

Knowledge and Acceptance to COVID 19 Vaccine among the Pregnant Women in the Selected Rural Area of the Vellore District

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Abstract: COVID-19 infection was highly infectious and fatal worldwide. The vaccine against COVID -19 was seen as an effective way to control the outbreak in a phased manner. Vaccination was initially administered to the health care workers and frontline workers. It was extended to older people and the public over the age of 18 years except for the pregnant women who were considered vulnerable. There was limited data on the efficacy of the vaccine. Yet, the Royal College of Obstetrics and Gynecology recommended the vaccination for pregnant women. Later, the Ministry of Health and Family Welfare announced the extension of the vaccination program to antenatal mothers and lactating mothers on 2nd July 2021. **Objective:** This study was to assess the knowledge and acceptance of vaccines among pregnant women and to explore the factors influencing their decision. **Method:** A cross-sectional study using a semi-structured questionnaire was conducted. **Result:** This study found a higher rate of acceptance of COVID 19 vaccine among pregnant mothers. It was high among the mothers who were pregnant for the first time and among the highly educated. Though the acceptance was high, the knowledge regarding the vaccine was only moderate. The common reasons for non-acceptance were mainly the fear of danger to the growing fetus and the mother's role in decision-making because a small proportion of them still relied on the family's decision. **Conclusion:** COVID 19 vaccination rate among women was high. The major reason for hesitancy was the fear and inadequate knowledge of its importance, which could be handled through education.

Keywords: COVID- 19 vaccine, Knowledge of vaccine, Vaccine acceptance, vaccine hesitancy

1. Introduction

COVID 19 pandemic caused increased mortality and morbidity worldwide, especially among pregnant women^[1]. Vaccination against the COVID 19 was considered the game-changing tool in controlling the infection along with the other control measures^[2]. The Government of India launched the COVID 19 vaccination program for people above 18 years of age excluding antenatal and lactating mothers on 16th January 2021. The vaccination coverage in India was only 6% initially when it was 12.9% globally^[3]. However, a study showed that there was a high acceptance rate of vaccines in India compared to many other countries^[4]. Later when the vaccination was introduced for pregnant women, They could receive one of those three vaccines (Covaxin, Covishield, or Sputniks) available in any of the COVID vaccination centers in India^[2].

The acceptance of vaccination globally was not explicated then. A survey done among 17871 pregnant and non-pregnant women in 16 countries, including India showed that 45.9% of the pregnant women were willing to vaccinate if the vaccine's efficacy was 90% and if it was safe and freely given. The most common factor considered for hesitancy was that it was not safe, and it would cause harm to the growth of the fetus^[4]. Meanwhile, a study conducted in Switzerland to assess the acceptance of COVID 19 vaccination among pregnant women showed that 29.7% of the study population were vaccinated and the factors

influenced were older age group (age above 40 years), Higher education, History of vaccination earlier with Influenza vaccine and the information from the health care provider. It was interesting to know that mothers in their third trimester had shown increased acceptance^[5]. Hence this study was done to assess the awareness, acceptance, and hesitancy for COVID 19 vaccination among the pregnant mother and identify the factors influencing the decision.

2. Subjects and Methods

Between December 2021 and February 2022, a cross-sectional survey was conducted using a semi-structured questionnaire in a secondary care hospital of Christian Medical College, Vellore which caters to a population of 1.38 lakh. The samples were all antenatal mothers attending the Antenatal care OPD. All mothers attending the OPD were invited to participate in the study. The sample size was calculated using a study among pregnant women in 16 countries (including India) which reported that 52 % of the pregnant women will accept the COVID-19 vaccine if it has an efficacy of 90%^[6]. The estimated sample size of 450 was estimated with a 10% non-response rate. From the sampling frame of antenatal registered to the day's OPD subjects were selected using simple random sampling based on the eligibility criteria of the study. The eligibility criteria were mothers who could read and write English or Tamil.

The study tool contained three parts. Part 1 consists of details about the demographic data, Obstetric history, and COVID infection or exposure to COVID infection before or during pregnancy. Part 2 had questions related to Knowledge regarding COVID 19 vaccine and part 3 was regarding Vaccine acceptance. Part 1 was filled out by the investigator and part 2 and 3 which contained a semi-structured questionnaire was filled out by the participants.

The data was analyzed using SPSS version 25 and was presented. Mean and standard deviation (SD) was estimated for continuous variable and frequency for categorical variables. Chi-square analysis was used to identify the independent factors associated with Vaccine acceptance, and hesitancy and it was declared at $p < 0.05$ with a 95% confidence interval.

