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Factors associated with antenatal depression during the COVID-19 (SARS-CoV2) pandemic: A cross-sectional study in a cohort of Turkish pregnant women

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Abstract

Purpose: To determine the effect of the COVID-19 pandemic on antenatal depression in Turkish pregnant women.

Design and Methods: In this cross-sectional study, data were collected from 497 pregnant women between May and July 2020 using the Edinburgh Depression Scale (EDS) to determine the effect of obstetrics history, fear of hospitalization, concerns about the pandemic, birth, and the health of both mother and infant, on antenatal depression during the COVID-19 outbreak in Turkey.

Findings: The general EDS mean score of the total group was determined as mean 13.70 ± 6.22, which was higher than the critical cutoff point of 13. According to the multiple linear regression model applied in the study, the best predictive variables for the mean EDS score were determined to be concerned about completing a healthy pregnancy ($r = -0.45$), social media and news programs related to COVID-19 increasing levels of concern ($r = -0.31$), fear of hospitalization as the birth approaches ($r = -0.45$), having bad dreams during the COVID-19 pandemic ($r = -0.41$), the request for an elective cesarean delivery because of fear of catching COVID-19 ($r = -0.40$), fear of breastfeeding the infant ($r = -0.45$), and concerns that their own health would be negatively affected because of the pandemic ($r = -0.39$), and these variables affected the mean EDS score negatively (total variance 40.5%, $R = 0.642$).

Practical Implications: The COVID-19 pandemic has created an urgent need to implement specific antenatal programs to promote the psychological health of pregnant women and reduce antenatal depression during this or similar crises.

KEYWORDS

COVID-19 pandemic, outbreak, perinatal depression, perinatal mood disorder, SARS-CoV-2

1 | INTRODUCTION

SARS-CoV-2 virus infection causes COVID-19 disease which requires global emergency intervention, as it can cause acute respiratory tract infections, and may progress as asymptomatic, mild, or severely symptomatic.[1,2] In Turkey, the first COVID-19 case was announced by the Ministry of Health on March 10, 2020, and the first death related to COVID-19 occurred on March 15, 2020.[3] Although there is insufficient evidence about the effect of COVID-19 on pregnancy, it is known that in pregnancy the immune system is partially suppressed rendering pregnant women defenseless against viral infections.[4,5] Therefore, pregnant women are thought to be a

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group requiring special care, and which can be examined during the pandemic.[6] Despite the statements that the general isolation precautions taken for adults are valid and sufficient for pregnant women, the anxiety levels of pregnant women have been reported to have risen greatly due to the rapid worldwide spread of COVID-19 infection, which is easily transmitted from person to person.[5] In this crisis environment, the concerns experienced by pregnant women include the long quarantine period, lockdowns and curfews, the fear of coming into contact with a COVID-19 carrier, the fear of infection, hopelessness, boredom, concerns about food shortages, lack of information, economic problems and stigmatization.[7–9] As there is a risk to their own and the infant's health, pregnant women may have a tendency to feel sad, isolated, fearful, stressed, anxious, and experience depression.[5,6]

Perinatal mental health problems, manifesting most as perinatal depression may be a significant public health problem throughout the world during the COVID-19 pandemic.[10] Sadness or a negative mood may be seen together with antenatal depression, which is characterized by symptoms such as hopelessness, sleep disorders, changes in appetite, suicidal thoughts, feelings of worthlessness, and loss of interest and pleasure, which can have destructive outcomes for the pregnant woman and the family.[11] These mental health problems can cast a shadow on the excitement of pregnancy, which is one of the most important developmental periods of a woman's life,[12] and the woman may even have to struggle with depression after the birth.[11,13] It has been reported that antenatal depression can lead to negative obstetric and fetal outcomes such as low birthweight, preterm birth, retarded intrauterine development, and delayed mother-infant bonding.[13–15]

In the past decade, studies of antenatal depression have mainly focused on elucidating the underlying causes.[16] Due to the cultural and socioeconomic environment in various developing regions of the world, several unique factors contribute to antenatal depression. Antenatal depression has been found to be associated with domestic violence,[17] low social support,[18] social conflict,[19] low income,[11] antenatal anxiety,[16] unwanted pregnancy,[20] history of depression,[19] and previous prenatal loss.[16] Social support may act to directly reduce the risk of depression by promoting positive mood states and improving health-related behaviors, or it may only protect against depression in individuals under stress.[18]

To the best of our knowledge, the current study is the first such research in Turkey. The aim of this study was to determine the effect of the COVID-19 pandemic on antenatal depression symptoms in Turkish pregnant women.

