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Factors affecting the acceptability of COVID-19 vaccine in the postpartum period

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ABSTRACT

Background: Coronavirus disease 2019 (COVID-19) has spread rapidly around the world, causing massive morbidity and mortality. Vaccination during puerperium protects both the mother and the newborn and is important to keep the pandemic under control.

Methods: Women who gave birth at Ankara City Hospital between February 11, 2021 and March 21, 2021 were included. Data were collected through a face-to-face questionnaire.

Results: We asked 412 postpartum women were surveyed about their acceptance of the COVID-19 vaccine; 137 (33.3%) of them wanted to be vaccinated, while 275 (66.7%) of them did not want to be vaccinated. Reasons for vaccination rejection; 209 (76%) of them stated that there was not enough information about the safety of the vaccine for the postpartum period, and 89 (32.4%) of them thought that the vaccine would not be effective for the disease. Three of the answers in the survey were found significantly different in high-risk pregnancy (HRP) group compared to low-risk pregnancy (LRP) group; 1) Having their babies to be vaccinated, 2) To be vaccinated if it will be recommended to the puerperal women, and 3) Feeling anxious about being infected by SARS-CoV-2 ($p < .05$).

Conclusions: Health authorities recommend the COVID-19 vaccine to breastfeeding mothers. However, a relatively low vaccination acceptance rate was observed in the present study. For newly developed vaccines, concern over vaccine safety is the biggest obstacle to vaccine administration. Therefore, the reasons that influence acceptance or refusal of vaccines are important for developing targeted communication strategies and healthcare policies.

Introduction

The Coronavirus disease 2019 (COVID-19) has spread rapidly, causing massive global morbidity, mortality, and social disruption.[1] There is currently no effective treatment for COVID-19. All countries are trying to control the spread of COVID-19 by implementing quarantines, social distancing, travel restrictions, and the wearing of face masks, but this has caused physical and psychosocial deterioration.

The use of vaccines to protect pregnant women and newborns from infectious diseases is very important in routine antenatal care. Despite this information, none of the COVID-19 vaccine trials included breastfeeding women.[2] There are limited data on the effects of COVID-19 infection on newborn and breastfed babies born from infected mothers.[3,4] However, major women's health authorities recommend receiving the COVID-19 vaccine during breastfeeding and the continuation of breastfeeding in recently vaccinated persons.[5] Vaccination in the postpartum period protects both the mother and the newborn.[6]

Vaccine hesitations and complex public health problems are the most important problems affecting the success of vaccination programs.[7] The main reasons for hesitation are mistrust of the vaccine, worries about possible harmful effects of the vaccine, and mistrust of the public health system.[7]

For the time being, our knowledge is still limited about attitudes of puerperal women against COVID-19 vaccination. We aimed to determine the knowledge and concerns of puerperal women and draw attention to this important topic.

Material and methods

This cross-sectional study was conducted on those who gave birth at Ankara City Hospital between February 11, 2021 and March 21, 2021. Data were collected by three maternal-fetal medicine fellows using face-to-face questionnaires. Written informed consent was obtained from all participants. The protocol applied was approved by the Ministry of Health of the Republic of Turkey and the Medical Research Ethics Department of the hospital (E2-21-119). The first part of the questionnaire assessed socio-demographic characteristics, obstetric history, and vaccination history; in the second part, perception, precautions, attitude, and anxiety about the COVID-19 pandemic were assessed; the third part assessed attitude and level of knowledge about the COVID-19 vaccine. SPSS 22.0 statistical package program was used for data analysis. While evaluating the study data, statistical methods such as descriptive frequency, percentage, mean, standard deviation, and median were used to compare quantitative data. Chi-

square (χ2) test was used for the comparison of categorical data. The compliance of the data to normal distribution was evaluated by Kolmogorov – Smirnow and Shapiro–Wilk tests. Spearman's correlation test was used to examine the relationships between variables. Values with a probability (p) less than .05 will be considered significant and there will be a difference between groups, higher values will be considered insignificant and there will be no difference between groups.

