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Pregnant Women's Acceptance of COVID-19 Vaccination: An Examination of Attitudes, Perceptions, and Health Information Acquisition

Gebelerin COVID-19 Aşısı Kabulü: Tutum, Algı ve Sağlık Bilgisi Edinmelerine Yönelik Bir İnceleme

Yazışma Adresi
Correspondence Address

Özlem KAPLAN
Erciyes University,
Faculty of Health Sciences,
Nursing Department,
Kayseri, Türkiye
ozlem.kaplan@erciyes.edu.tr

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Ozlem KAPLAN
Erciyes University,
Faculty of Health Sciences,
Nursing Department,
Kayseri, Türkiye

Salime MUCUK
Erciyes University,
Faculty of Health Sciences,
Nursing Department,
Kayseri, Türkiye

Fulya CAGLI
Erciyes University,
Faculty of Medicine,
Department of Obstetrics and Gynaecology,
Kayseri, Türkiye

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ABSTRACT

Aim

Determining the impact of pregnant women's attitudes towards vaccination, perception of COVID-19 causes, and tendencies in acquiring health information from digital platforms on their vaccination status.

Methods

This descriptive and cross-sectional study was conducted between January 6 and February 28, 2022, and the sample consisted of 325 pregnant women. Data was collected using "Personal Information Form", "Attitudes Towards the COVID-19 Vaccine Scale", "Perception of Causes of COVID-19 Scale", and "Obtaining and Verifying Health Information from Digital Media Scale". Data analysis was done with the SPSS statistical program using independent two-sample t-test, chi-square test and, logistic regression analyzes to identify predictors. Statistical significance was accepted as $p<0.05$.

Results

While 51.3% of pregnant women stated that they had the COVID-19 vaccine; of those who were not vaccinated, 78.6% stated that they were not vaccinated because of the risk of harming their baby. It was determined that the vaccination rate of the pregnant women increased as the total score of the "Attitudes Towards the COVID-19 Vaccine Scale" and the "environmental environment sub-dimension" score of the "Perception of Causes of COVID-19 Scale" increased ($p<0.05$). The vaccination percentage of pregnant women in the third and second trimesters is higher than in the third trimester ($p<0.001$). The probability of not being vaccinated is 3.017 times higher in non-workers than in workers, and 2.596 times more in those who have COVID-19 than those who do not.

Conclusion

Vaccination preferences vary according to the characteristics of the individual. It is crucial to provide detailed and reassuring information to pregnant women about the vaccination to be sustainable.

Keywords

COVID-19, nursing, perception, pregnant, , vaccine

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ÖZET

Amaç

Gebelerin aşıya yönelik tutumları, COVID-19'un nedenleri algısı ve dijital ortamda sağlık bilgisi edinme eğilimlerinin COVID-19 aşısı olma durumlarına etkisinin belirlenmesidir.

Yöntem

Bu tanımlayıcı ve kesitsel çalışma 6 Ocak - 28 Şubat 2022 tarihleri arasında gerçekleştirilmiş olup, örneklemi 325 gebe oluşturmuştur. Verilerin toplanmasında Kişisel Bilgi Formu, "COVID-19 Aşısına Yönelik Tutumlar Ölçeği", "COVID-19'un Nedenleri Algısı Ölçeği" ve "Dijital Ortamda Sağlık Bilgisi Edinme ve Teyit Ölçeği" kullanılmıştır. Verilerin analizi SPSS istatistik programı ile bağımsız iki örneklem t testi, ki-kare testi ve yordayıcıların tespiti için Lojistik Regresyon analizleri ile yapılmıştır. İstatistiksel anlamlılık p<0,05 kabul edilmiştir.

Bulgular

Gebelerin %51.3'ü COVID-19 aşısı yaptırdığını belirtirken, aşı olmayan gebelerin %78.6'sı aşının bebeğine zarar verme riski nedeniyle aşı olmadıklarını ifade etmiştir. Gebelerin "COVID-19 Aşısı Tutum Ölçeği" toplam puanı ve "COVID-19'un Nedenleri Algısı Ölçeği" "çevre alt boyut" puanı arttıkça aşı olma oranının arttığı belirlenmiştir (p<0.05). Birinci ve ikinci trimesterde olan gebelerin aşı olma yüzdesi üçüncü trimesterde olanlardan daha yüksektir (p<0.001). Aşı olmama olasılığı çalışmayanlarda çalışanlara göre 3.017 kat, COVID-19 geçirenlerde ise geçirmeyenlere göre 2.596 kat fazladır.