The research questions were:

- Is there a statistically significant relationship between obstetric history and antenatal depression during the COVID-19 pandemic?
- Is there a statistically significant relationship between the various anxieties and fears of pregnant women due to COVID-19 and antenatal depression?
- What are the most predictive variables for antenatal depression in Turkish pregnant women during the COVID-19 pandemic?

2 | METHODS

2.1 | Participants and sampling

The research data were collected from 497 pregnant women between May and July 2020. As pregnant women in Turkey must remain at home during the COVID-19 pandemic, the data were collected as an online survey comprising a Personal Information Form and the Edinburgh Depression Scale (EDS). A link for the online questionnaire was sent to pregnant women who were attending university hospitals in the Mediterranean region of Turkey for antenatal follow-up. Patients included in the study were those who were aged > 18 years, literate in Turkish, had no psychiatric disease, and were willing to participate in the study. Patients were excluded if they had been diagnosed with COVID-19 or had suspected positivity. Researchers sent the online questionnaire to 650 pregnant women and the response rate was 76%.

2.2 | Instruments

The research data were collected as an online survey comprising a Personal Information Form and the EDS. The Personal Information Form was developed by the researchers and consisted of descriptive items questioning age, educational level, gestational week, and parity, and questions of how COVID-19 had affected the pregnancy such as fears of not completing the pregnancy, concerns about maternal and infant health, fear of going to the hospital during the COVID-19 pandemic, and changes to the frequency of attending antenatal check-ups. As the researchers could not access any specific questionnaire about pregnancy and COVID-19, some questions were asked in the Personal Information Form such as: “Do you fear giving birth in hospital during the COVID-19 pandemic?,” “What is the effect of the COVID-19 pandemic on the frequency of attending antenatal check-ups?,” “Do you fear breastfeeding the infant because of the COVID-19 pandemic?,” “Do you have concerns that the infant's health will be negatively affected by the COVID-19 pandemic?,” “Do you have concerns that your own health will be negatively affected by the COVID-19 pandemic?,” “Have you changed your lifestyle and nutritional habits to strengthen your immune system during the COVID-19 pandemic?,” “Do you think social media and news related to the COVID-19 pandemic have increased your levels of concern?,” “Have you been having bad dreams during the COVID-19 pandemic?,” “Will you request an elective cesarean because of the fear of catching COVID-19?,” and “Do you intend to restrict visitors after the birth?”

Depressive symptoms of the pregnant women during the pandemic were investigated using the EDS, which is widely used throughout the world.[5,19] The EDS[21] was first developed to determine postnatal depressive symptoms but has recently been used to screen for depressive symptoms during pregnancy.[13,19] Validity and reliability studies of the scale in Turkish were conducted by Aydın et al.[22] The EDS is a self-reported scale consisting of 10 items

with 4-point Likert responses. The total score ranges from 0 to 30, with a cutoff point of 13 for high risk of depression that requires clinical follow-up.[21]

2.3 | Statistical analysis

Data obtained in the study were analyzed statistically using SPSS version 22.0 software (IBM Corpn. 2013). To determine the risk of antenatal depression, the cutoff value of 13 in the EDS was accepted.[21,22] Conformity of the depression scores to normal distribution was assessed with the Shapiro–Wilk test, then bivariate analysis was applied to determine differences between the groups. In the bivariate analysis, to determine the mean score of two groups of independent variables, the independent samples *t*-test was applied, and when there were more than two groups, one-way ANOVA (posthoc Scheffe test) was used. Homoscedasticity was evaluated using the Levene test.

To determine the sociodemographic, emotional, and health factors affecting the depression symptoms, a multiple linear regression model was used. The R^2 was calculated. Estimates of the model parameters and standard errors for these estimates were calculated. The independent associations of prespecified factors with antenatal depression were examined with proportional odds multivariable regression analysis. To determine whether antenatal depression was associated with personal and pandemic-related features, the odds ratio (OR) with 95% confidence interval (95% CI) of antenatal depression was calculated for each variable with univariate statistics (unadjusted OR). Parameter estimates were exponentiated to obtain ORs for higher satisfaction scores together with the corresponding 95% CI. Statistical significance was concluded when the 95% CI did not include unity ($p < 0.01$). To avoid the inclusion of variables with a correlation in the model, common linearity between the factors was analyzed. Models were formed using backward step regression by including variables observed to have a significant relationship in the bivariate analysis.

