

Fear of COVID-19 and Depression in Pregnant Women and New Mothers: A Cross-Sectional Study

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ABSTRACT

Purpose: The objective of this study was to assess the levels of COVID-19 fear and depression among pregnant women and new mothers.

Methods: The study is of a cross-sectional design. The study sample consisted of pregnant women and new mothers, aged 18 years or older, who had given birth within the past year and resided in a province in the Eastern Black Sea region (n = 259). Data were collected using a personal information form, the COVID-19 Fear Scale, and the Patient Health Questionnaire-9 (PHQ-9).

Results: Women's COVID-19 Fear Scale score mean was 15.28±6.42 and their PHQ-9 mean score was 9.27±5.31. Multiple linear regression analysis showed that the variables of PHQ-9 (p=0.000), educational background (p=0.029), occupational status (p=0.0015) and socioeconomic status (p=0.012) were statistically significant predictors of COVID-19 fear. All variables were found to explain the variance in COVID-19 Fear Scale scores to 16% (R² = 0.164).

Conclusion: The women in this study appeared to have a moderate level of COVID-19 fear. PHQ-9, educational background, occupational status, and socioeconomic status were predictors of women's COVID-19 fear. The pandemic period, which is a public health emergency, affects not only the physical health but also the psychological health of pregnant and post-partum women, a particularly vulnerable group. It is very important for midwives and nurses to effectively screen pregnant and post-partum women, particularly vulnerable group, for symptoms of depression and fear, and to provide them with accurate and up-to-date information to protect and improve their health.

Keywords: Depression, Fear of COVID-19, PHQ-9, Postpartum, Pregnant

ÖZET

Amaç: Bu çalışmanın amacı gebeler ve doğum yapan annelerde COVID-19 korku ve depresyon düzeylerini değerlendirmektir.

Method: Çalışma kesitsel tiptedir. Çalışmanın örneklemini, Doğu Karadeniz bölgesindeki bir ilde ikamet eden, 18 yaş ve üzeri gebe ve son bir yıl içinde yeni doğum yapmış anneler oluşturmuştur. Veriler kişisel bilgi formu, COVID-19 Korku Ölçeği ve Hasta Sağlık Anketi-9 (PHQ-9) kullanılarak toplanmıştır.

Bulgular: Kadınların COVID-19 Korkusu Ölçeği puan ortalaması 15,28±6,42 ve PHQ-9 ortalama puanı 9,27±5,31 idi. Çoklu doğrusal regresyon analizi, PHQ-9 (p=0.000), eğitim durumu (p=0.029), mesleki durum (p=0.0015) ve sosyoekonomik durum (p=0.012) değişkenlerinin COVID-19 korkusunun istatistiksel olarak anlamlı yordayıcıları olduğunu göstermiştir. Tüm değişkenlerin COVID-19 Korkusu Ölçeği puanlarındaki varyansı %16 (R² = 0.164) ile açıkladığı bulunmuştur.

Sonuç: Bu çalışmadaki kadınların COVID-19'a karşı orta düzeyde korkuya sahip oldukları görülmüştür. PHQ-9, eğitim durumu, mesleki durum ve sosyoekonomik durum, kadınların COVID-19 korkusunun yordayıcılarıydı. Bir halk sağlığı acil durumu olan pandemi dönemi, özellikle savunmasız bir grup olan hamilelerin ve yeni annelerin sadece fiziksel sağlığını değil aynı zamanda psikolojik sağlığını da etkilemektedir. Ebe ve hemşirelerin özellikle savunmasız bir grup olan gebeleri ve yeni anneleri depresyon ve korku belirtileri açısından etkin bir şekilde taramaları, sağlıklarını korumaları ve iyileştirmeleri için onlara doğru ve güncel bilgiler vermeleri çok önemlidir.

Anahtar Kelimeler: Depresyon, COVID-19 korkusu, PHQ-9, Postpartum, Gebe.