Sonuç

Aşı tercihleri, bireyin özelliklerine göre değişmektedir. Aşılamanın sürdürülebilir olması için, gebelere aşılar hakkında güven verici bilginin verilmesinin önemli olduğu düşünülmektedir.

Anahtar Kelimeler

COVID-19, hemşirelik, algı, gebe, aşı

What is known about the field

- Respiratory complications caused by COVID-19 infection affect the health of both mother and child.
- Pregnant women are considered a high-risk population for COVID-19 infection.
- The tendency to receive the COVID-19 vaccine during pregnancy and the factors influencing this situation are important for the health of mother and child.

Contribution of the article to the field

- One out of every two pregnant women has not been vaccinated against the COVID-19 virus.
- For vaccination to be sustainable, it is essential that nurses provide pregnant women with detailed and reassuring information about the importance, benefits and possible side effects of vaccines.

INTRODUCTION

The Coronavirus (SARS-CoV-2) (COVID-19) infection, which affected the whole world in a short time, infected approximately 621 million people and caused the death of 6.5 million people (1,2). Like H1N1 infection, it is known that respiratory tract complications caused by COVID-19 infection adversely affect maternal and infant health. However, complications that may be caused by COVID-19 during and after pregnancy have not been fully revealed yet (3,4). Pregnant women experience the COVID-19 disease more severely than their non-pregnant peers and experience intensive care unit admission and invasiveness. Ventilation is more common (5). Therefore, pregnant women are classified as a high-risk population for COVID-19 infection (6,7).

Vaccines have been found to provide high levels of immunity in adults. It is emphasized that this level can only be reached with vaccines. Vaccination of pregnant women, which is of great importance for the future of society, is an important issue. However, the negative effects of the pandemic on health, society, and the economy have accelerated the work by making it necessary to skip some steps in the vaccine development process, which normally takes longer. As of December 2020, some vaccines have been approved for emergency use by global health organizations. However, the vaccine studies conducted in this process also do not have a pregnant arm, and the results obtained from pregnant animals are also limited (8). Nevertheless, international health organizations recommend that

pregnant women be vaccinated against COVID-19, considering the heavy losses of the pandemic (9). Similarly, the Ministry of Health in Türkiye recommends that pregnant women be informed and voluntarily vaccinated against COVID-19, and if possible, vaccination should be done after the first trimester (10). There is distrust of the COVID-19 vaccine in society and fear of its side effects. In the context of widespread skepticism and fear of side effects associated with the COVID-19 vaccine within society, misinformation, negative attitudes and perceptions play a significant role (11). One of the underlying reasons for this misinformation and fear may stem from false beliefs, propagated through various sources including digital platforms. With the vast amount of health information available online, pregnant women, like many others, may encounter misleading or inaccurate information regarding the COVID-19 vaccine and its potential risks (11,12). Misinterpretation of such information can lead to unwarranted concerns and hesitancy towards vaccination among pregnant women. Thus, addressing the influence of misinformation and the potential impact of digital health information on shaping attitudes and perceptions towards vaccination status becomes paramount in fostering informed decision-making and enhancing vaccine acceptance rates among pregnant women. In this context, the tendency to get the COVID-19 vaccine during pregnancy and determining the factors affecting this situation is important regarding the mother and baby's health. Assuming that the confusion experienced may make it difficult for pregnant women to decide whether to be vaccinated against COVID-19, this study was conducted to determine the effect of pregnant women's attitudes towards vaccination, their perception of the causes of COVID-19, and their tendency to seek health information in the digital environment on their COVID-19 vaccination status.

Research Questions

This study was designed to answer the following questions:

Regarding pregnant women,

- What is the status of vaccination for COVID-19?
- Does "Attitudes Towards the COVID-19 Vaccine" affect vaccination status?
- Does “Perception of Causes of COVID-19 Scale” affect vaccination status?
- Does “Obtaining and Verifying Health Information from Digital Media Scale” affect vaccination status?
- What are the other factors that influence vaccination status for COVID-19?

