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Acceptance for coronavirus disease 19 vaccines among pregnant women seeking antenatal care in tertiary care hospital

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ABSTRACT

Background: Corona virus disease 2019 (COVID -19) is caused by the Severe acute respiratory syndrome corona virus (SARS-COV-2). In the absence of an effective treatment, vaccination becomes the main modality to control the incidence of infectious diseases. Hence, there is a need to estimate the attitudes and willingness among pregnant women for COVID 19 Vaccine.
Objectives of the Study: To estimate the frequency of COVID 19 Vaccine acceptance and non acceptance in pregnant women attending antenatal OPD. To describe the factors associated with non acceptance of COVID 19 Vaccine in pregnant women attending antenatal OPD
Materials and Methods: This is an observational cross-sectional study where 500 pregnant women attending antenatal care were counseled about the COVID-19 vaccine. Women who refused the vaccine were asked about the reasons for refusal and the same was noted.
Results: 95.6% accepted the vaccine and 4.4% did not accept. Majority belonged to 21 to 25 years(45% acceptors and 72% non acceptors), were second gravidas (38.7% acceptors and 54.5% non acceptors) and were between 25 to 36 weeks gestation(52.7% acceptors and 50% non acceptors). 13.8% of acceptors and 4.5% of non acceptors had previous history of abortions. Commonest concern was fear of vaccine related complications and fear of harming the fetus. Vaccine reactions followed by fear of harming the baby were the commonest reasons for non acceptance.
Conclusion: Vaccine acceptance was high in this study (95.6%). Vaccine induced reactions followed by fear of harming the baby were the commonest reasons for non acceptance.

1. Introduction

Corona virus disease 2019 (COVID -19) is caused by the Severe acute respiratory syndrome corona virus (SARS-COV-2). It is a RNA virus belonging to Corona virus family. This variant was first identified in Wuhan City, China in 2019. Corona viruses are known for causing common cold. The transmission of COVID-19 variant is air born.[1] The virus can be isolated from faeces and fomites. Vertical transmission is possible but uncommon.[2]

1.1. Effects on pregnancy

COVID-19 infection during pregnancy is associated with increased severity of infection in the mother when compared to non pregnant woman especially in third trimester[1] and these mothers are more likely to need intensive care

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admission.[3] Also noted is an increased rate of cesarean deliveries, increased risk of still births and fetal growth restriction.[1] The risk of preterm labor among COVID -19 infected pregnancies is 17%.

1.2. COVID-19 vaccines

In the absence of an effective treatment, vaccination becomes the main modality to control the incidence of infectious diseases. The vaccines against COVID-19 however were developed in an emergency situation in a short period of time. This along with other factors like reports of adverse reactions, misinformation, social and political environment led to reduced acceptance to vaccination.[4] Adding to this there is a lack of scientific data among pregnant women because they were excluded in vaccine trials.

Hence, there is a need to estimate the attitudes and willingness among pregnant women for COVID 19 Vaccine so that the concerns can be identified and addressed and more women come forward for vaccination.

Vaccine can be taken anytime during pregnancy and breast feeding. Being unvaccinated is one of the risk factor for hospitalization if infected.[1]

According to the recommendations issued by the American College of Obstetricians and Gynecologists,[5] the Center for Disease Control and prevention, and the Royal College of Obstetricians and Gynecologists,[1] Covid-19 vaccination should not be withheld in pregnant women. Ministry of health and family welfare, Government of India approved the use of vaccines for pregnant women and lactating women on 25 June 2021.[6]

The vaccines available in India as on 4^{th} October 2022 are COVISHEILD (viral vector vaccine), COVAXIN (whole viron inactivated vaccine), SPUTNIK-V (viral vector vaccine), ZyCoV- D (DNA based vaccine), CORBEVAX (protein subunit vaccine), Janssen (viral vector vaccine) and Moderna (mRNA vaccine).[7]

The ChAdOx1 nCoV- 19 Corona Virus Vaccine (Covisheild) has shown to have 76% overall efficacy against symptomatic COVID-19 after more than 14 days after the 2^{nd} dose.[8]

2. Objectives of the Study

1. To estimate the frequency of COVID 19 Vaccine acceptance and non-acceptance in pregnant women attending antenatal OPD.
2. To describe the factors associated with non-acceptance of COVID 19 Vaccine in pregnant women attending antenatal OPD.