C OVID-19 first emerged in China and was declared a pandemic on March 11, 2019. Identified as a significant public health issue by the World Health Organization (WHO), COVID-19 has had a negative impact on the health of many people, potentially leading to death (1). Globally, the COVID-19 pandemic has disrupted healthcare systems, affecting physical and mental health, with significant psychological consequences reported across different populations, including pregnant women (2). The diseases and deaths caused by COVID-19 broadcasted on media, TV and press organs has taken a toll on many people psychologically (3). Moreover, with the closure of schools, workplaces and social spaces in the fight against the pandemic came social isolation, which led to negative psychological outcomes such as fear and depression (2).

The data available in the literature on complications caused by COVID-19 in pregnant women and newborns are limited. As the effects of COVID-19 infection on pregnancy remain unknown, pregnant women, new mothers and newborns are considered to be at high risk for COVID-19 (4, 5). Women's immune system is suppressed during pregnancy. This makes them more prone to COVID-19, which causes especially pregnant women and also women who are nearing or have recently given birth to experience greater fear and anxiety (6, 7). Pregnant women feel fear and anxiety not only for their own health but are worried about their unborn baby as well (8). It has been reported in the literature that pregnant women experience high levels of anxiety and that their COVID-19 fear is considerably correlated with depression (9, 10). In a study by Fan et al. (2021) conducted on pregnant and new mothers in China and Hong Kong, most of the participants reported that the thought of COVID-19 made them feel scared and anxious. The same study also reported that postpartum depression had increased with the outbreak of the COVID-19 pandemic (4). In a qualitative study investigating the experiences of pregnant women during the COVID-19 pandemic in Turkey, women reported that disruptions and limitations in the provision of health services had aggravated their fears about peripartum (prenatal, natal and postpartum) care. Further, it was pointed out that the restrictions and lockdowns brought by the COVID-19 pandemic affected the social support systems of pregnant women, causing

an increase in their anxiety (5). In Turkey, health policies introduced during the pandemic, such as restrictions on healthcare access and limited interaction with healthcare professionals, significantly impacted pregnant women's psychological well-being (5,6). Studies show that the psychological health of pregnant women has been greatly affected during the pandemic and that they experience at least one psychological problem such as depression, anxiety, and stress in addition to COVID-19 fear (4, 11).

Psychological evaluation of pregnant women and postpartum women in an international public health crisis is crucial (12). It is stated that in a pandemic, the psychological health of people is not emphasized as much as their physical health and the psychological consequences will persist in the long run (13). In this sense, it is of utmost importance that midwives and nurses conduct effective screenings for depression and fear symptoms and convey accurate and up-to-date information about COVID-19 in order to protect and improve women's psychological health in the peripartum period (4). Previous studies have put forth that studies should be conducted to examine the causes of anxiety and fear in women who were pregnant or gave birth during the pandemic (4, 14). Studies on pregnant women and new mothers will constitute a key component in actions to be taken to mitigate the adverse mental health consequences of a possible large-scale future pandemic and justify the preparedness that needs to be established for the provision of reliable healthcare services (4, 11). It is believed that determining the situation in different cultures will contribute to the literature. Against this background, this study aimed to investigate the levels of COVID-19-related fear and depression in pregnant women and new mothers aged 18 years or older, living in a province located in the the Eastern Black Sea (EBS) region.

Material and Methods

Study Design: This study was conducted using a cross-sectional design.

Setting and Participants: The study was carried out in a province in the EBS region. Researchers gathered the data through face-to-face interviews in family health centers between April and July 2022. Data collection

took an average of 15 minutes per participant. The study population consisted of pregnant women and new mothers, who gave birth in the last 1 year, aged 18 years or older, living in a province located in Turkey (N = 1922). Sample size was calculated by G*Power 3.1, which resulted in a minimum sample size of 198 persons with power = 0.80, alpha = 0.05, and d = 0.35 (4). The sample consisted of 259 women who had command of the Turkish language and consented to take part in the research.

Data Collection Tools: The researchers gathered the data by means of personal information form, COVID-19 Fear Scale and Patient Health Questionnaire-9 (PHQ-9).

Personal-information form: The researchers designed the personal-information form after conducting a thorough review of pertinent literature (4). The form consisted of 11 items about the participants' socio-demographic characteristics such as educational background and age as well as certain characteristics related to COVID-19.

