



**Covid-19 Vaccine Acceptance in Pregnant Women Attending the
Outpatient Clinic at Bashair Teaching Hospital, Khartoum,
Sudan 2023**

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Abstract**Background:**

Shortly after the COVID-19 Pandemic multiple researches were focused on manufacturing and synthesizing a vaccine to overcome the disease. Pregnant women being at increased risk of critical illness and having high rates of ICU admission especially due to respiratory prone illnesses, and Sudan being a third world country have high illiteracy rates among females, hence it was essential to determine vaccine acceptance and hesitancy attitudes toward COVID-19 vaccines in pregnant women.

Methodology:

A prospective cross-sectional Hospital based study; it was conducted at Bashair Teaching Hospital which is a tertiary specialized university Hospital that falls under the administration of Al-Neelain University Faculty of Medicine. The sample size consisted of 240 pregnant women who attended the outpatient clinic during the study period. The collected data was analyzed using Statistical package for social sciences (SPSS) V26.

Results:

Out of all the 240 participants, 89 individuals (37%) expressed their willingness to receive the vaccination if it were advised for pregnant women. The primary reasons for denial were insufficient data about the safety of COVID-19 vaccines in pregnant individuals and concerns about potential harm to the developing fetus. There was a modest positive association observed between the acceptance of the COVID-19 vaccine and the number of children of school age. Pregnant women in the first trimester shown greater willingness to receive the COVID-19 vaccine compared to those in the second and third trimesters.

Conclusion:

The current study demonstrated a poor level of acceptance of COVID-19 vaccination among a group of pregnant women. The primary cause of reluctance was apprehension regarding the safety of the vaccine. An important step in developing effective immunization tactics during the ongoing epidemic is to identify the attitudes prevalent among priority groups.

Contribution to Literature

- There is limited evidence regarding the perception of pregnant women about the covid-19 vaccines.
- Public health policies and community awareness about the effectiveness and safety of the vaccines in pregnant women is warranted.

Introduction

Even though more than one year have passed since the start of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic, there is no specific treatment for the disease. More than 2 million deaths have been registered worldwide by February 2021, according to the WHO. Therefore, it is important to avoid infection. In the absence of an effective treatment for novel coronavirus disease 2019 (COVID-19), non-pharmaceutical interventions are the only disease control available. Social distancing, face masks, and personal hygiene are the most effective preventive measures, but maintaining these measures in the long term is impractical. As a result, as with other viral outbreaks in the past, herd immunity through vaccination is becoming the most effective method of eradication.(1,2).

Research was done to develop a vaccine against SARS-CoV-2 shortly after the disease was discovered (3). The success of any vaccine depends not only on its efficacy but also on its acceptance. But as WHO highlighted in 2019, vaccine hesitance poses a major threat to global health (4), Fear and mistrust of vaccines, underestimation of their value, and lack of access to vaccines are some of the main factors behind this hesitancy to get vaccinated (5).

Pregnant women are at increased risk of critical illness, ICU admission, and invasive ventilation compared with non-pregnant patients of the same age (6), (7), (8). Therefore, pregnant women are classified as a high-risk population for COVID-19 infection (9).

Even though pregnant women have not been included in any COVID-19 vaccine clinical trials to date (10), public health authorities, including the American College of Obstetricians and Gynecologists and the Society for Maternal-Fetal Medicine recommend that The American College of Obstetricians and Gynecologists (ACOG) recommends that all eligible persons aged 6 months and older, including pregnant and lactating individuals, receive a COVID-19 vaccine or vaccine series. Messenger RNA (mRNA) and Novavax COVID-19 vaccines are preferred over the Johnson & Johnson/Janssen (J&J/Janssen) COVID-19 vaccine for most individuals, including pregnant and lactating individuals, for primary series (11).

Limited information is available regarding COVID-19 during pregnancy. Insufficient understanding of the risks, benefits, and efficacy of vaccines; long-term consequences; and insufficient, faith in the current

healthcare system affects the perception and acceptance of vaccine. However, a thorough understanding of the variables influencing behavioral changes is necessary for effective pandemic management.

As the COVID-19 pandemic spreads around the globe, it's crucial to comprehend the pregnant women's attitudes toward COVID-19. In order to administer the COVID-19 vaccine when it is available and to develop a plan to overcome vaccine hesitancy, it is necessary to determine the prevalence of COVID-19 vaccine acceptance and reasons for rejection among pregnant women. The study aims to determine vaccine acceptance and hesitancy attitudes toward COVID-19 vaccines in pregnant women.