Informed consent was taken after duly explaining the study's benefits to the participants. The study's protocol and ethics were approved by the College of Nursing Research

Committee of Christian Medical College, Vellore (min no:41)

3. Results

Demographic Variables:

Nearly three fourth of the study participants were between the age group of 21 to 30 years with a mean age of 24.32 (SD±4.143). A majority (36.2%) of them had completed their undergraduate degree and one-fourth had completed their higher secondary education. Only 5% of them were employed whereas the rest remained as homemakers. The majority (64%) of them were Primi mothers and nearly half of the subjects were in their third trimester. About one-third had one or more risk factors associated with pregnancy and the most common risk factor was Gestation Diabetes Mellitus (GDM) which comprised about 30.4%. The other risk factors were previous history of LSCS, Anaemia, Infertility, Gestational Hypertension, and Hypothyroidism. Table 1 shows the characteristics of the study participants.

Table 1: Demographic variables and obstetric history of study participants

Variables	Categories	No	%
Age	Less than 20 years	85	18.9
	21 – 30 years	328	72.9
	30-40 years	36	8
	More than 40 years	1	0.2
	Mean	24.32	SD – 4.143
Education	Middle school	11	2.4
	High School	55	12.2
	Higher Secondary	120	26.7
	Diploma	57	12.7
	Undergraduate Degree	163	36.2
Occupation	Student	1	0.2
	Unskilled	3	0.7
	Semi-skilled	1	0.2
	Skilled	8	1.8
	Homemakers	425	94.4
	Professionals	12	2.7
Obstetric score	Primi	288	64
	Multiparity	156	34.7
	Grand-multiparity	6	1.3
Trimester	First	98	21.8
	Second	141	31.3
	Third	211	46.9
High Risk	Yes	110	24.4
	No	340	75.6

Knowledge regarding Vaccine:

Most of them (62.2%) had a moderate level of knowledge regarding COVID vaccine. Figure 1 shows the level of knowledge among the study participants. Most of them knew that two doses of vaccine were recommended for pregnant women (96.4%) and that it is safe (95.1%) for the mothers during their pregnancy. Almost three fourth of them had known that the vaccines were administered free of cost in the government centers (73.6%) with an interval of one to three months intervals (74.4%) based on the vaccines administered. Only 24.9% knew about possible infection even after being vaccinated and the infection would complicate the pregnancy (36.9%). More than 50% of the 166 samples who said that COVID 19 infection would cause complications felt it would lead to the Severity of COVID

19 infection, Preterm labor, and Increased blood pressure. While some felt it would only lead to one of those complications mentioned above at any given time. Table 2 presents the data on their knowledge regarding COVID vaccination.

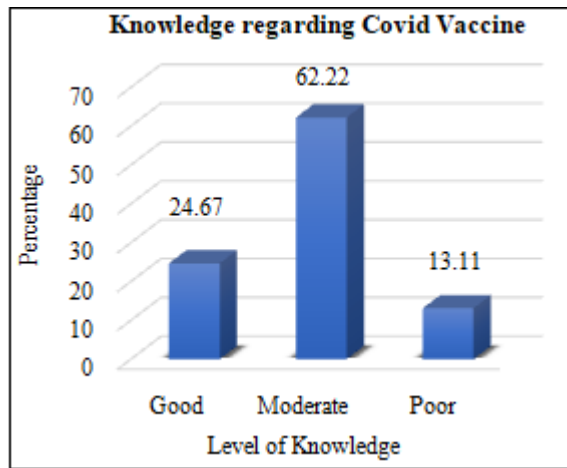


Figure 1: Knowledge regarding vaccines

Table 2: Knowledge regarding COVID Vaccination

S. No	Knowledge of the COVID-19 Vaccine	No (%)
1.	It is safe to take a vaccine against COVID 19 during pregnancy.	428 (95.1)
2.	All pregnant mothers should be vaccinated.	411 (91.3)
3.	The infection rate will reduce when the whole community is vaccinated.	354 (78.7)
4.	The vaccine is free of cost at the government setting	399 (88.7)
5.	Vaccination centers	327 (72.7)
6.	Recommended vaccines available in the country.	331 (73.6)
7.	Number of doses recommended by the Government.	434 (96.4)
8.	The recommended interval between the doses	335 (74.4)
9.	A person infected with COVID -19 also requires a vaccine	302 (67.1)
10.	COVID 19 infection is possible even after vaccination	112 (24.9)
11.	COVID Infection causes complicated pregnancy.	166 (36.9)
12.	Complications of COVID 19 Infection during Pregnancy	
	The severity of COVID 19 infection	64 (14.2)
	Pre-term Labour	11(2.4)
	Increased blood pressure	6 (1.3)
	All the above	56 (12.4)