METHODS

Descriptive and cross-sectional study data were collected between 6 January and 28 February 2022. The study population consists of pregnant women who were followed up at the perinatology clinic of a university health research and application centre between the data collection dates. The study sample consisted of 325 pregnant women due to calculations with a 0.20 effect size, 0.05 margin of error, and 0.95 power. Assuming that there may be losses, the study was completed with 332 people. To calculate the power of the research, the mean score of the “Attitudes Towards COVID-19 Vaccine Scale” was used in the G* Power program, and the effect size was 0.84 due to the calculation. The working power was determined as 99% due to the post-power analysis made by taking effect size:0.84 n:332 and alpha:0.05. All pregnant women over 18 years of age were included in the study. Pregnant women with communication barriers who did not want to participate in the survey or did not want to give written consent, risky pregnancies, or had a health risk related to the baby were excluded from the study.

Data Collection Tools

Study data were collected with the “Personal Information Form”, “Attitudes Towards the COVID-19 Vaccine Scale”, “Perception of Causes of COVID-19 Scale”, and “Obtaining and Verifying Health Information from Digital Media Scale.”

Personal Information Form

This “Personal Information Form”, which includes 19 questions, includes questions about COVID-19, as well as items questioning the sociodemographic and obstetric characteristics of the pregnants (11,12,13).

Attitudes Towards the COVID-19 Vaccine Scale (ATV-COVID-19)

“Scale of Attitudes Towards the COVID-19 Vaccine Scale” developed by Broad et al. (2020). The scale consists of two sub-dimensions: “positive attitude” (items 1-4) and “negative attitude” (items 5-9). The items in the scale are answered with a five-point Likert scale. Items in the negative attitude sub-dimension are reverse-coded items. The score that can be obtained from the scale is a minimum of 9 and a maximum of 45. The scale's total score is obtained by dividing the total item scores in its sub-dimension by the number of items. High scores indicate that a positive attitude towards vaccines increases in the positive attitude sub-dimension, while a negative attitude decreases in the negative attitude sub-dimension. The Cronbach's Alpha value of the scale was 0.80 for the total scale score (14). In this study, Cronbach's Alpha values were determined as 0.86 for the total scale score.

Perception of Causes of COVID-19 Scale (PCa-COVID-19)

“Perception of Causes of COVID-19 Scale” Geniş et al. (2020) developed by. The scale consists of fourteen items and three sub-dimensions. In the “conspiracy” sub-dimension (first six items), people's conspiracy

beliefs, such as biological warfare and efforts to sell vaccines, are determined to cause the disease. In the "environment" sub-dimension (items 7-12), possible causes of the COVID-19 epidemic related to the social and physical environment, such as nutritional disorders, global warming, and environmental pollution, are questioned. In the "faith" sub-dimension (items 13-14), perceptions related to religious and spiritual beliefs are determined as the cause of illness. The scale is answered with a five-point Likert scale; no reverse-coded item exists. The scale's total score is obtained by dividing the total item scores in the sub-dimension by the number of items in that sub-dimension. The high scores indicate a high level of perception in the relevant sub-dimension (14). While the Cronbach's Alpha value of the total scale score (14), in this study, was determined as 0.87.

Obtaining and Verifying Health Information from Digital Media Scale

"Obtaining and Verifying Health Information from Digital Media Scale" was developed by Çömlekçi and Bozkanat (2021). The scale is used to determine users' behaviors to receive and confirm health information in the digital environment during the COVID-19 pandemic and identify the sources new media users frequently refer to get and confirm health information. There are 10 items and three factors on the scale. Factor 1 (items 1-3) represents "Web 1.0 and Obtaining Health Information". This factor shows whether people apply to non-interactive environments while searching for health information online. Factor 2 (items 4-6) represents "Web 2.0 and Digital Health Information Acquisition". This factor shows the status of people obtaining health information through social media platforms such as Instagram, YouTube, or Twitter. Finally, F3 (items 7-10) is the "Digital Confirmation" factor. It shows people's habits of confirming health information obtained in digital environments (15).
Factors respond with a 5-point Likert scale. The scale is not evaluated over the total score. The relevant items' averages are taken to calculate the factors' scores. The high sub-dimension scores indicate that people prefer obtaining health information from the appropriate source or that their digital health information confirmation habits increase. While factors can be evaluated separately in the scale, F1 and F2 can also be evaluated together (15). While the Cronbach's Alpha value of the scale was 0.75, it was determined as 0.82 in this study.

Data Collection

Before the study, a preliminary study was made to 10 pregnant women in order to determine the clarity of the survey questions. Pregnant women with preliminary study were not included in the study. The perinatology outpatient clinic was asked to participate by providing the necessary information. The questionnaire, which would take an average of ten minutes, was given to the mothers.