A value of $p < 0.05$ was accepted as statistically significant.

2.4 | Ethical considerations

Approval for the study was granted by the Regional Committee for Medical and Health Research Ethics in Turkey (ref. nr: 02/2020-08, date: April 29, 2020). Each participant provided online voluntary written informed consent. The study was conducted in accordance with the principles of the Declaration of Helsinki.

3 | RESULTS

3.1 | Descriptive statistics

The sample characteristics are shown in Table 1. An evaluation was made of 497 pregnant women, 40.8% aged 28–32 years old, and 44.7% in the range of 13–27 gestational weeks. Of the whole sample, 16.7% were in the first trimester, 44.7% in the second trimester, and 38.6% in the third trimester. Of the total 497 pregnant women, 51.5% were university graduates, 46.1% were primiparity, and 45.5% already had children (Table 1).

TABLE 1 Descriptive information of the pregnant women ($n = 497$)

Sociodemographic variables	Number (%)
Age (years)	
18–22	29 (5.8)
23–27	157 (31.6)
28–32	203 (40.8)
33–37	78 (15.7)
38–42	30 (6.0)
Gestational week	
0–12	83 (16.7)
13–27	222 (44.7)
28–40	192 (38.6)
Trimester	
1	83 (16.7)
2	222 (44.7)
3	192 (38.6)
Educational level	
Primary school	64 (12.9)
High school	145 (29.2)
University	256 (51.5)
Postgraduate	32 (6.4)
Previous pregnancy	
Yes	268 (53.9)
No	229 (46.1)
Children	
Yes	226 (45.5)
No	271 (54.5)

Various effects of the COVID-19 pandemic on Turkish pregnant women are shown in Table 2. Concerns about not completing a healthy pregnancy because of COVID-19 were expressed by 60.4%, 63.9% of the respondents stated that they were fearful of giving birth in a hospital during the COVID-19 pandemic, and 61.4% reported that they had reduced the frequency of attending antenatal check-ups because of COVID-19.

The majority of the pregnant women were affected negatively by concerns about their own and their infant's health because of the COVID-19 pandemic. Of the total sample, 57.9% stated that they had improved their lifestyle and nutritional habits to strengthen their

TABLE 2 Descriptive information of the effect of the COVID-19 pandemic on the pregnant women

Variables	*n* (%)
Concern about completing a healthy pregnancy	
Yes, I am very concerned	300 (60.4)
I am partially concerned	178 (35.8)
I am not concerned	19 (3.8)
Fear of giving birth in hospital during the COVID-19 pandemic	
Yes	316 (63.6)
Partial	147 (29.6)
No	34 (6.8)
The effect of the COVID-19 pandemic on the frequency of attending antenatal check-ups	
Decreased	305 (61.4)
Increased	18 (3.6)
Partial effect	110 (22.1)
Not affected	64 (12.9)
Fear of breastfeeding the infant because of the COVID-19 pandemic	
Yes	184 (37.0)
Partial	174 (35.0)
No	139 (28.0)
Concerns that the infant's health will be negatively affected by the COVID-19 pandemic	
Yes	325 (65.4)
Partial	122 (24.5)
No	50 (10.1)
Concerns that pregnant woman's own health will be negatively affected by the COVID-19 pandemic	
Yes	352 (70.8)
Partial	116 (23.3)
No	29 (5.8)
Changing to lifestyle and nutritional habits to strengthen immune system in COVID-19 pandemic	
Yes	288 (57.9)
Partial	119 (23.9)
No	90 (18.1)
Effect of social media and news related to the COVID-19 pandemic on increased levels of concern	
Yes	384 (77.3)
Partial	95 (19.1)
No	18 (3.6)
Having bad dreams during the COVID-19 pandemic	
Yes	202 (40.6)
No	295 (59.4)
Request for an elective cesarean because of the fear of catching COVID-19	
Yes	101 (20.3)
Partial	83 (16.7)
No	313 (63.0)
Planning to restrict visitors after the birth	
Yes	421 (84.7)
Partial	63 (12.7)
No	13 (2.6)

immune system during the COVID-19 pandemic, and 77.3% reported that social media and news programs related to COVID-19 increased their levels of concern. The vast majority of the study respondents (84.7%) stated that they would restrict visitors after birth (Table 2).