3. Materials and Methods

An observational cross-sectional study was done in Vani Vilas Hospital attached to Bangalore Medical College and Research Institute, Bangalore for 6 weeks in September and October 2021. 500 pregnant women attending antenatal OPD were included in the study.

3.1. Inclusion criteria

1. Pregnant women irrespective of the gestational age.
2. Pregnant women willing to participate in the study.

3.2. Exclusion criteria

1. Pregnant women already vaccinated with COVID-19 vaccine.
2. Pregnant women not willing to participate in the study.

After obtaining approval and clearance from the institutional ethics committee, the participants fulfilling the inclusion criteria were enrolled for the study. After obtaining informed consent, all women were subjected to history taking and counseling. Counseling included full information about the risks of COVID 19 infection in pregnancy, the benefits and risks of COVID 19 vaccine (including rare possibility of thrombosis). The participants were also informed about that the long term adverse reactions and safety for fetus and child is not yet established. Each woman was enquired about any queries if they had regarding COVID-19 vaccination and were addressed by the counselors to help them take informed decision. Women who refused the vaccine were asked about the reasons for the same and were noted. COVID 19 vaccines were given free of cost to the pregnant women.

3.3. Assessment tools

Uniform Proforma was used to collect data.

3.4. Outcome measures

Number of women accepting to take COVID-19 Vaccine. Number of women not willing to take COVID-19 Vaccine and the reasons for their refusal.

3.5. Statistical analysis

The data collected was analyzed statistically using descriptive statistics like percentage and average calculation (mean/median/mode).

4. Results

Out of 500 pregnant women 478 (95.6%) accepted the vaccine and 22 (4.4%) did not accept the vaccine. Maximum women belonged to age group of 21 to 25 years (45% in acceptors and 72% in non acceptors) followed by 26 to 30 years (Table S1). Majority were in second pregnancy (38.7% in acceptors and 54.5% in non acceptors) followed by first pregnancy (Table S2). Majority were between 25 to

36 weeks gestational age (52.7% in acceptors and 50% in non acceptors) (Table S3). 13.8% of acceptors and 4.5% of non acceptors had previous history of abortions (Table S6). Medical and Obstetric co morbidities were seen in 34.1% of acceptors and in 13.63% of non acceptors (Table 2). 81% of acceptors and 9.1% of non acceptors expressed no concerns on asking, rest had one or more concerns. Commonest concern was fear of vaccine related complications and fear of harming the fetus (Table 3). Vaccine reactions followed by fear of harming the baby were the commonest reasons for non acceptance (Table 4). Recent history of proven COVID-19 infection was seen in 1.3% of acceptors whereas none of the non acceptors had COVID-19 infection in the recent past (Table S5).

5. Discussion

Vaccine acceptance in the present study was 95.6%. We noted a surprisingly high acceptance among antenatal women. A survey in 16 countries by Malia Skjefte et al. among pregnant women and women of young children showed an acceptance rate of 52% and 73.4% respectively. They also reported that vaccine acceptance was highest in India, Philippines and countries in Latin America and lowest in Russia, The United States and Australia.[9]

The acceptance rate of COVID-19 vaccine during pregnancy varies across the globe ranging from as low as 29.5%[10] to as high as 84.5%.[11] These rates are lower than that found in our study.

Acceptance as high as 90% is reported in a survey from India among both pregnant and lactating mothers.[12] An acceptance of 83.6% is reported among the general population in India.[13] Qunaibi EA and associates reported a high vaccine hesitancy of 81%-83% among Arabs in and around Arab region.[14]

In the present study 95.6% have actually received the vaccine. This reflects a real time acceptance rate compared to other studies where the acceptance rates are based on a scenario where the women is asked about her likelihood of getting vaccinated. Some studies have been done before the vaccine availability.