COVID-19 Fear Scale: This scale was developed by Ahorsu, et al. (15) and its Turkish validity and reliability were tested by Bakioglu, et al. (16). The scale has a Cronbach's Alpha coefficient of 0.82. In our study, the scale has a Cronbach's Alpha coefficient of 0.89. Fear of COVID-19 Scale is a 5-point Likert scale and it consists of 7 items, none of which are reversed. The total score derived from all items on the scale indicates the extent of COVID-19-related fear experienced by the individual. Scores on the scale range from 7 to 35, with a higher score signifying a greater level of fear associated with COVID-19.

Patient Health Questionnaire-9 (PHQ-9): This questionnaire was developed by Kroenke, et al. (17) for the purpose of depression screening and its Turkish validity and reliability was tested by Sari, et al. (18). The scale has a Cronbach's Alpha coefficient of 0.84. In our study, the scale has a Cronbach's Alpha coefficient of 0.86. PHQ-9 is a 4-point Likert scale and it consists of 9 items. It assesses how often a patient has been bothered by depressive symptoms over the last two weeks. The scores that can be obtained on the scale are between 0 and 27. Scores ranging from 1 to 4 indicate 'very minimal' symptoms, 5 to 9 represent 'mild' symptoms, 10 to 14 indicate 'moderate'

symptoms, 15 to 19 suggest 'moderate to severe' symptoms, and scores between 20 and 27 indicate 'severe' symptoms of depression. Respondents with PHQ-9 ≥ 10 are considered to be in depression (17). The last item on the questionnaire is not included in the total score.

Ethical Considerations: Ethics committee approval (15.03.2022/Decision no:49-04) and institutional approval prior to the study. Participants were briefed about the study in compliance with the Declaration of Helsinki, and their consent was obtained through an Informed Consent Form. Only individuals who volunteered were included in the study.

Statistical Analysis: We conducted the data analysis using IBM SPSS version 25. The level of statistical significance was accepted as $p < 0.05$. Normal distribution of data was assessed using measures of skewness and kurtosis. Descriptive statistics including mean, standard deviation, range, frequency, and percentage were employed. Parametric tests such as the Independent Samples Test and One-Way ANOVA were utilized for data analysis. Multiple linear regression analysis (enter method) was carried out to identify predictors of COVID-19 fear. Prior to conducting the multiple linear regression analysis, multicollinearity and data normality were assessed.

Results

Mean age of the women participating in this research was 29.23 ± 4.61 (min=18, max=45). Some of the women's characteristics and a comparison of their Fear of COVID-19 Scale and PHQ-9 scores are given in Table 1.

A statistically significant difference was found between fear of COVID-19 and occupational status ($p=0.022$), received mental health support ($p=0.046$), and vaccinated against COVID-19 ($p=0.013$).

PHQ-9 showed a statistically significant difference between place of residence ($p=0.003$), received mental health support ($p=0.001$), vaccinated against COVID-19 ($p=0.042$) and lost a relative to COVID-19 ($p=0.043$).

Table 1: Some of the women's characteristics and a comparison of their fear of COVID-19 scale and PHQ-9 scores (n = 259)