Ethical Approval

To carry out the research, T.C. Study approval (2021-09-29T10-39-35) from the Ministry of Health Scientific Research Platform and Erciyes University Clinical Research Ethics Committee approval (2022/39) from the Clinical Research Ethics Committee was received. Verbal and written consent was obtained from the individuals included in the study by explaining the purpose of the study. At every study stage, care was taken to comply with the Principles of the Declaration of Helsinki.

Statistical Analysis

The statistical package program evaluated the Statistical Package for Social Sciences (SPSS). Descriptive statistics were given as the number of units (n), percentage (%), mean ± standard deviation (x±ss). The normality of data of numerical variables Q - Q plot was evaluated with the measures of kurtosis and skewness. The homogeneity of variances was evaluated with Levene's test. Scale scores according to vaccination status were compared with t-tests in independent samples. In the comparison of categorical variables to vaccination status, the Pearson chi-square test was used. If the chi-square test result was significant, subgroup analyses were performed with the Bonferroni Corrected z test. Variables with $p < 0.25$ in univariate analyzes to determine the factors affecting the unvaccinated status included in the logistic regression analysis. The backward elimination Wald method was used. A p-value of <0.05 was considered statistically significant.

RESULTS

The distribution of vaccination status by obstetric and socio-demographic characteristics is shown in Table 1. The mean age of the included pregnant women was 28.38±5.58 years, with a mean gestational age of 24.68±9.13 weeks and an average gravidity of 2.33±1.32. Vaccination status differs statistically according to the gestational week. The rate of those who were not vaccinated in the 3rd trimester was statistically higher than in the 1st and 2nd trimesters ($p<0.001$). Vaccination status differs statistically according to working status. The rate of not being vaccinated in non-workers is statistically higher than in workers. Vaccination status does not vary statistically according to education level ($p= 0.479$). The rate of non-vaccination is statistically higher among those whose income is less than their expenses and those whose income is more than their expenses than among those whose income is equal to their expenses ($p=0.039$). The rate of non-vaccination is statistically higher for those who have had COVID-19 disease than those who have not ($p=0.001$).

Table 1. Distribution of vaccination status according to obstetric and socio-demographic characteristics

	n(%)	COVID-19 vaccination status				Test Statistics	
		Yes		No			
		n	%	n	%	χ^2	p
Age (mean±sd=28.38±5.58)							
18-26	127(38.3)	53	41.7	74	58.3	1.991	0.370
27-35	168(50.6)	84	50.0	84	50.0		
36 and above	37(11.1)	17	45.9	20	54.1		
Pregnancy week (mean±sd=24.68±9.13)							
1st trimester	48(14.5)	30	62.5	18	37.5 [a]	19,355	**<0.001**
2nd trimester	141(42.5)	77	54.6	64	45.4 [a]		
3rd trimester	143(43.1)	47	32.9	96	67.1 [b]		
Gravida(mean±sd=2.33±1.32)							
One	101(30.4)	55	54.5	46	45.5	3.916	0.141
Two	115(34.6)	48	41.7	67	58.3		
Three or more	116(34.9)	51	44.0	65	56.0		
Graduation							
Primary education	54(16.3)	24	44.4	30	55.6	1,471	0.479
Secondary education	143(43.1)	62	43.4	81	56.6		
Bachelor and above	135(40.7)	68	50.4	67	49.6		
Work							
Working	69(20.8)	44	63.8	25	36.2	10,583	**0.001**
Not working	263(79.2)	110	41.8	153	58.2		
Economical situation							
My income is less than my expenses	128(38.6)	53	41.4	75	58.6 [a]	6.472	**0.039**
My income is equal to my expenses	166(50.0)	88	53.0	78	47.0 [b]		
My income is more than my expenses	38(11.4)	13	34.2	25	65.8 [a]		
Presence of chronic disease							
Yes	47(14.2)	20	42.6	27	57.4	0.323	0.570
No	285(85.8)	134	47.0	151	53.0		
Worry about contracting COVID-19							
I don't worry	54(16.2)	23	42.6	31	57.4	0.601	0.741
I am not sure	39(11.8)	17	43.6	22	56.4		
I'm worried	239(72.0)	114	47.7	125	52.3		
COVID-19 disease status							
Yes	119(35.8)	41	34.5	78	65.5	10,618	**0.001**
No	213(64.2)	113	53.1	100	46.9		
A family member status of having COVID-19 disease							
Yes	181(54.5)	77	42.5	104	57.5	2.365	0.124
No	151(45.5)	77	51.0	74	49.0		
Death of a family member due to COVID-19							
Yes	33(9.9)	16	48.5	17	51.5	0.065	0.799
No	299(90.1)	138	46.2	161	53.8		
Number of tests for COVID-19							
Zero	157(47.3)	70	44.6	87	55.4	3,924	0.141
One	90(27.1)	37	41.1	53	58.9		
Two and above	85(25.6)	47	55.3	38	44.7		