When there is a real time vaccine availability and women are actually receiving the vaccine, the acceptance rates might differ. The acceptance rate might increase or decrease depending on the social environment, political environment, severity of the disease with emerging variants of COVID 19 and with time. As observed by Marva MM et al, the acceptance rates improved from 2020 where it was 38% and it doubled to 71% in the next 2 years.[15] A cross-sectional survey in a tertiary care reported an anticipated acceptance as 41% and the actual acceptance as 7.3%.[16]

When this study was conducted at our institute, the vaccination program was initiated just 15 days back. Being a tertiary care institute and a dedicated maternal and child hospital with 1500 deliveries per month, our Institute caters to a large number of obstetric population. During the pandemic, the institute was simultaneously running COVID and non COVID services for pregnant women and the routine obstetric services were not compromised. This might have made a great impact in building the faith among the public. In one of the studies women have quoted as worsening of maternal and child health care during the pandemic as a reason for vaccine hesitancy.[15]

The faith of the public in the Institute, dedicated counseling, the very fact that the vaccine was recommended by the government and being offered free of cost at a tertiary care, Obstetricians involvement, availability of vaccines at the antenatal care unit are probably the factors responsible for the good acceptance. The involvement of obstetrician as a primary health care provider is seen to be associated with increased vaccine acceptance.[17]

Average of around 80 to 100 pregnant women who come for the antenatal care get to interact with the women who have already received the vaccine and seeing the other pregnant women receiving vaccines is a positive reinforcement and motivation for these pregnant women to accept vaccines. In a study from United States, women receiving group prenatal care and vaccine being recommended by their health care provider were factors associated with higher vaccine acceptance.[18]

80.33% received COVAXIN and 19.66% received COVISHEILD (Table S4). The type of vaccine was given according to the availability. Majority of the times COVAXIN was given. COVISHEILD was given when COVAXIN was not in stock.

Each woman was asked about her concerns if any for the vaccination. 18.2% of women expressed their concerns. It is a very positive attitude and response from the pregnant women that 81.2% apparently had no concerns and were confident to receive the vaccine.

The non acceptors of vaccine were few (4.4%). They were counseled and asked about the reasons for refusal. Most common reason of refusal being fear that the vaccine will harm the baby and fear of vaccine related side effects. When the present study was done, there was no safety data available of these vaccines on fetus and there were reports of vaccine induced reactions which might have influenced their decision. This was followed closely by women who did not accept the vaccine because their friends, relatives and even some of the health care workers told them not to take the vaccine.

Women around the globe who received COVID-19 vaccine were observed in observational studies and now there is emerging evidence regarding the safety of these vaccines in pregnancy. Data from United Kingdom and The United States of America show that more than 34710 pregnant have received the COVID-19 vaccine and are safe to use in pregnancy. Also there is evidence that severe COVID 19 disease occurred to pregnant mothers who

Table 1: Social factors and vaccine acceptance

Social Factors	Accepted n = 478		Non-Accepted n = 22	
	Number	% age	Number	% age
Religion of Participant				
Hindu	263	55.00%	12	54.50%
Christian	13	2.70%	1	4.50%
Muslim	202	42.30%	9	40.90%
Education of Participant				
Illiterate	19	4.00%	2	9.10%
Primary school	47	9.80%	1	4.50%
Middle school	19	4.00%	2	9.10%
High school	214	44.80%	9	40.90%
Intermediate/diploma	119	24.90%	4	18.20%
Profession or honours	14	2.90%	0	0.00%
Occupation of Participant				
Housewife	452	94.60%	20	90.90%
Elementary occupation	3	0.60%	0	0.00%
Machine operator	1	0.20%	0	0.00%
Craft and trade	4	0.80%	0	0.00%
Clerk	2	0.40%	0	0.00%
Skilled worker	11	2.30%	2	9.10%
Professionals	5	1.00%	0	0.00%
Socio-economic status of Participant				
Lower	384	80.30%	18	81.80%
Lower middle	22	4.60%	0	0.00%
Upper lower	52	10.90%	3	13.60%
Upper middle	20	4.20%	1	4.50%

Table 2: Distribution of study participants based on obstetric and medical co morbidities