Acceptance of Vaccine:

Nearly 75% of the pregnant women were vaccinated (Figure 2). Forty percent of them had decided for themselves to be vaccinated whereas, for another 40%, their spouse had made the decision (Figure 3). A majority (74.3%) of them were vaccinated with Injection. Covishield from the Primary

Health Centre. Among those vaccinated, half of them reported that they had side effects after the vaccination. The reported side effects were fever, pain in the injection site, and fatigue. (Figure 3)

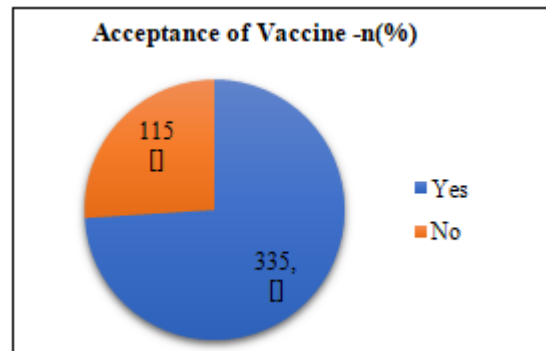


Figure 2: Acceptance of COVID 19 Vaccine

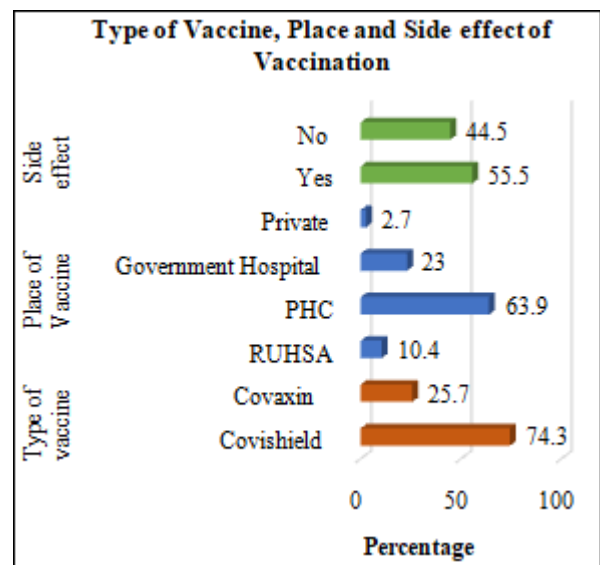


Figure 3: Type of vaccine, Place, and side effects of Vaccination

Factors influencing non-acceptance of Vaccine:

One-quarter of the pregnant mothers were not vaccinated. A major reason for not taking the vaccine is found to be fear (31.3%) and not interested to take the vaccine. Nineteen percent said the vaccine will affect the pregnancy. The other reasons were family not permitting (8.7%), recent respiratory infection (4.3%), the vaccine would cause abnormality in the Fetal growth (3.5%) and 1.7% of the mothers were not eligible for the vaccine as they were under 18 years. Figure 4 explains the reason for not taking the COVID 19 vaccine.

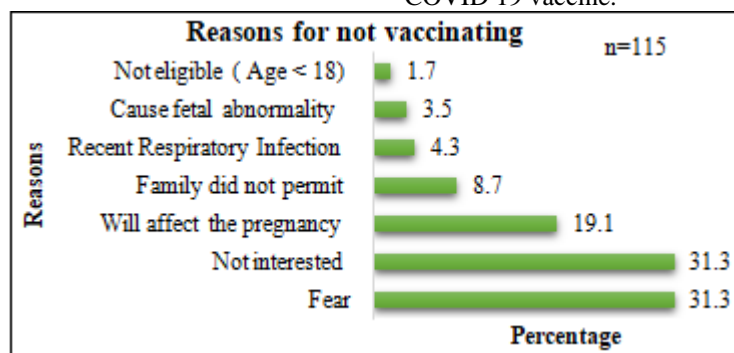


Figure 4: Reason for not vaccinating

Association between selected variables and acceptance of vaccine:

There is a significant association between the trimester and the acceptance of the vaccine (p-value = 0.00001). Whereas

no association between other selected variables such as age, education, occupation, obstetrical score, trimester, and the acceptance of vaccination.