%: Row percent, χ^2 :Pearson chi-square test, a and b superscripts indicate inter-category difference in unvaccinated subjects. Categories with the same letter are statistically similar.

Table 2 shows the distribution of the characteristics of pregnant women related to COVID-19. 41.2% of pregnant women had COVID-19 disease during pregnancy. While 51.3% of the pregnant women received the COVID-19 vaccine during pregnancy, 64.3% received two doses, and 69.5% preferred the Biontech vaccine. 78.7% of pregnant women stated that the reason for not vaccinating against COVID-19 is that "it may harm the baby."

Table 2. Distribution of COVID-19-related characteristics of pregnant women (n=332)

Features	*n* (%)
Status of having COVID-19 disease during pregnancy	
Yes	49 (41.2)
No	70 (58.8)
The status of being pregnant with the COVID-19 vaccine	
Yes	79 (51.3)
No	75 (48.7)
COVID-19 vaccine dose	
1 dose	44 (28.6)
2 doses	99 (64.3)
3 doses	11 (7.1)
COVID-19 vaccine received	
Sinovac	37 (24.0)
Biotech	107 (69.5)
Both of them	10 (6.7)
Reason for not vaccinating for COVID-19*	
Not trusting the vaccine	106 (59.5)
It may harm the baby	140 (78.7)
Can hurt me	58 (32.6)
Low protection	65 (36.5)
Don't think you're immune	23 (12.9)
Spouse does not want	77 (43.3)
No physician approval	10 (5.6)

*The pregnant women chose more than one reason.

According to Table 3, the positive, negative, and total scores of the "Attitudes Toward the COVID-19 Vaccine" of those who have not been vaccinated against COVID-19 are statistically lower than the vaccinated. The "environmental" score of the "Perception of Causes of COVID-19" of those who are not vaccinated for COVID-19 is statistically lower than those who have been vaccinated. Health information acquisition and confirmation scale scores in the digital environment are statistically similar in those vaccinated.

Table 3. Comparison of scale scores according to vaccination status

	COVID-19 vaccination status		Test Statistics	
	Yes	No	t	p
	mean±sd	mean±sd		
ATV-COVID-19				
Positive attitude score	3.74±0.99	3.24±1.12	4,250	**<0.001**
Negative attitude score	4.22±0.97	3.84±1.11	3.251	**0.001**
Total score	7.95±1.48	7.08±1.92	4,594	**<0.001**
PCa-COVID-19				
Conspiracy score	2.73±1.04	2.94±1.10	-1.805	0.072
Environmental score	2.97±0.91	2.76±0.86	2.165	**0.031**
Faith score	2.79±1.14	2.79±1.25	0.043	0.966
Total score	8.49±2.34	8.49±2.47	0.013	0.990
"Obtaining and Verifying Health Information from Digital Media Scale"				
F1-Web 1.0 and Health Knowledge Acquisition score	8.58±2.91	8.51±3.02	0.241	0.810
F2-Web 2.0 and Digital Health Information Acquisition score	6.33±2.91	6.78±3.15	-1.327	0.185
F3-Digital Confirmation score	12.72±4.42	11.954.61	1,549	0.122
F1+F2	14.92±4.92	15.28±5.25	-0.651	0.515

t : *t* test on independent samples, ATV-COVID-19: Attitudes Towards the COVID-19 Vaccine Scale, PCa-COVID-19 Scale: Perception of Causes of COVID-19 Scale

Table 4. Binary factors affecting COVID-19 vaccination status Logistics determination by regression analysis.