Results

In total, 412 puerperal women who completed the questionnaire were included in our study. The high-risk pregnancy (HRP) group (203; 49.3%) included women with gestational hypertension (64), gestational diabetes mellitus (64), threatened preterm labor (35), fetal anomalies (18), multiple pregnancies (8), preterm premature rupture of the membranes (5), gestational cholestasis (5), and intrauterine growth restriction (3). Socio-demographic features are shown in Table 1. Of the 412 puerperal women, 363 (88.1%) were breastfeeding. Forty-five (10.9%) puerperal women have gotten a COVID-19 infection. When asked if they would receive the vaccine if it were offered to puerperal women, 137 (33.3%) of them stated their intent for vaccination, while 275 (66.7%) of them said they would not be vaccinated. Answers to the questionnaire and comparisons of the acceptance and refusal groups of the COVID-19 vaccine are shown in Tables 2 and 3. Correlations between COVID-19 vaccine acceptance and socio-demographic features are shown in Table 4.

Discussion

In the present study, we found a low acceptance of the COVID-19 vaccine (33.3%) in the postpartum period. For those who accepted the vaccine, the idea that the vaccine would primarily protect the baby was an important factor and they also believed that they were adequately informed about the COVID-19 vaccine compared to those who refused vaccination. When we evaluated the reasons for vaccine refusal, the three most common answers were: 1) there was not enough reliable data about vaccine administration to puerperal women, 2) the vaccine could fail, and 3) the vaccine would harm the baby.

As the education level increases, access to up-to-date and scientific information about vaccination increases as well. The main sources of information were media resources. It is important to reach the whole society to explain the importance of vaccination. Therefore, informative resources should be used effectively. The perception that there was not enough information about the COVID-19 vaccine safety in the LRP group was significantly higher than in the HRP group. Mistrust of the COVID-19 vaccine was greater in women with LRP, indicating that informing them is a priority.

Several studies showed that the best approach to protect infants in the neonatal period is placental passive antibody transfer by vaccine efficacy. However, presently COVID-19 vaccine acceptance is still low in pregnancy.[8] That's why vaccination during the postpartum period becomes more important for newborn protection. Based on the mechanism of action of the vaccines, vaccine-induced immunoglobulin A protects the newborn against SARS-CoV-2 infection by passing into the breast milk.[9] There is no data showing that the vaccine may harm the neonate during lactation. The vaccine appears to be safe for women who are breastfeeding.[9] Breast milk contains nutrients, minerals, and vitamins that the baby needs, as well as many beneficial components, including immunoglobins, antiviral factors, cytokines, and leukocytes, thus reducing the risk of various diseases, including infection.[9] Fenizia et al. found evidence of COVID-19 RNA in breast milk and detected anti-SARS-Cov-2 IgM when they tested for the presence of specific anti-SARS-CoV-2 IgM and IgG.[10] In another study, it was

Table 1. Socio-demographic data.

Variables		(n = 412) N (%) mean ± SD median (min-max)
Age		28.69 ± 5.4
Gravidity		2 (1–6)
Parity		2 (0–5)
Gestational week at birth		38 (24–42)
Day after birth		2 (0–24)
Number of householder		4 (2–9)
Number of school kid		0 (0–4)
Number of person with co-morbidity		0 (0–2)
Number of >65 age householder		0 (0–2)
Income (month) (Turkish Lira)		3721.80 ± 2200.57
High Risk Pregnancy		203 (%49.3)
Delivery by cesarean		251 (%60.9)
Education Status	None	36 (%8.7)
	Primary school	51 (%12.4)
	Secondary school	205 (%49.8)
	University	120 (%29.1)
Career	Housewife	332 (%80.6)
	Government official	70 (%17)
	Private sector	5 (%1.2)
	Worker	5 (%1.2)
Husband Career	Worker	203 (%49.3)
	Government Official	128 (%31.1)
	Merchant	58 (%14.1)
	Private sector	23 (%5.6)

Table 2. Answers of the women who want to vaccinate, or don't want to vaccinate and who have high-risk pregnancy and low-risk pregnancy and comparing statistical significance of the answers.