	n (%)	Fear of COVID-19 Scale Mean \pm SD (Min-Max)	PHQ-9 Mean \pm SD (Min-Max)
Education			
Primary/Secondary School	73 (28.2)	15.69 \pm 6.36 (7-33)	9.68 \pm 6.02 (0-26)
High School	79 (30.5)	14.70 \pm 6.58 (7-28)	9.16 \pm 5.89 (0-27)
University or higher	107 (41.3)	15.42 \pm 6.36 (7-34)	9.07 \pm 4.26 (0-20)
Test p		0.491 0.612**	0.309 0.734**
Place of residence			
Rural	74 (28.6)	15.51 \pm 6.00 (7-27)	11.10 \pm 6.55 (0-27)
Urban	185 (71.4)	15.18 \pm 6.59 (7-34)	8.54 \pm 4.54 (0-24)
Test p		0.367 0.714*	3.088 0.003*
Occupational status			
Works	84 (32.4)	16.59 \pm 6.37 (7-34)	9.60 \pm 4.85 (0-23)
Does not work	175 (67.6)	14.65 \pm 6.36 (7-33)	9.11 \pm 5.52 (0-27)
Test p		2.300 0.022*	0.699 0.485*
Socioeconomic status			
Income less than expenses	81 (31.3)	13.91 \pm 5.88 (7-29)	10.03 \pm 5.10 (0-24)
Income equal to expenses	135 (52.1)	15.91 \pm 6.82 (7-34)	9.17 \pm 5.59 (0-27)
Income greater than expenses	43 (16.6)	15.88 \pm 5.79 (7-33)	8.13 \pm 4.62 (0-23)
Test p		2.712 0.068**	1.852 0.159**
Chronic disease			
Yes	240 (92.7)	15.09 \pm 6.37 (7-34)	9.26 \pm 5.06 (0-27)
No	19 (7.3)	17.68 \pm 6.66 (7-29)	9.36 \pm 7.97 (0-26)
Test p		-1.700 0.090*	-0.055 0.957*
Received mental health support			
Yes	19 (7.3)	18.10 \pm 7.54 (7-29)	13.94 \pm 5.08 (3-23)
No	240 (92.7)	15.05 \pm 6.28 (7-34)	8.90 \pm 5.15 (0-27)
Test p		2.003 0.046*	4.106 0.001*
History of COVID-19 infection			
Yes	112 (43.2)	15.95 \pm 6.58 (7-34)	9.20 \pm 5.14 (0-24)
No	147 (56.8)	14.76 \pm 6.26 (7-29)	9.32 \pm 5.45 (0-27)
Test p		1.477 0.141*	-0.182 0.856*
Vaccinated against COVID-19			
Yes	184 (71.0)	15.86 \pm 6.65 (7-34)	9.70 \pm 5.40 (0-27)
No	75 (29.0)	13.84 \pm 5.57 (7-29)	8.22 \pm 4.96 (0-21)
Test p		2.506 0.013*	2.039 0.042*
Lost a relative to COVID-19			
Yes	26 (10.0)	17.53 \pm 6.26 (7-29)	11.26 \pm 4.35 (3-20)
No	233 (90.0)	15.03 \pm 6.40 (7-34)	9.05 \pm 5.36 (0-27)
Test p		1.899 0.059*	2.032 0.043*

* T-test in independent groups

** One Way ANOVA

Abbreviations: PHQ-9, Patient Health Questionnaire-9.

Respondents with PHQ-9 \geq 10 are considered to be in depression. In this study, 40.9% (n=106) of the women were depressed. 39% (n=62) of pregnant women and 44% (n=44) of postpartum women were depressed (data

not shown). The women's Fear of COVID-19 Scale mean score was 15.28 \pm 6.42 and their PHQ-9 mean score was 9.27 \pm 5.31 (Table 2).

Table 2: Fear of COVID-19 scale and PHQ-9 mean scores (n = 259)

	Pregnant (n = 159)	Postpartum (n = 100)	Total	Test <i>p</i>
	Mean \pm SD (Min-Max)	Mean \pm SD (Min-Max)	Mean \pm SD (Min-Max)	
Fear of COVID-19 Scale	15.16 \pm 6.33 (7-34)	15.46 \pm 6.58 (7-29)	15.28 \pm 6.42 (7-34)	-0.354 0.724*
PHQ-9	9.01 \pm 5.24 (0-27)	9.68 \pm 5.41 (0-24)	9.27 \pm 5.31 (0-27)	-0.975 0.330*

* T-test in independent groups
Abbreviations: PHQ-9, Patient Health Questionnaire-9.