	Regression Coefficients*						
			Wald			95% CIfor *exp* (*β*)	
	β	*SE*	Statistics	*p*	Exp (*β*)	Lower	upper
Constant	2.921	0.739	15.625	<0.001	18,563		
Pregnancy Week							
3rd trimester					Ref		
2nd trimester	-0.978	0.270	13,151	**<0.001**	0.376	0.222	0.638
1st trimester	-1.312	0.378	12,045	**0.001**	0.269	0.128	0.565
Work							
Working					Ref		
Not working	1.104	0.310	12,665	**<0.001**	3,017	1.642	5,541
The state of having a COVID-19 infection							
No					Ref		
Yes	0.954	0.267	12,785	**<0.001**	2,596	1,539	4,380
ATV-COVID-19 Total	-0.328	0.074	19,568	**<0.001**	0.720	0.623	0.833
Environmental Score	-0.308	0.142	4,692	**0.030**	0.735	0.556	0.971

Variables Included in the Model: Pregnancy week, job, economic situation. The state of having a COVID-19 infection, testing for covid infection, a family member Status of having COVID-19 disease. Covid-19 Attitude Total. F2 digital . F3 digital . conspiracy perception. environmental perception
Model Summary : Hosmer and Lemeshov Test χ^2=4.136; p =0.845; Nagelkerke $R2$ = 0.252
Ref: Referance kategory

Table 4 shows the binary logistic regression analysis results of the factors affecting the vaccine.Variables with p<0.25 value were included in the binary logistic regression model in the comparisons in Tables 2 and 3 to determine the factors affecting the status of being vaccinated against COVID-19. Since the total score of ATV-COVID-19 in Table 3 is obtained from positive and negative attitude scores, only the total score is included in the model. Final factors affecting vaccination status Backward It was determined by the Wald method.

According to Table 4, the factors affecting vaccination status were determined as the week of gestation, employment status, COVID-19 status, the total score of the "ATV-COVID-19", and the environmental score of the "Perception of Causes of COVID-19 Scale". The probability of not being vaccinated in the first and second trimesters of pregnancy is statistically lower than those in the third trimester. Those who do not work are 3.017 times more likely to be unvaccinated than those who work. Those who have had COVID-19 are 2,596 times more likely to be unvaccinated than those who have had it. The probability of not being vaccinated decreases as the total score of ATV-COVID-19 and the environmental score of PCa-COVID-19 increase.

DISCUSSION

This study was aimed to determine the effect of pregnant women's attitudes towards vaccination, their perception of the causes of COVID-19, and their tendency to seek health information in the digital environment on their COVID-19 vaccination status. In a meta-analysis study, the estimated rate of those considering getting the COVID-19 vaccine among pregnant women varies between countries, but the general rate is 47%. This rate parallels the result obtained from our study (16,17). Reifferscheid et al.'s research in Canada showed that the vaccine acceptance rate was 57.5%, and the most common effect among pregnant women who did not get vaccinated was the concern for vaccine safety (18). In Türkiye, the Ministry of Health, Coronavirus Scientific Committee, Türkiye Medical Association, Association of Public Health Specialists, Maternal Fetal Medicine and Perinatology Society, and the Turkish Society of Gynecology and Obstetrics have advised pregnant women to vaccinate against COVID-19 (9,10,20-21). However, the reasons for the low vaccination rates are the lack of information and data on the disease, the lack of data on the safety of the vaccine in pregnant women, the effectiveness and side effects of the vaccines, and the chaos experienced worldwide due to the effective use of social media by anti-vaccine campaigns(11,12).

The vaccination rate in pregnant women varies according to trimesters. In the literature, the highest vaccination rate was in the 3rd trimester, while the lowest vaccination rate in our study was among 3rd-trimester pregnant women. This may be because the studies were conducted in different societies and between different pregnant groups (22,23). We think that the lower rate of vaccination in the 3rd trimester in our study may be due to the idea of postponing the vaccination until the postpartum period due to the closeness of the birth. The most common reason for not being vaccinated was 'it may harm the baby.' In the study of Goncu Ayhan et al., it was determined that approximately half of the pregnant women refused the COVID-19 vaccine because of the thought that it may have harmful effects on the fetus (24).

Again, unlike our study, Riad et al., in their research among pregnant and lactating women in Czechia, showed that the highest rate of vaccination was in pregnant women in the 3rd trimester and the lowest rate was in pregnant women in the 1st trimester. However, in this study, only 3.6 % of pregnant women (70.2%) who were optimistic about the vaccine had it during their pregnancy. In contrast, the others postponed the vaccine until after delivery. In the same study, similar to ours, the reason for not being vaccinated was the fear of harming the baby (25).