Co Morbidities	Acceptors n=163(34.1%)		Non-Acceptors n=03(13.63%)	
	Number	% age	Number	% age
Previous LSCS	98	20.5%	3	13.6%
Severe Anemia	8	1.7%	0	0%
Pregnancy induced Hypertension	13	2.7%	0	0%
Gestational Diabetes Mellitus	11	2.3%	0	0%
Epilepsy	3	.6%	0	0%
Hypothyroid	20	4%	0	0%
Anemia	4	0.8%	0	0%
Obesity	1	0.2%	0	0%
VDRL Positive	2	0.4%	0	0%
HIV Positive	1	0.2%	0	0%
Herpes	1	0.2%	0	0%
Angioplasty	1	0.2%	0	0%

Table 3: Distribution of study participants based on Concerns for COVID-19 vaccination

Concern For Covid-19 Vaccination	Accepted n=478		Non-Accepted n=22	
	Number	% age	Number	% age
No concerns	387	81.0%	2	9.1%
Fever	43	9.0%	5	22.7%
Harm to baby	38	7.9%	13	59.1%
Fear to take during pregnancy	0	0.0%	1	4.5%
Fear of injection	3	.6%	1	4.5%
Fear of reaction	2	.4%	0	0%

Table 4: Reasons for non-acceptance

Reasons	Number
Fear of reactions	14
Fear of harming baby	14
Friends and family influence	12
Fear to take during pregnancy	02
Local health care worker influence	03
Fear of injection	02
Taken tetanus vaccine and does not want to take covid vaccine same day	01
Had recent herpes infection	01
Has anemia	01
Has diabetes	01

did not receive the Vaccine. Those who received 3 doses of vaccine have 88% less chance of severe disease with Omicron variant.[1] This can be now used to counsel pregnant mothers.

5.1. Reasons for non acceptance of vaccine

Most common reason reported in the literature is the fear of harming the fetus and fear of vaccine side effects which is similar to the finding in the present study.[19] In a French survey women expressed vaccination could be more risky than the COVID-19 disease itself.[10]

Worsening of MCH care in pandemic,[15] skeptical about the future vaccine availability in studies conducted early in pandemic,[16] doubt about the authenticity of vaccine,[20] rapid development of vaccine,[16] pharmaceutical gains, concerns about the unknown long term effect on the fetus, pregnant and lactating women were not included in vaccine trials,[12] lack of safety data in pregnancy, fear that they can get COVID 19 from the vaccine,[21] belief that vaccine was not necessary are the other reasons reported in literature.

5.2. Factors influencing vaccine acceptance

5.2.1. Socio demographic factors

Some studies report no significant association with vaccine acceptance.[22] In our study also there is no significant difference noted in acceptance and non acceptance with respect to sociodemographic factors like age, religion, education, occupation, and socioeconomic status (Table 1). However, some studies have shown an association as follows:-

1. **Age** – in a study among general population, older age are more likely to accept vaccine and think that it is their social responsibility. Also depends on the source of information about vaccines. The older population received information from reliable sources like the national news and government agencies whereas the younger population tends to depend on the social media for information which is less reliable.[13]
2. **Socioeconomic status (SES)** – Higher SES women are more likely to receive vaccine.
3. **Education status** - Educated women are more likely to accept vaccine.[12]
4. **Occupation** – Unemployed women are less likely to accept the vaccine.[23] Employed women where their workplace mandates them to take vaccine also showed increased acceptance.[18]
5. **Obstetric and medical factors** – Present study showed no significanrt association for factors like parity, gestational age, previous abortions, obstetric and medical co morbidities. Studies in literature have shown an association. Women in 2^{nd} and 3^{rd} trimester and women with pregnancy complications were more likely to accept vaccines.[24] Multiparous women had higher acceptance.
6. **Past history of COVID infection** – No association in present study. Regan AK and associates reported that these women are less likely to accept vaccine as they tend to believe they are protected from infection.[23]

6. Conclusion

Vaccine acceptance was high in this study (95.6%). There was no significant difference in the demographic, social. Obstetric and medical parameters among acceptors and non acceptors of vaccine. Fear of vaccine related complications and fear of harming the fetus were the general concerns expressed by 18.2% of pregnant women. Vaccine induced reactions followed by fear of harming the baby were the commonest reasons for non-acceptance of vaccine.

7. Ethics Approval

Ethical committee approval from the ethics committee of Bangalore Medical College and Research Institute was taken.

8. Source of Funding

No funding was taken.

9. Conflict of Interest

None.

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