3.2 | Factors associated with antenatal depression

The general EDS mean score was determined as mean 13.70 ± 6.22. As the pregnancy trimester increased, so the mean antenatal depression score was determined to increase ($F = 4.069$, $p < 0.02$). When the examination was made of between which groups there was a difference, the antenatal depression score of those in the third trimester ($\bar{X} = 14.69$, $SD = 6.40$), was determined to be higher than the score of those in the second trimester ($\bar{X} = 13.16$, $SD = 5.92$). The antenatal depression risk scores of those in both trimesters were higher than the critical cutoff point of 13. According to the bivariate analysis, the EDS mean score increased with the factor of already having children ($t = 2.134$, $p = 0.033$) and it was not observed to be affected by a history of pregnancy.

As concerns increased related to completing a healthy pregnancy during the COVID-19 pandemic, so the mean EDS score was determined to increase ($F = 67.07$, $p < 0.0001$). The mean EDS score of those with concerns about completing a healthy pregnancy was higher than the score of those with no or few concerns ($\bar{X} = 16.01$, $SD = 5.43$). The mean EDS score of the patients with concerns about completing a healthy pregnancy was above the cutoff point of 13. The mean EDS score of the pregnant women who were fearful of giving birth in the hospital during the COVID-19 pandemic was higher ($\bar{X} = 15.31$, $SD = 5.97$) than the scores of those who were partially afraid ($\bar{X} = 11.42$, $SD = 5.82$) and of those who were not afraid ($\bar{X} = 8.59$, $SD = 4.05$) ($F = 36.61$, $p < 0.0001$).

The mean EDS score varied significantly according to the frequency of attending antenatal check-ups, as it was affected by the COVID-19 outbreak ($F = 9.11$, $p < 0.0001$). The mean EDS scores of those who increased and decreased the frequency of attending antenatal check-ups were above 13. According to the results of the Scheffe test, which was applied to determine from which group the difference originated, the mean EDS score of those who reduced the frequency of attending antenatal check-ups ($\bar{X} = 14.65$, $SD = 5.91$) was higher than the score of those who partially reduced attendance ($\bar{X} = 12.37$, $SD = 5.99$) and of those who did not change their frequency of antenatal check-ups ($\bar{X} = 10.97$, $SD = 6.52$). The depression scores of the pregnant women who increased the frequency of attending antenatal check-ups were determined to be higher ($\bar{X} = 15.56$, $SD = 7.59$) than the scores of the patients who did not change the frequency of attendance.

The mean EDS score of the pregnant women who reported being frightened or had partial fear of breastfeeding the infant because of COVID-19, was over 13. Thus, the mean EDS score was seen to significantly change depending on the fear of breastfeeding the infant ($F = 62.04$, $p < 0.0001$). The mean EDS score of the pregnant women with a great fear of breastfeeding because of the pandemic ($\bar{X} = 16.97$, $SD = 5.36$) was determined to be higher than the score of those who were partially afraid ($\bar{X} = 13.16$, $SD = 5.53$) and of those who were not afraid ($\bar{X} = 10.06$, $SD = 5.90$). The mean EDS scores of the pregnant women with concerns that their own and their infant's health would be affected by the COVID-19 pandemic ($F = 39.31$, $p < 0.0001$) were determined to be higher ($F = 43.16$, $p < 0.0001$).

A statistically significant difference was determined in the mean EDS score between the pregnant women who did and did not improve their lifestyle and nutritional habits to strengthen their immune system during the COVID-19 pandemic ($F = 18.15$, $p < 0.0001$). The mean EDS score of those who improved lifestyle and nutritional habits ($\bar{X} = 14.79$, $SD = 6.31$) was determined to be higher than that of those who made partial improvements ($\bar{X} = 13.55$, $SD = 5.48$) and of those who made no improvements ($\bar{X} = 10.43$, $SD = 5.70$). The mean EDS score of those who made improvements to lifestyle and nutritional habits was above the critical value of 13.