Research Methodology

Study Design/Setting

This is a prospective cross-sectional Hospital based study. It was conducted at Bashair Teaching Hospital which is a tertiary specialized university Hospital that falls under the administration of Al-Neelain University Faculty of Medicine. It is located at southern Khartoum state, Sudan. It represents one of the major health care service providers at the area alongside Ibrahim Malik Teaching Hospital, it serves a large population. The study took place in the period between January – April 2023.

Study Population

The study population were the pregnant women attending the outpatient clinic at the Bashair Teaching Hospital. All pregnant ladies presenting during the study period who agreed to participate in the study were included and non-pregnant ladies, pregnant ladies who already received the vaccine and those who refuse to participate were excluded from the study.

Sample Size:

Using the Solvin's equation for estimated population: $n = N / 1 + (N * e^2)$.

where n = sample size, N = estimated population size (600), e = margin of error (0.05).

Total sample size (n) = 240.

Sampling Technique:

Convenient sampling, whereby all pregnant ladies who attended the outpatient clinic during the study period were included until the sample size was reached.

Data Collection Methods and Tools:

Data was collected using interviewer administered questionnaire. The collected data was handled and cleaned from entering errors and duplication mistakes using Microsoft Excel 2016 then the cleansed data was analyzed using the statistical package for social sciences (SPSS) V.26 and displayed in the form of frequency tables.

Results

Demographic data:

The sociodemographic characteristics of the subjects are presented in Table 1. Out of the 240 pregnant women who filled out the questionnaire, 89 (37%) expressed their intention to receive the vaccine if it was advised.

Table 1: Sociodemographic data

Characteristic	Frequency
Age	27.99 ± 5.6
Gravidity	2.32 ± 1.37
Parity	1.01 ± 1.08
Gestational week	28.74 ± 8.88
Number of people in the household	3.13 ± 1.21
Number of school age children	0.46 ± 0.90
Co- morbidity	0.07 ± 0.28
Number of people in the household >65 year	0.03 ± 0.17
Income (month) (USD)	276.74 ± 112.99
High- risk pregnancy	92 (30.7)
Education Status	
None	4 (1.3)
Primary school	76 (25.4)
Secondary school	148 (49.3)
University	72 (24)
Career Housewife	231 (77)
Government official	46 (15.3)
Private sector	12 (4)
Worker	11 (3.7)
Husbands Career	
Worker	120 (40)

Government official	76 (25.3)
Merchant	63 (21)
Private sector	41 (13.7)

The acceptance rates of the COVID-19 vaccine and the replies of patients with high-risk and low-risk pregnancies are provided in Table 2 for comparison. No statistically significant distinction was observed between the high-risk and low-risk groups.

Table 3 provides a concise overview of the justifications for declining the COVID-19 vaccination. The primary concerns expressed by pregnant women who indicated their intention to decline the vaccine were; the absence of sufficient data about the safety of the COVID-19 vaccine specifically for pregnant individuals, and the potential risk of adverse effects on the developing fetus.

When we compared pregnant women in their first trimester with those in their second and third trimesters, we found that women in their first trimester showed a higher level of interest in obtaining the COVID-19 immunization compared to the others (P <0.05).

Table 2: Covid-19 vaccine acceptance rate

Questions	Answer	Want to be vaccinated (n = 89; 37%)	Do not want to be vaccinated (n = 151; 63%)	P value
Have you ever been vaccinated?	Yes	78 (87.6)	111 (73.5)	0.653
	No	11 (12.4)	40 (26.5)	
Have you been vaccinated in the last 5 years?	Yes	76 (85.4)	108 (71.5)	0.354
	No	13 (14.6)	43 (28.5)	
If the influenza vaccine was recommended, would you have vaccinated in the present pregnancy?	Yes	52 (58.4)	42 (27.8)	0.000
	No	37 (41.6)	109 (72.2)	
Have you been vaccinated for influenza in the present pregnancy?	Yes	5 (5.6)	3 (2)	0.363
	No	84 (94.4)	148 (98)	