Questions	Answers	Want to vaccinate n:137 (%33.3)	Not want to vaccinate n:275 (%66.7)	p-Value*	High risk pregnancy n:203(%49.3)	Low risk pregnancy n:209(%50.7)	p-Value*
Did you ever get vaccinated?	Yes	131 (%95.6)	270 (%98.2)	.129	192 (%94.6)	209 (%100)	**.001**
	No	6 (%4.4)	5 (%1.8)		11 (%5.4)		
Did you get vaccinated in the last 5 years?	Yes	123(%89.8)	250(%90.9)	.713	180 (%88.7)	193 (%92.3)	.203
	No	14(%10.2)	25(%9.1)		23 (%11.3)	16 (%7.7)	
Is the influenza vaccine recommended in this pregnancy?	Yes	2(%1.5)	4 (%1.5)	.997	4 (%2)	2 (%1)	.391
	No	135 (%98.5)	271 (%98.5)		199 (%98)	207 (%99)	
If the influenza vaccine recommended would you get vaccinated in this pregnancy?	Yes	65(%47.4)	94(%34.2)	**.009**	65 (%32)	94 (%45)	**.007**
	No	72(%52.6)	181(%65.8)		138 (%68)	115 (%55)	
Did you get the influenza vaccine in this pregnancy?	Yes						
	No	137(%100)	275 (%100)		203 (%100)	209 (%100)	
Is the tetanus vaccine recommended in this pregnancy?	Yes	123 (%89.8)	228(%82.9)	.064	172(%84.7)	179 (%85.6)	.793
	No	14(%10.2)	47(%17.1)		31(%15.3)	30 (%14.4)	
Did you get the tetanus vaccine in this pregnancy?	Yes	123(%89.8)	223(%81.1)	**.023**	172 (%84.7)	174 (%83.3)	.683
	No	14(%10.2)	52(%18.9)		31 (%15.3)	35 (%16.7)	
Do you prefer your baby to be vaccinated?	Yes	137(%100)	270 (%98.2)	.112	203 (%100)	204 (%97.6)	**.027**
	No		5 (%1.8)			5 (%2.4)	
Do you have a high risk of COVID-19 transmission at work?	Yes	16(%11.7)	17 (%6.2)	.053	13 (%6.4)	20 (%9.6)	.237
	No	121 (%88.3)	258 (%93.8)		190 (%93.6)	189 (%90.4)	
Did you have a close contact with COVID-19 positive person?	Yes	18(%13.1)	70(%25.5)	**.004**	39 (%16.3)	65 (%26.3)	**.013**
	No	119(%86.9)	205(%74.5)		170 (%83.7)	154 (%73.7)	
Do you give attention to hand hygiene while breastfeeding?	Yes	113(%100)	250(%100)		175 (%100)	188 (%100)	
	No						
Do you give attention to mask usage while breastfeeding?	Yes	104 (%92)	230(%92)	.991	162(%92.6)	172 (%91.5)	.704
	No	9(%8)	20(%8)		13 (%7.4)	16 (8.5)	
Do you prefer an isolated place while breastfeeding?	Yes	104 (%92)	237(%94.8)	.307	153 (%87.4)	188 (%100)	**.001**
	No	9(%8)	13(%5.2)		22 (%12.6)		
Do you air the room before breastfeeding?	Yes	102(%90.3)	234(%93.6)	.262	152 (%86.9)	184 (%97.9)	**.001**
	No	11(%9.7)	16(%6.4)		23 (%13.1)	4 (%2.1)	
Are you afraid of infecting the baby with COVID-19 while breastfeeding?	Yes	53(%42.7)	105 (%39)	.486	73 (%38)	85 (%42.3)	.388
	No	71(%57.3)	164(%61)		119(%62)	116(%57.7)	
Do you have palpitation, sweating, or feeling of tightness in the chest, when you think that you were infected by COVID-19?	Yes	13(%9.5)	32(%11.6)	.510	30 (%14.8)	15(%7.2)	**.013**
	No	124(%90.5)	243(%88.4)		173 (%85.2)	194(%92.8)	
Do you have fear of death, when you think that you were infected by COVID-19?	Yes	2(%1.5)	18(6.5)	**.024**	15(%7.4)	5(2.4)	**.018**
	No	135(%98.5)	257(93.5)		188(92.6)	204(97.6)	
Will you accept visitors to your home?	Yes	14(%10.2)	52(%18.9)	**.023**	13 (%6.4)	53 (%25.4)	**.001**
	No	123(%89.8)	223(%81.1)		190 (%93.6)	156 (%74.6)	
Did you get COVID-19?	Yes	11(%8)	34(%12.4)	.184	25 (%12.3)	20 (%9.6)	.372
	No	126(%92)	241(%87.6)		178 (%87.7)	189 (%90.4)	
Did COVID-19 treatment recommended to you?	Yes	2(%18.2)	11(%32.4)	**.026**	10 (%40)	3(%15)	**.016**
	No	9(%81.8)	23(%67.6)		15(%60)	17 (%85)	
Did you use recommended medicine for COVID-19?	Yes	1(%50)	8 (%72.8)	**.035**	8 (%80)	1 (%33.3)	**.013**
	No	1(%50)	3(%27.2)		2 (%20)	2 (%66.7)	
Did you hear the COVID-19 vaccine before?	Yes	135 (%98.5)	263 (%95.6)	.125	199 (%98)	199 (%95.2)	.115
	No	2(%1.5)	12(%4.4)		4 (%2)	10 (%4.8)	
Do you think that you have enough information about the COVID-19 vaccine?	Yes	56(%40.9)	40(%14.5)	**.001**	53 (%26.1)	43 (%20.6)	.184
	No	81(%59.1)	235(%85.5)		150 (%73.9)	166 (%79.4)	
Do you think COVID-19 vaccine will harm your baby while breastfeeding?	Yes	66(%48.2)	230(%83.6)	**.001**	142 (%70)	154 (%73.7)	.400
	No	71(%51.8)	45(%16.4)		61 (%30)	55 (%26.3)	
Do you think that the vaccine will protect your baby from COVID-19?	Yes	99(%72.3)	62(%22.5)	**.001**	109 (%53.7)	157 (%75.1)	**.000**
	No	38(%27.7)	213(%77.5)		94(%46.3)	52 (%24.9)	
If the COVID-19 vaccine will be recommended for puerperal women will you get vaccinated?	Yes	137 (%100)	275 (%100)		82 (%40.4)	55 (%26.3)	**.002**
	No				121 (%59.6)	154 (%73.7)	