A statistically significant difference was determined in the mean EDS score according to the effect on the level of concern of social media and news programs related to COVID-19 ($F = 27.23$, $p < 0.0001$). The mean EDS score of the pregnant women who reported that social media and news programs related to the COVID-19 pandemic increased their levels of concern ($\bar{X} = 14.75$, $SD = 5.98$; EDS > 13) were determined to be higher than the mean EDS score of those whose levels of concern were partially increased ($\bar{X} = 10.53$, $SD = 5.57$) and of those who reported no increase ($\bar{X} = 8.28$, $SD = 6.81$). The mean EDS score of the pregnant women who reported having bad dreams during the pandemic ($\bar{X} = 16.74$, $SD = 5.52$) was found to be higher than the score of those who did not have bad dreams ($t = 9.85$, $p < 0.0001$).

A statistically significant difference was determined in the mean EDS score according to the request for an elective cesarean delivery because of the fear of catching COVID-19 ($F = 48.84$, $p < 0.0001$). The mean score of those who requested an elective cesarean delivery because of the fear of catching COVID-19 ($\bar{X} = 17.54$, $SD = 5.17$) was higher than the score of those who did not request an elective cesarean ($\bar{X} = 11.79$, $SD = 7.97$). The mean EDS score of those who were undecided on the subject of elective cesarean ($\bar{X} = 16.24$, $SD = 5.19$) was higher than the score of those who did not request an elective cesarean.

A significant relationship was seen between the mean EDS score and the fear of hospitalization as the birth approached ($F = 62.00$, $p < 0.0001$). The mean EDS score of those who feared hospitalization as the birth approached ($\bar{X} = 15.81$, $SD = 5.69$) was higher than the score of those who were partially afraid ($\bar{X} = 11.38$, $SD = 5.17$) and of those who were not afraid ($\bar{X} = 8.51$, $SD = 7.54$). A significant relationship was determined between the mean EDS score and the intention to restrict visitors following the birth ($F = 3.30$, $p < 0.0001$). The mean EDS score of the pregnant women who planned to restrict visitors after the birth ($\bar{X} = 14.01$, $SD = 6.23$) was higher than the score of those who planned to partially restrict visitors ($\bar{X} = 12.00$, $SD = 5.76$; Table 3).

According to the multiple linear regression model applied in the study, the best predictive variables for the mean EDS score were determined to be concerned about completing a healthy pregnancy, social media and news programs related to COVID-19 increasing levels of concern, fear of hospitalization as the birth approaches, having bad dreams during the COVID-19 pandemic, the request for an elective cesarean delivery because of fear of catching COVID-19, fear of breastfeeding the infant, and concerns that their own health would be negatively affected because of the pandemic, and these variables affected the mean EDS score negatively (Table 4). It was determined that the independent variables explained 42.9% of the dependent variables in the model.

4 | DISCUSSION

Although the clinical and epidemiological characteristics of COVID-19 infection have been rapidly identified throughout the world,[1,6,23,24] the determination of the maternal and neonatal effects has remained limited.[25,26] The easy transmission of the disease from person to person[23] has raised concerns about the risk of vertical intrauterine infection transmission from mother to fetus.[6,27] Of most concern are that it is not known when the disease will be brought under control and the destructive effects of the virus on humans.[5,28] Even if pregnant women are not exposed to the virus, the daily increasing number of cases can trigger the development of psychological problems such as anxiety and depression in pregnant women.[5,9,29] The aim of this study was to determine the risk of antenatal depression and the factors affecting that risk in Turkish pregnant women caused by the COVID-19 (SARS-CoV2) pandemic.

There has been no previous study in Turkey that has investigated the effect of the pandemic on the psychology of pregnant women, and in international literature, there is just one study that was conducted on pregnant women in China in the third trimester.[5]

TABLE 3 The effect of various characteristics of the study group on the depression points