Table 3: Association between Knowledge, Certain clinical–demographic variables, and acceptance of the vaccine

Variables	Vaccinated N=335	Unvaccinated N= 115	Total N=450	Chi square	p value
	No (%)	No (%)	No (%)		
<i>Age</i>					
Less than 20 years	57 (17)	28 (24.3)	85 (18.9)	3.110	0.211
21 – 30 years	249 (74.3)	79 (68.7)	328 (72.9)		
More than 30 years	29 (8.7)	8 (7)	37 (8.2)		
<i>Education</i>					
Up to High School	49 (14.6)	17 (14.8)	66 (14.6)	3.272	0.513
Higher Secondary	85(25.4)	35 (30.4)	120 (26.7)		
Diploma	41(12.2)	16 (13.9)	57 (12.7)		
Undergraduate Degree	129 (38.5)	34 (29.6)	163 (36.2)		
Postgraduate	31(9.3)	13 (11.3)	44 (9.8)		
<i>Occupation</i>					
Others	11(3.6)	2 (1.7)	13 (2.9)	0.733	0.693
Homemakers	315 (94)	110 (95.7)	425 (94.4)		
Professionals	9 (2.7)	3 (2.6)	12 (2.7)		
<i>Gravida</i>					
Primi	208 (62.1)	80 (69.6)	288 (64)	4.717	0.095
Multiparity	124 (124)	32 (27.8)	156 (34.7)		
Grand-multiparity	3 (0.9)	392.6)	6 (1.3)		
<i>Trimester</i>					
First	55 (16.4)	43 (37.4)	98 (21.8)	32.953	<0.00001**
Second	98(29.6)	42 (36.50)	141 (31.3)		
Third	181 (5.4)	30 (26.1)	211 (46.9)		
<i>High Risk factors</i>					
Yes	107 (31.9)	33 (28.7)	140 (31.11)	0.421	0.517
No	228 (68.1)	82 (71.3)			
<i>Knowledge</i>					
Good	95 (28.4)	16 (13.9)	111(24.6)	17.909	0.000**
Moderate	207 (61.8)	73 (63.5)	280 (62.2)		
Poor	33(9.6)	26 (22.6)	59 (13.11)		

4. Discussion

India was considered the fastest country to roll out COVID 19 vaccine when it was initially started for healthcare workers and the public. There was a similar trend seen when a vaccination campaign was announced for pregnant women. This study done among pregnant women on COVID 19 vaccine gave an insight into their knowledge, attitude, and practices. It was interesting to know that the rate of acceptance of COVID 19 vaccine was much higher despite not enough understanding of the vaccine was found.

This study found that there was a significantly higher acceptance rate (74%) of the COVID 19 vaccine among pregnant than the previously reported among pregnant women in south Tamil Nādu (37%)^[7]. The major difference could be because the study was done nine months after the vaccination was rolled out for pregnant women in the country. The increased acceptance rate could also be because the other general population was already vaccinated without any major adverse events reported. Although there were misleading messages in social media, it did not largely affect the mothers from abstaining from vaccination whereas another study reported that rumors in social media caused a greater impact on the acceptance rate negatively^[8]. Furthermore, the information was mostly received from the health care services where they had their regular pregnancy

check-up which signifies their trust towards their health care system.

In this study, a high rate of acceptance was found among the mothers who were pregnant for the first time (64%). In contrast, another study (systemic analysis and metanalysis) done on vaccine hesitancy among the antenatal mother from Dec 2020 to April 2022; showed a higher acceptance rate among the multi-mothers^[9]. Although the acceptance was significantly high and surpassed the previous studies done among pregnant women in Vietnam (39.73%)^[10], Turkey (37%)^[7] Sub Saharan (35%)^[11] and Nepal (22%)^[12], the knowledge among the women was only satisfactory. It was also found that mothers who had higher education and were in their third trimester (46.9%) accepted vaccines willingly. Similar findings were found among Saudi Arabian mothers^[13]

They were not aware of the significance of the vaccine. They accepted vaccines because it was safe, and it is freely offered by the government and certain private centers. The non-acceptance of the vaccine was mainly due to the fear of the side effects and fear of endangering Fetal development. Similar findings were reported by mothers across many countries^{[14][10][8]}. Secondly, there were also social factors related to decision-making. Most of the decisions are made by the family members in India. Nearly about 30% did not

show interest in taking the vaccine and this could be because of the influence of the family in decision-making and partly because of the inadequate knowledge of the vaccine.

5. Conclusion

In conclusion, there was a higher rate of acceptance of vaccines among pregnant mothers. Fear of danger to the life of a growing fetus was the major hindrance to accepting the vaccine which could be tackled through education. Improved knowledge of vaccines could have helped achieve complete coverage of vaccination even during the pandemic

Conflict of interest

The author has no conflict of interest.

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