Other factors affecting vaccination status include employment, income-expenditure ratio, and COVID-19 disease. The results of our study are consistent with the literature and show that vaccine refusal rates are higher in low-income pregnant women (26,27). The vaccination rate among working pregnant women was statistically significantly higher. Further analysis determined that the probability of not being vaccinated in the unemployed was 3.017 times higher than in the workers. Dogan Yüksekol et al. (2022) study is the support this finding (28). Moreover, it has also been determined that the probability of not being vaccinated in people with COVID-19 is 2,596 times more than in those who have passed. This may be because having had the disease reduces the possibility of getting sick again.

When the COVID-19 attitudes scale was evaluated in our study, it was determined that the positive and negative attitude levels of the participants, the average score, and the total score average were higher in those who were vaccinated. High scores obtained from the negative sub-dimension of this scale are interpreted as positive attitudes towards the vaccine (14). It has been determined that the vaccination status of pregnant women with high Attitudes toward COVID-19 vaccine scores is high. Raising awareness among pregnant women about vaccines will make them more confident. With the scale for PCa-COVID-19 directed to pregnant women, the thoughts of the pregnant women about the factors causing the disease were evaluated. It measures the level of attribution that the coronavirus is a kind of conspiracy, that environmental reasons cause the disease, or that it is based on religious reasons. According to this survey, the environmental perception score of pregnant women who have been vaccinated is statistically significantly higher than those who have not been vaccinated. Aydın et al's study on the relationship between perceived causes of COVID-19 and fear of COVID-19 showed that the mean score of the conspiracy sub-dimension was higher (29).

In the context of widespread skepticism and fear of side effects associated with the COVID-19 vaccine within society, misinformation and misconceptions play a significant role. One of the underlying reasons for this misinformation and fear may stem from false beliefs, propagated through various sources including digital

platforms (12). However, in the study did not find a significant relationship between vaccination status and the scores obtained from the "Obtaining and Verifying Health Information from Digital Media Scale". Several factors may contribute to this result. Firstly, the scale might not have been sensitive enough to detect subtle variations in information-seeking behaviors or the quality of information accessed by pregnant women. Secondly, individual differences in information-seeking behaviors and digital literacy levels among pregnant women could have influenced the results (12,30). Some pregnant women may rely heavily on digital sources for health information, while others may prefer other sources such as healthcare providers or traditional media. Additionally, variations in the ability to critically evaluate and verify the accuracy of online health information may have impacted the relationship between digital health information seeking and vaccination status. Overall, while our study did not find a significant association between obtaining and verifying health information from digital media and COVID-19 vaccination status among pregnant women.

Limitations of the Study

In this study, quantitative data could have been supported by qualitative data to reveal the factors affecting vaccination status more clearly. For this purpose, focus group interviews or in-depth individual interviews could be conducted.

CONCLUSION

Vaccination preferences vary depending on gestational week, employment status, perceptions of potential effects of the vaccine on infant health, individuals' experiences with COVID-19, and their attitudes towards the vaccine. Based on the study's findings, nurses can significantly contribute to boosting COVID-19 vaccination rates among pregnant women.Strategies could include targeted educational programs to improve attitudes towards the COVID-19 vaccine, particularly addressing concerns related to safety and efficacy during pregnancy. Additionally, interventions should consider the association between employment status and vaccination status, aiming to provide access to vaccination for pregnant women who may not be actively employed. Given the higher likelihood of unvaccinated status among those who have had COVID-19, targeted outreach efforts should be made to ensure that this population receives accurate information about the benefits of vaccination, including potential protection against future infections. Furthermore, healthcare providers should prioritize offering vaccination to pregnant women earlier in their pregnancies, as indicated by the lower likelihood of unvaccinated status in the first and second trimesters compared to the third trimester.

Author contribution

Conceptualization: ÖK, SM, FÇ; Design: ÖK, SM, FÇ; Counselling: ÖK; Data Gathering/Processing: ÖK; Analysis/Interpration: ÖK, SM, FÇ; Literature Review: ÖK, FÇ; Writing: ÖK, SM, FÇ; Critical Review: SM, FÇ; Resources: ÖK, SM, FÇ; Materials: ÖK, SM, FÇ.

Conflicts of interest

The authors declare that they have no potential conflicts of interest related to the case report, the authorship, and/or the publication of this article.

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