Characteristics	EDS mean score, mean ± *SD*	Statistics
Trimester		
1	12.87 ± 6.36	$F = 4.069$
2	13.16±5.92[a]	$p = 0.018$
3	14.69 ± 6.40[a]	
Pregnancy history		
Yes	14.32 ± 6.16	$t = 2.4$
No	12.98 ± 6.23	$p = 0.17$
Having children		
Yes	14.35 ± 6.13	$t = 2.13$
No	13.16 ± 6.25	$p = 0.033$
Concern about completing a healthy pregnancy		
Yes	16.01 ± 5.43[a,b,c]	$F = 67.07$
Partial	10.37 ± 5.71[a,b]	$p < 0.0001$
No	8.47 ± 5.25[a,c]	
Fear of giving birth in hospital during the COVID-19 pandemic		
Yes	15.31 ± 5.97[a]	$F = 36.61$
Partial	11.42 ± 5.82[a]	$p < 0.0001$
No	8.59 ± 4.05[a]	
The effect of the COVID-19 pandemic on the frequency of attending antenatal check-ups		
Decreased	14.65 ± 5.91[a]	$F = 9.11$
Increased	15.56 ± 7.59[b]	$p < 0.0001$
Partial effect	12.37 ± 5.99[a]	
Not affected	10.97 ± 6.52[a,b]	
Fear of breastfeeding the infant because of the COVID-19 pandemic		
Yes	16.97 ± 5.36[a]	$F = 62.04$
Partial	13.16 ± 5.53[a]	$p < 0.0001$
No	10.06 ± 5.90[a]	
Concerns that the infant's health will be negatively affected by the COVID-19 pandemic		
Yes	15.24 ± 5.83[a]	$F = 39.31$
Partial	11.83 ± 5.66[a]	$p < 0.0001$
No	8.28 ± 5.75[a]	
Concerns that pregnant woman's own health will be negatively affected by the COVID-19 pandemic		
Yes	15.15 ± 5.78[a]	$F = 43.16$
Partial	10.97 ± 5.66[a]	$p < 0.0001$
No	7.14 ± 5.70[a]	

(Continues)

TABLE 3 (Continued)

Characteristics	EDS mean score, mean ± *SD*	Statistics
Changing lifestyle and nutritional habits to strengthen immune system in COVID-19 pandemic		
Yes	14.79 ± 6.31[a]	$F = 18.05$
Partial	13.55 ± 5.48[b]	$p < 0.0001$
No	10.43 ± 5.70[a,b]	
Effect of social media and news related to the COVID-19 pandemic on increased levels of concern		
Yes	14.74 ± 5.95[a,b,c]	$F = 27.23$
Partial	10.53 ± 5.57[a,b]	$p < 0.0001$
No	8.28 ± 6.81[a,c]	
Having bad dreams during the COVID-19 pandemic		
Yes	16.74 ± 5.52	$t = 9.85$
No	11.62 ± 5.81	$p < 0.0001$
Request for an elective cesarean because of the fear of catching COVID-19		
Yes	17.54 ± 5.17[a]	$F = 48.84$
Partial	16.24 ± 5.19[b]	$p < 0.0001$
No	11.79 ± 5.97[a,b]	
Fear of hospitalization as the birth approaches		
Yes	15.81 ± 5.69[a]	$F = 62.00$
Partial	11.38 ± 5.17[a]	$p < 0.0001$
No	8.51 ± 5.74[a]	
Planning to restrict visitors after the birth		
Yes	14.01 ± 6.23[a]	$F = 3.30$
Partial	12.00 ± 5.76[a]	$p < 0.0001$
No	12.15 ± 6.79	

Note: The difference between groups with the same letter for each variable was significant ($p < 0.05$).

The results of the current study showed that Turkish pregnant women were at high risk of antenatal depression during the COVID-19 pandemic (EDS score: 13.70 ± 6.22) and the risk of depression was greater in the third trimester (EDS score: 14.69 ± 6.40). The great emphasis put on recommendations made by the government and scientific authorities during the pandemic for high-risk groups, including pregnant women, and the contagious nature of the virus[30] could have had an effect on the high depression score of the pregnant women.

In the study by Wu et al.[5] of pregnant women as a group who must take more care, the mean EDS scores were determined as 7.7 ± 4.3 for the period January 1–20, and 7.7 ± 4.4 for January 21 to February 9. The risk of antenatal depression was higher in the Turkish pregnant women than in those in China, where more stringent quarantine precautions were applied during the pandemic. This difference could be due to sociocultural differences and to the fact that the virus was seen for the first time in China and at that time there was insufficient knowledge about the severity of the disease. In addition, that the number of cases in Turkey was greater than the number of positive cases reported in China might have influenced this situation.