Table 3. Factors predicting women's fear of COVID-19

Independent Variable	Unstandardized Coefficients		Standardized Coefficients	t	p	95.0% CI	
	B	SE	β			Lower Bound	Upper Bound
(Constant)	13.841	3.508		3.946	0.000	6.932	20.750
PHQ-9	0.289	0.077	0.239	3.730	0.000*	0.136	0.441
Age	-0.040	0.090	-0.028	-0.439	0.661	-0.217	0.138
Status (ref: Postpartum)							
Pregnant	-0.085	0.873	-0.006	-0.097	0.922	-1.804	1.634
Education (ref: Primary/Secondary School)							
High School	-1.850	1.058	-0.133	-1.749	0.081	-3.934	0.233
University or higher	-2.607	1.190	-0.200	-2.190	0.029*	-4.951	-0.263
Place of residence (ref: Rural)							
Urban	-0.505	0.956	-0.036	-0.529	0.598	-2.389	1.378
Occupational status (ref: Does not work)							
Works	2.608	1.060	0.191	2.459	0.015*	0.519	4.697
Socioeconomic status (ref: Income less than expenses)							
Income equal to expenses	2.348	0.927	0.183	2.532	0.012*	0.522	4.174
Income greater than expenses	2.324	1.246	0.135	1.865	0.063	-0.131	4.779
Chronic disease (ref: Yes)							
No	-2.317	1.478	-0.094	-1.567	0.118	-5.228	0.595
Received mental health support (ref: No)							
Yes	0.908	1.547	0.037	0.587	0.558	-2.138	3.955
History of COVID-19 infection (ref: No)							
Yes	0.629	0.797	0.049	0.789	0.431	-0.941	2.200
Vaccinated against COVID-19 (ref: No)							
Yes	1.682	0.876	0.119	1.920	0.056	-0.044	3.409
Lost a relative to COVID-19 (ref: No)							
Yes	1.306	1.306	0.061	1.000	0.318	-1.266	3.878

Dependent variable: Fear of COVID-19

Abbreviations: CI, confidence interval; SE, standard error; β , standardized regression coefficient; PHQ-9, Patient Health Questionnaire-9; ref, reference.Notes: Durbin-Watson = 1.906; $F = 3.427$, $p < 0.001$; $R = 0.405$; $R^2 = 0.164$; Adjusted $R^2 = 0.116$; * = $p < 0.05$

The authors also examined the correlation between the Fear of COVID-19 Scale and PHQ-9 scores of women participating in the study. According to the results of Pearson's correlation test, a low level of positive linear correlation was found ($r=0.27$, $p=0.0001$). The higher the fear of COVID-19, the more severe the depression.

Table 3 provides an analysis of the variables/factors affecting women's fear of COVID-19. Multiple linear regression analysis was performed to predict fear of COVID-19 on the basis of these variables. Based on analysis results, it was determined that the model created was statistically significant ($F=3.427$, $p<0.001$). From among the variables included in the model, PHQ-9, educational

background, occupational status and socioeconomic status were found to be statistically significant predictors of fear of COVID-19 ($p < 0.05$). All variables were found to explain the variance in Fear of COVID-19 Scale scores to 16% ($R^2 = 0.164$).

Discussion

It is known that feelings of uncertainty and fear are common in any public health emergency (12). Likewise, the COVID-19 pandemic has caused especially pregnant women and new mothers to experience more fear (6, 7). This study was conducted to determine fear of COVID-19 and depression in pregnant women and new mothers. The objective of this study was to determine the levels of COVID-19 related fear and depression in pregnant women and new mothers.

Our study results showed that women experienced moderate fear of COVID-19 (Table 2), which supports the results of previous studies indicating that pregnant and/or new mothers experienced moderate fear of COVID-19 (4, 10, 14). As the effects of COVID-19 on pregnancy remain unknown, pregnant women and new mothers are considered to be at high risk for COVID-19 (4, 5). Women's immune system is suppressed during pregnancy. This makes them more prone to COVID-19, which can cause pregnant women and women who are nearing or have recently given birth to experience greater stress, anxiety and fear (6, 7).

Our study revealed a positive linear relationship between fear of COVID-19 and depression. The higher the fear of COVID-19, the more severe the depression. This result shows parallelism with the results of previous studies in the literature (4, 9). Times marked by uncertainty such as a pandemic can cause people to experience negative psychological issues such as depression and fear (2).

After performing a multiple regression analysis in our study to identify the variables that predict fear of COVID-19, the findings revealed that the variables predicting fear of COVID-19, it was found that the variables of PHQ-9 score, educational background, occupational status and socioeconomic status of women were statistically significant predictors of fear of COVID-19 ($F = 3.427$, $p < 0.001$). All variables were found to explain the variance in Fear of COVID-19 Scale scores to 16% ($R^2 = 0.164$).