Was the tetanus vaccine recommended in the present pregnancy?	Yes	68 (76.4)	116 (76.8)	0.821
	No	21 (23.6)	35 (23.2)	
Have you been vaccinated for tetanus in the present pregnancy?	Yes	63 (70.8)	102 (67.5)	0.533
	No	26 (29.2)	49 (32.5)	
Are you going to have your baby vaccinated after birth?	Yes	88 (98.9)	149 (98.7)	1
	No	1 (1.1)	2 (1.3)	
Do you have a high risk of COVID- 19 transmission at work?	Yes	7 (7.9)	12 (7.9)	0.958
	No	82 (92.1)	139 (92.1)	
Did you have close contact with a COVID- 19- positive person?	Yes	14 (15.7)	26 (17.2)	0.630
	No	75 (84.3)	125 (82.8)	
Did you care about hand hygiene during the pandemic?	Yes	89 (100)	151 (100)	
	No			
Did you care about social distancing during the pandemic?	Yes	89 (100)	151 (100)	
	No			
Did you care about using a mask during the pandemic?	Yes	89 (100)	151 (100)	
	No			
Did you have COVID- 19 in this pregnancy?	Yes	11 (12.4)	19 (12.6)	0.552
	No	78 (87.6)	131 (87.4)	
Have you heard about the COVID- 19 vaccine before?	Yes	88 (98.9)	149 (98.7)	0.901
	No	1 (1.1)	2 (1.3)	

Do you think that you have enough information about the COVID- 19 vaccine?	Yes	49 (55.1)	64 (42.4)	0.007
	No	40 (45.9)	87 (57.6)	
If the COVID- 19 vaccine were recommended for pregnant women, would you have vaccinated?	Yes	89 (100)	151 (100)	
	No			

Table 3: Reasons for refusing Covid-19 vaccine

Questions	Answer	Refuse to get vaccinated (n = 151)	P value
Afraid of injection	Yes	7 (4.6)	0.304
	No	144 (95.4)	
Vaccine will harm my body	Yes	27 (17.9)	0.027
	No	124 (82.1)	
Vaccine will cause COVID- 19 infection	Yes	14 (9.3)	0.495
	No	137 (90.7)	
Vaccine will harm my baby	Yes	63 (41.7)	0.076
	No	88 (58.3)	
COVID- 19 is not a serious disease	Yes	4 (2.6)	0.115
	No	147 (97.4)	
I have low risk for COVID- 19 infection	Yes	7 (4.6)	0.238
	No	144 (95.4)	
I believe that even if I am sick my baby and I will not encounter any negative events	Yes	1 (0.7)	0.500
	No	150 (99.3)	

I do not think the vaccine will work	Yes	41 (27.2)	0.000
	No	110 (72.8)	
Family members have hesitancy toward the COVID- 19 vaccine	Yes	27 (17.9)	0.000
	No	124 (82.1)	
Lack of data about COVID- 19 vaccine safety in pregnant women	Yes	99 (65.6)	0.628
	No	52 (34.4)	

Discussion

The current study demonstrated a poor level of acceptance of COVID-19 vaccination among a group of pregnant women. The vaccination acceptance group believed that they received sufficient information regarding the COVID-19 vaccine in comparison to the vaccine refusal group ($P < 0.05$). Media outlets served as their primary means of obtaining information. Accessible and widely available sources of information are crucial in disseminating comprehensive knowledge on the significance of vaccination to all segments of the population.

The individuals exhibited comparable levels of acceptability towards both influenza and COVID-19 vaccinations. Upon comparing the COVID-19 vaccine acceptance and refusal groups, it was shown that the refusal group had a lower level of acceptance towards the influenza vaccine. This outcome aligns with the phenomenon of vaccination hesitancy, which has been an escalating issue in the field of public health for the past 10 years (12). According to Özceylan et al., there was a 2% decline in the immunization rate in Turkey between 2016 and 2018 when compared to other developed countries. (13) The key factors contributing to vaccine reluctance were the underestimation of the vaccine's effectiveness and a lack of trust. The study revealed that vaccine refusal was mostly driven by a significant level of mistrust towards the vaccine, ranking it as the third most prevalent factor. (14, 15)

Administration of tetanus toxoid during pregnancy is a mandatory component of the health policy in Turkey and is being rigorously adhered to by obstetricians and family practitioners. Within the cohort of individuals involved in this investigation, the level of acceptability for the tetanus vaccine was much greater compared to both the COVID-19 and influenza vaccines. The acceptance percentages for tetanus immunization were comparable between the COVID-19 vaccine acceptance and refusal groups. Thus, pregnant women comprehend the beneficial impacts of tetanus vaccination on the health of both the mother and the newborn

by preventing the occurrence of infectious diseases and death. This case highlights the significance of actively pursuing vaccination as a strategic health policy, particularly in the context of a pandemic. (16, 17)