Table 3. Reasons for the COVID-19 vaccine refusal?.

Questions	Answers	Not want to vaccinate n = 275(%)	High risk pregnancy n = 121(%)	Low risk pregnancy n = 154(%)	P-value*
Afraid of injection	Yes	7(%2.5)	7 (%5.8)		**.002**
	No	268(%97.5)	114(%94.2)	154(%100)	
The vaccine is harmful to my body	Yes	16(%5.8)	11 (%9.1)	5 (%3.2)	**.040**
	No	259(%94.2)	110(%90.9)	149(%96.8)	
The vaccine will cause COVID-19 infection	Yes	30(%10.9)	25 (%20.7)	5 (%3.2)	**.001**
	No	245 (%89.1)	96 (%79.3)	149(%96.8)	
The vaccine is harmful for my baby	Yes	65(%23.6)	41 (%33.9)	24 (%15.6)	**.001**
	No	210(%76.4)	80 (%66.1)	130 (%84.4)	
COVID-19 is not a serious disease	Yes	21(%7.6)	21(%17.4)		**.001**
	No	254(%92.4)	100(%82.6)	154(%100)	
I have a low risk to get COVID-19 infection	Yes	31(%11.3)	26(%21.5)	5 (%3.2)	**.001**
	No	244(%88.7)	95 (%78.5)	149(%96.8)	
I believe that even if I am sick, me and my baby will not encounter any negative events	Yes	19(%6.9)	9 (%7.4)	10(%6.5)	.759
	No	256(%93.1)	112(%92.6)	144(%93.5)	
I don't think that vaccine will work	Yes	89(%32.4)	36(%29.8)	53 (%34.4)	.412
	No	186(%67.6)	85 (%70.2)	101(%65.6)	
Family members do not agree with the COVID-19 vaccine	Yes	30(%10.9)	10 (%8.3)	20(%13)	.212
	No	245(%89.1)	111(%91.7)	134(%87)	
Lack of sufficient information about safety of COVID-19 vaccine in puerperium	Yes	209(%76)	76 (%62.8)	133(%86.7)	**.001**
	No	66 (%24)	45 (%37.2)	21(%13.6)	
I think the virus get mutation	Yes	41(%14.9)	21 (%17.4)	20(%13)	.313
	No	234(%85.1)	100(%82.6)	134(%87)	

*Chi-squared test is applied.