Examining the variables that emerged as statistically significant predictors of fear of COVID-19 according to the regression analysis results, it became evident that the "PHQ-9" variable ranked first in the order of significance, suggesting that the more severe depression in women, the greater their fear of COVID-19. The research conducted by Fan, et al. (4) conducted on women is similar to our study in this regard. Further, our study results showed that approximately half of the women (40.9%) were depressed. It can be seen that the rate of depression found in our study is higher than the generally accepted pre-pandemic prevalence for perinatal depression of up to 20% (19, 20). When we look at previous studies in the literature, it is seen that the rate of depression in pregnant women and new mothers during the COVID-19 pandemic was found to range between 17.2% and 58.0% (4, 21-23). As the effects of COVID-19 on pregnancy remain unknown, pregnant women and new mothers are considered to be at high risk for COVID-19 (4, 5). The COVID-19 pandemic impacts not only physical health but also psychological well-being (2, 3). It has been observed that the psychological problems in pregnant and/or new mothers have increased with the outbreak of COVID-19 (9, 13, 23-25). The pandemic has led people to experience negative psychological issues such as depression and fear (2).

The variable ranking second in the order of significance was "educational background". Our study showed that the higher the education level of women, the lower their COVID-19 fear. In contrast to our study result, a study conducted during the pandemic period showed that the higher the level of education of pregnant women, the more severe their anxiety (26). This being said, studies show in general that pregnant women with a high education level experience less psychological problems such as fear and anxiety (24, 27-28). This discrepancy may be due to various factors such as cultural context, sources of information, or personal coping mechanisms. It is stated that low education level may cause fear as it can make it harder for individuals to inform themselves about COVID-19 and to understand how and to what extent this infection may affect their health (28). The more knowledge an individual has about COVID-19, the lower their fear of COVID-19, suggesting that education and knowledge are key to a healthier society (27).

The variable identified as the third most significant in terms of importance was "occupational status". Working women have more COVID-19 fear. Previous studies have shown that pregnant women working during the pandemic were more likely to experience psychological problems (12,

29). Fear is a common occurrence in times of uncertainty, such as a pandemic (12). It is believed that having to leave their homes where they feel safe, worrying about getting infected with COVID-19 and the financial stress caused by the pandemic create fear in working women (12, 29, 30).

It is known that along with the physiological effects, socioeconomic effects are another cause of fear of COVID-19 (27). The variable that ranked fourth in the order of significance according to our study was "socioeconomic status". According to our study results, women whose income was equal to expenses experienced more fear of COVID-19 than those whose income was less than expenses. Whilst it is known that the pandemic has had more negative effects on pregnant women, especially on those with low income (24), a study revealed that middle-income pregnant women were more likely to experience psychological problems (12). In their study, Wu, et al. (12) stated that women whose income was equal to expenses were at a greater risk due to the economic hardships and increasing unemployment caused by the pandemic.

This study has various limitations. The results of this research are limited to pregnant women and new mothers living in the province where the research was conducted. Due to the reliance on self-reported data from participants and the utilization of a cross-sectional study design, the research findings only reflect the circumstances at the time of data collection.

In summary, it was observed that the women involved in this study experienced a moderate level of COVID-19 fear. PHQ-9, educational background, occupational status, and socioeconomic status were predictors of and explained women's COVID-19 fear.

The pandemic period, a public health emergency, impacts not only physical health but also psychological well-being of pregnant women and new mothers, who are a particularly vulnerable group. In this context, it is very important for midwives and nurses to effectively screen women, who are at a particularly high risk, for depression and fear symptoms and provide them with accurate and up-to-date information in order to protect and improve their health. It is recommended that longitudinal studies on pregnant women and new mothers be conducted with a view to providing reliable healthcare services and ensuring preparedness against possible large-scale pandemics that may occur in the future.

Declarations

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Conflict of interest statement

The authors report there are no competing interests to declare.

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Data Availability Statement

The data can be obtained from the correspondent author by e-mail.

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