There has been found to be a relationship between most sociodemographic, psychiatric, and medical factors and the risk of antenatal depression.[31] In the current study, concerns about completing a healthy pregnancy during the COVID-19 pandemic were determined to increase the risk of antenatal depression, and the pregnant women with high levels of concern were seen to have a mean EDS score above the critical value (>13). Following the reporting of the first COVID-19 case in Turkey, a call was made by the Ministry of Health for social distancing, isolation and personal

TABLE 4 Multiple regression model for EDS score

Variable	Coef.	Std. error	Beta	95% confidence interval	*T*	Sig.	*r*
Constant	31.005	0.968		28.6–132.49	32.026	0.00	–
Concern about completing a healthy pregnancy	−1.710	0.453	−0.156	−3.38 to 1.71	−3.775	0.00	−0.452
Effect of social media and news related to the COVID-19 pandemic on increased levels of concern	−1.552	0.442	−0.129	−1.18 to 0.03	−3.511	0.00	−0.312
Fear of hospitalization as the birth approaches	−1.392	0.338	−0.162	−2.43 to 0.68	−4.122	0.00	−0.445
Having bad dreams during the COVID-19 pandemic	−2.446	0.464	−0.193	−2.44 to 1.12	−5.272	0.00	−0.405
Request for an elective cesarean delivery because of the fear of catching COVID-19	−1.278	0.289	−0.166	−3.49 to −1.63	−4.423	0.00	−0.396
Fear of breastfeeding the infant because of the COVID-19 pandemic	−1.367	0.309	−0.176	−2.44 to 1.18	−4.420	0.00	−0.447
Concerns that pregnant woman's own health will be negatively affected by the COVID-19 pandemic	−0.820	0.433	−0.077	−1.99 to 0.84	−1.894	0.05	−0.386

Abbreviation: EDS, Edinburgh Depression Scale.

quarantine precautions to be taken, and permission was given to manage the chronically sick and pregnant.[3]

Of the pregnant women in this study, 77.3% stated that social media and news programs related to the COVID-19 pandemic raised levels of concern. As there are limited studies of the effects of the COVID-19 virus on health in pregnancy and the pandemic has been dealt with intensely in the media in different dimensions, this could have increased the levels of concern and the mean EDS scores.

An important characteristic of pandemic infections is that they lead to severe fear in society.[32] This is a negative emotion leading to extreme emotional avoidance because of the fear stimulus and has a negative effect on the quality of life of the individual.[19,33,34] A disease outbreak such as pandemic viral infections can cause fear at a societal level.[33] Stress and fear associated with pandemic diseases are associated with clinical phobias, anxiety diseases, and depression.[35]

In the current study, the risk of antenatal depression was found to be higher in the pregnant women who feared giving birth in the hospital during the COVID-19 pandemic compared to those who were only partially or not afraid. It has been reported that pregnant women with a psychiatric disease such as antenatal depression or symptoms request an elective cesarean delivery associated with the fear of birth.[20] The findings of this study support that findings of antenatal depression during the pandemic have an effect on the requests for an elective cesarean delivery. The risk of antenatal depression of the pregnant women in this study who requested an elective cesarean because of the fear or partial fear of catching COVID-19 was found to be high (EDS > 13).

Pregnant women are predisposed to respiratory pathogens and especially to severe pneumonia because of the physiological adaptive changes (elevation of the diaphragm, increased oxygen consumption, and edema of the respiratory tract mucosa) and immunosuppressive status.[36] Therefore, with the concern that there could be an increase in the rate of COVID-19 infection seen in pregnant women, obstetricians do not call them for antenatal check-ups unless necessary, and efforts are made to reduce the possibility of contact with infected persons.[36–38] In the current study, 61.4% of the pregnant women stated that they reduced the frequency of attending antenatal check-ups during the COVID-19 pandemic. However, it was noticeable that the mean EDS scores of both those who increased and decreased the frequency of attending antenatal check-ups were high (>13). This could be attributed to some pregnant women experiencing extreme stress and fear during the pandemic with panic and anxiety because of the increase in isolation and self-quarantine precautions and that some wished to see a doctor because of the slightest suspicion or problem and wanted to be reassured that the fetus was healthy.[39] It has been reported that the feeling of panic or panic attacks in the mother can cause her to cease breastfeeding.[40] In the current study, 37% of the pregnant women reported a fear of breastfeeding the infant, and the mean EDS score of these women was 16.97 ± 5.36, and the mean EDS score of those who were partially afraid was also seen to be high.

