their providers. Overall, there was a positive attitude on COVID-19 vaccine, consequently translating to high level of vaccination in this study group.

As to the aspect of COVID-19 vaccine practices, more than 70% responded that they have discussed the vaccine information with their health care providers, and more than 80% advised them to get vaccinated. However, this study did not include if patients accepted their provider’s recommendation. Research conducted in the Czech Republic, only 13.3% individuals indicated their physician’s vaccine recommendations, and 62.2% were against them.^[18] The study also revealed that majority will not delay vaccination up until they give birth however more than 40% will not recommend vaccination to other pregnant or breastfeeding women. This can be attributed to vaccine side effects personally experienced by the participants, as well as some inaccurate information received from social media via their vaccine research. The research presented that study subjects prefer a brand of vaccine which is different in a Jordanian study, showing almost 70% of no vaccine preference.^[11] In addition, the majority were unwilling to pay for the vaccine if its not free. This can be attributed to the study population’s low financial capability.

Conclusion

This study was a KAP on COVID-19 vaccine in a tertiary hospital among high-risk pregnant and lactating women.

Socio-demographic characteristics of the participants showed that they were high-school graduate, single, unemployed, and most resides in CALABARZON area. Diabetes mellitus is the primary comorbidity identified amongst the participants. There was a high level of vaccine acceptance amongst high-risk pregnant and lactating women. The majority relies on social media for vaccine information. Most participants were aware that vaccination is evidence-based but have concerns regarding its safety to high-risk women during pregnancy and lactation. High-risk women generally have a positive attitude toward vaccination. As to practices, vaccine discussion was common during visits, patients do their own research on vaccine information, and more are willing to get vaccinated even if pregnant or lactating.

Limitations of the study

The following were the limitations of the study:

1. Low-risk pregnant and low-risk lactating patients were not included in the study
2. Reasons of vaccine hesitancy, especially those unvaccinated, were not explored
3. Specific timing of vaccination was not asked
4. Women who came for antenatal consults and delivered in PGH who were from a certain geographic location were only included.

Recommendations

For future research studies, the authors recommend the following:

1. Measure the level of knowledge by scoring their responses to specific questions
2. Correlate socio-demographic characteristics and KAP
3. Studies on the correlation of the timing of vaccination and attitudes of patients before pregnancy, during pregnancy and postpartum
4. Future studies may investigate specific aspects of vaccine administration and effects to elucidate the reasons behind vaccine hesitancy
5. A similar study may be done to private hospitals since our study included only low to middle-income patients
6. Recommend that policymakers use the results of the study in crafting ways to focus information dissemination and health education among pregnant and lactating women using social media.

Statement of authorship

IA was responsible for the conception and design of the study, as well as the acquisition of data. Both IA and VG drafted the manuscript, made critical revisions of the content, and provided approval of the final version of the manuscript.

Author disclosure

All authors declared no conflicts of interest. Funding was provided by the principal investigators. The views and opinions contained in this article were those of the authors and do not necessarily represent those of the Philippine General Hospital.

Authorship contributions

Iris Soria-Arikan - Involved in the conceptualization, writing of the protocol, methodology, data curation, writing of the original draft, review and editing.

Valerie Tiempo Guinto - Involved in conceptualization, methodology, writing of the protocol, supervision, review and editing of the final draft, submission for publication, revisions for publication.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author, V.T.G.

References

- DOH COVID-19 Tracker. Doh.gov.ph. [Last accessed on 2022 Nov 19].
- Clemente MJ, Amosco M, Octavio MB, Bravo SL, Villanueva-Uy E. Maternal and neonatal outcomes of pregnant women with clinically confirmed COVID-19 admitted at the philippine general hospital. *Acta Medica Philippina* 2021;55:183-90.
- Martinez-Portilla RJ, Sotiriadis A, Chatzakis C, Torres-Torres J, Sosa SEY, Sandoval-Mandujano K, *et al.* Pregnant women with SARS-CoV-2 infection are at higher risk of death and pneumonia: propensity score matched analysis of a nationwide prospective cohort (COV19Mx). *Ultrasound in Obstetrics and Gynecology* 2020;57:224-31. <https://doi.org/10.1002/uog.23575>.
- Center for Disease Control. COVID -19 Vaccination for Women who are Pregnant or Breastfeeding. <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/recommendations/pregnancy.html>. [Last accessed on 2024 Sep 10].
- ACOG and SMFM Joint Statement on WHO recommendations regarding COVID-19 vaccines and pregnant individuals. ACOG. <https://www.acog.org/news/news-releases/2021/01/acog-and-smfm-joint-statement-on-who-recommendations-regarding-covid-19-vaccines-and-pregnant-individuals>. [Last accessed on 2021 Jan 27].
- POGS Practice Bulletin on COVID-19 Vaccination of Pregnant and Breastfeeding Women. Fourth Update, Available from: <https://pogsinc.org>. [Last accessed on 2022 Jan 13].
- ACOG Practice Advisory. Vaccinating Pregnant and Lactating Patients Against COVID-19. [Last accessed on 2020 Dec].
- Stuckelberger S, Favre G, Ceulemans M, Nordeng H, Gerbier E, Lambelet V, *et al.* SARS-CoV-2 vaccine willingness during the first pandemic wave: Cross sectional study in Switzerland. *Viruses* 2021; p. 1-13.
- Skjefte M, Ngirbabul M, Akeju O, Escudero D, Hernandez-Diaz S, Wyszynski DF, *et al.* COVID-19 vaccine acceptance among pregnant women and mothers of young children: Results of a survey in 16 countries. *Eur J Epidemiol* 2021;36:197-211.
- Sutton D, D'Alton M, Zhang Y, Kahe K, Cepin A, Goffman D, *et al.* COVID-19 vaccine acceptance among pregnant, breastfeeding, and nonpregnant reproductive-aged women. *Am J Obstet Gynecol* 2021;3:100403.
- Abuhammad S. Attitude of pregnant and lactating women toward COVID-19 vaccination in Jordan: A cross-sectional study. *J Perinat Med* 2022;50:896-903.
- Philippine Statistics Authority. 2019 Philippine Statistical Yearbook. ISSN-0118-1564, p. 630.
- Demographic Profile of Poor Households in the Philippines, from the Family Income and Expenditure Survey of 2021. <https://cpbrd.congress.gov.ph>. [last accessed on 2021 Sep 14].
- Azar WS, Njeim R, Fares AH, Azar NS, Azar ST, El Sayed M, *et al.* COVID-19 and diabetes mellitus: How one pandemic worsens the other. *Rev Endocr Metab Disord* 2020;21:451-63.
- Berdida DJ, Grande RA, Lopez V. Filipinos' health information-seeking behaviors and their implications for COVID-19 vaccination. *Public Health Nurs* 2022;39:553-61.
- Roldan-Gan R, Chua JC, Dela Rosa CJ, Arellano B. Factors affecting the awareness, acceptance, and hesitancy among unvaccinated filipinos without medical background regarding SARS-CoV-2 (COVID-19) Vaccine. *Manila J Sci* 2022;15:26-43.
- Falsaperla R, Leone G, Familiari M, Ruggieri M. COVID-19 vaccination in pregnant and lactating women: A systematic review. *Expert Rev Vaccines* 2021;20:1619-28.
- Riad A, Jouzová A, Üstün B, Lagová E, Hruban L, Janků P, *et al.* COVID-19 vaccine acceptance of pregnant and lactating women (PLW) in Czechia: An analytical cross-sectional study. *Int J Environ Res Public Health* 2021;18:13373.