Multiple studies on the effectiveness and safety of vaccines were conducted during the H1N1 pandemic specifically targeting pregnant women. The findings indicated a reduction in influenza-related illness among pregnant patients and verified infection in their newborns. (18) Experts in women's health have advised that pregnant women should consult their healthcare professionals to discuss immunization choices (19, 20). It is crucial to emphasize that, thus far, no study has presented evidence of the COVID-19 vaccine being safe for fetuses and newborns when assessing the risks and benefits of vaccination (21).

The primary apprehension among those who refuse to take the COVID-19 vaccination is the absence of sufficient safety data pertaining to its use in pregnant individuals. Although the CDC has identified pregnant women as a high-risk group, no COVID-19 vaccine trials have specifically targeted this population. The Advisory Committee on Immunization Practices issued a recommendation endorsing the administration of the COVID-19 vaccination to pregnant women, even though they were not included in the clinical trials. (21, 22). High-risk pregnant women had a higher prevalence of anxiety in comparison to low-risk pregnant women (23).

Our hypothesis was that the amount of anxiety would influence the acceptability of the COVID-19 vaccine in pregnant women at high risk. However, our findings indicate that there is no discernible difference in COVID-19 vaccine acceptance between high-risk and low-risk groups. Significantly higher acceptance rates for influenza and tetanus vaccines were observed in the high-risk group as compared to the low-risk group. The absence of safety data about the COVID-19 vaccine's effects during pregnancy may have played a role in this discovery.

The study identified three primary reasons for refusal among respondents experiencing a low-risk pregnancy who declined vaccination: concerns about potential harm to their health, doubts about the vaccine's effectiveness, and hesitancy influenced by family members ($P < 0.05$). These findings suggest that the low-risk pregnant group exhibits a higher level of skepticism towards the COVID-19 vaccine, highlighting the need for targeted dissemination of accurate information to this demographic.

An affirmative link was observed between the acceptance of the COVID-19 vaccine and the quantity of school-age children residing in the family ($P < 0.05$). Households with school-age children reported increased anxiety around the potential for these children to transmit the virus to other household members. A recent meta-analysis has been released regarding the involvement of children in the transmission of SARS-CoV-2 within households. The analysis concluded that the risk of children acquiring the virus and transmitting it inside the

household is rather low. (24) There is still a lack of clarity and incorrect information regarding the transmission of Covid-19, and it is important to address this issue within communities. It is vital for the majority of people to receive the vaccine in order to achieve herd immunity.

Individuals in the early stage of pregnancy (first trimester) showed more interest in getting the COVID-19 vaccine compared to individuals in the later stages of pregnancy (second and third trimesters) ($P < 0.05$).

The primary advantages of the current study were its originality, forward-looking design, and multitude of study variables.

Ultimately, the advantages of the COVID-19 vaccination show great potential, and health authorities strongly advise its administration during pregnancy. This study represents the initial assessment of pregnant women's perspectives on the COVID-19 vaccine. Vaccine safety concerns pose a significant barrier to vaccination, particularly for recently produced vaccinations.

Conclusion

A group of pregnant women were interviewed for this study, and the results showed that they had a low level of acceptance of the COVID-19 vaccination. The most significant reason for the reluctance was the fear that the vaccine would not be safe to use. During the ongoing epidemic, one of the most important steps in developing effective immunization strategies is to identify the attitudes that are prevalent among priority groups.

Recommendations:

- Raising awareness about the importance of vaccination especially in high-risk groups.
- Educating pregnant women about the efficacy of the vaccines.
- Further studies with larger sample sizes.
- Including pregnant women in clinical trials to test for efficacy and safety of the vaccines

Ethics approval and consent to participate:

Ethical Approval from the ethical committee at the community department at faculty of medicine Al-Neelain University was obtained in accordance with the declaration of Helsinki.

Consent for publication: Not Applicable.

Availability of data and materials: All data generated or analyzed during this study are included in this published article.

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Authors Contribution:

Duaa, Douha and Safa have constructed the research idea, Mustafa collected the data and provided the formal analysis of the data, all authors contributed equally in terms of manuscript writing, data analysis and final manuscript preparation and editing.

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