Table 4. Correlation between COVID-19 vaccine acceptance and socio-demographic features.

	Age	Gravidity	Parity	Gestational week at birth	Day after birth	Number of householders	Number of school kid	Number of person with comorbidity	Number of >65 age householder	Income (month) (tl)
r value**	.263	.223	.272	.076	-.056	.274	.179	.072	.000	.011
p value**	**.001**	**.001**	**.001**	.122	.256	**.001**	**.001**	.143	.999	.828

** Spearman's Correlation Analysis Test.

found that 80% of milk samples taken from mothers who had COVID-19 contained IgA, which was predominantly secretory IgA.[9] Those who refuse the vaccine should be informed about the potential benefits of breast milk to newborn babies.

The Advisory Committee on Immunization Practices (ACIP) recommends the COVID-19 vaccine to breastfeeding women when they meet the vaccination criteria based on priority groups, consistent with other major women's health authorities.[11–14] However, there are not enough safety data about vaccination during breastfeeding; this decision must be made after an individual risk-benefit assessment, which is also recommended by the Robert Koch Institute.[15]

Acceptance of influenza and COVID-19 vaccines were found to be similar in the present study. When the COVID-19 vaccine acceptance and refusal groups were compared, the acceptance group also expressed higher influenza vaccine acceptance. Ozceylan et al. reported a 2% decrease in vaccination rates in Turkey from 2016 to 2018, similar to that of developed countries.[16] This situation is consistent with the increasing vaccine hesitation in public health in recent years.[8,17] In the present study, mistrust of the COVID-19 vaccine was the most common reason for vaccine refusal. Therefore, healthcare providers should give detailed information about the effectiveness, safety, and benefits of vaccines.

In the present study, the acceptance rate of the tetanus vaccine during pregnancy was significantly higher than that of influenza and COVID-19 vaccines. Acceptance of the tetanus vaccine was significantly higher in the COVID-19 vaccine acceptance group than in the rejection group. A recent study showed that the vaccination rate was significantly higher in women who knew about the tetanus vaccine during pregnancy.[18] Also, the tetanus vaccination program during pregnancy is an important health policy in our country. It is crucial to explain the vaccines' positive effects on both maternal and newborn health to puerperal women for communal immunity achievement.

In the present study, we found that anxiety levels related to COVID-19 were higher in women with HRP compared to women with LRP. Acceptance of the COVID-19 vaccine was higher in women with HRP due to the increased level of anxiety. This group also did not want to receive visitors at home after delivery, which was consistent with high anxiety states. A recent study pointed out that the HRP population had high anxiety levels compared with the LRP population.[19] Also, Singh et al. pointed the psychological impact of the COVID-19 pandemic on pregnant women and recommended psychological support for their well-being. Anxiety might be an explanation for our findings and psychological support might improve vaccine acceptance in the post-partum period.[20]

In the present study, there was a positive and low-level relationship between the acceptance of the COVID-19 vaccine and the number of people living at home, and the number of school-age children. Participants expressed concern over COVID-19 transmission due to the high number of people living at home and school-age children. A new meta-analysis

found that the role of children in the household transmission of SARS-CoV-2 is very low.[21] There is much disinformation and confusion about COVID-19 transmission that must be clarified to improve acceptance of the COVID-19 vaccine in priority groups.

The prospective design of our study, as well as its novelty, large spectrum, and understandable questionnaire, are its main strengths. The main limitations were the relatively low number of the study population, and the survey was performed in the early postpartum period, which was too early for enough attachment between the mothers and their babies.

In conclusion, the benefits of the vaccine are promising and health authorities recommend the COVID-19 vaccine to breastfeeding mothers. However, relatively low vaccination acceptance rate was observed in the present study. For newly developed vaccines, concern over vaccine safety is the biggest obstacle to vaccine administration. The most common reason for vaccine refusal was hesitancy about vaccine safety. Therefore, the reasons that influence acceptance or refusal of vaccines are important to develop targeted communication strategies and healthcare policies.

Disclosure of potential conflicts of interest

No potential conflicts of interest were disclosed.

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