It was reported by 57.9% of the pregnant women in the study that they had made changes to their lifestyle and nutritional habits to strengthen their immune system during the COVID-19 pandemic, and the mean EDS scores of these women were above the critical value of 13 in respect of the risk of antenatal depression. Fear and anxiety have been shown to have negative effects on well-being, and these negative emotions can motivate avoidance behaviors, which lay the ground for risky behavior.[30,41] Harper et al.[30] stated that individuals in vulnerable groups such as the elderly, the pregnant, and those with chronic disease, exhibit a more protective attitude for themselves against the virus. The greater risk of antenatal depression of the pregnant women who improved their lifestyle and nutritional habits during the pandemic may have encouraged positive behaviors. In addition, pregnant women with greater awareness of the pandemic may be prone to depression because they know the harm of the disease and feel more fear.[5,41,42]

In the multiple linear regression model, the best predictive variables for antenatal depression were determined to be concerns

about completing a healthy pregnancy, social media and news programs related to COVID-19 increasing levels of concern, fear of hospitalization as the birth approaches, having bad dreams during the COVID-19 pandemic, the request for an elective cesarean delivery because of fear of catching COVID-19, fear of breastfeeding the infant, and concerns that their own health would be negatively affected because of the pandemic.

In a study conducted in China during the SARS-CoV-2 outbreak, being of low bodyweight, working, being primiparity, having a moderate income level, taking >7 h a week of exercise, living space per person of ≥20 m, and age <35 years when pregnant, were determined to have an effect on antenatal depression symptoms. Taking the risk of antenatal depression seriously, which may cause problems such as pregnancy loss, preterm birth, pre-eclampsia, or intrauterine growth retardation, there is a need for interventions to increase the mental health and well-being of pregnant women on an international scale.[31]

5 | LIMITATION

Some limitations in this study should be taken into consideration. Causal associations between maternal and fetal risk factors in the COVID-19 pandemic and antenatal depression could not be established due to the cross-sectional design of the study, the aim of which was to evaluate the psychosocial effects of the pandemic on antenatal depression as perceived only by pregnant women. Another limitation was that the study was conducted in a single region of Turkey. Therefore, the study results cannot be generalized to the general population. Further multicentre, large-scale studies are needed to confirm these findings. Moreover, although the data were collected through an online survey as the easiest and safest way to collect data during the COVID-19 pandemic, there might have been some misunderstanding of the questions compared to the face-to-face method. As completing an online questionnaire requires internet literacy, the survey response rate was 76% and nearly half of the respondents were university graduates. Furthermore, pregnant women with a positive COVID-19 test or suspected positivity were excluded from the study as they may have experienced different psychosomatic problems in the healing process. The Personal Information Form was developed by the researchers and consisted of descriptive items questioning age, educational level, parity, and questions of how COVID-19 had affected the pregnancy such as fears of not completing the pregnancy, concerns about maternal and infant health, fear of going to the hospital during the COVID-19 pandemic, and changes to the frequency of attending antenatal check-ups. As this is not a valid and reliable scale, it could constitute another limitation of the study. However, to the best of our knowledge, this is the first study in Turkey to determine the effect of the COVID-19 pandemic on antenatal depression symptoms in Turkish pregnant women, and the results can contribute to understanding Turkish women's psychological experience regarding maternity during the COVID-2019 pandemic.

6 | CONCLUSION

The results of this study demonstrated the effects of the COVID-19 pandemic on the mental health of Turkish pregnant women. The mean EDS scores of the Turkish pregnant women were high, underlining the increased risk of antenatal depression in pregnant women threatened by COVID-19. The study has shown that although social distancing, isolation, and quarantine are important, there is an urgent need for Turkish pregnant women to be evaluated during the pandemic not only in respect of physical symptoms, but also in respect of antenatal depression and for the necessary management to be implemented.

7 | IMPLICATIONS FOR PSYCHIATRIC NURSING PRACTICE

Even though in the past the responsibility for providing care for maternal mental health was in the domain of psychiatric healthcare providers, this situation has become a global crisis during the COVID-19 pandemic. Therefore, all healthcare professionals, not only mental health workers, but also obstetric and public health workers, in particular, have a responsibility for the protection of maternal mental health. The results of this study demonstrated that pregnant women were worried about both their own health and the health of their infants during the COVID-19 pandemic, and Turkish pregnant women had high depression scores. These results reveal the necessity for mental health programs specific to pregnant women. Early detection and treatment of depression during a pandemic will undoubtedly have positive long-term effects on maternal and infant health. Mental health support for pregnant women experiencing depression symptoms in this difficult period is an important requirement for public health.

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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