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Full length article

Does having a high-risk pregnancy influence anxiety level during the COVID-19 pandemic?

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ABSTRACT

Objective: We aimed to analyze the changing level of anxiety during COVID-19 pandemic in pregnant women, with and without high-risk indicators separately, in a tertiary care center serving also for COVID-19 patients, in the capital of Turkey.
Study design: We designed a case-control and cross-sectional study using surveys. The Spielberger State-Trait Anxiety Scale questionnaire (STAI-T) and Beck Anxiety Inventory (BAI) which were validated in Turkish were given to outpatient women with high-risk pregnancies as study group and normal pregnancies as control group. A total of 446 women were recruited.
Results: There was a statistically significant difference between those with and without high-risk pregnancy in terms of Trait-State Anxiety scores with COVID-19 pandemic ($p < 0.05$). We found an increased prevalence of anxiety during COVID-19 pandemic in high-risk pregnant women comparing to pregnancies with no risk factors ($p < 0.05$). There was a statistically significant difference between the education level in high-risk pregnant women in terms of anxiety scores ($p < 0.05$), Beck Anxiety score was highest in high school graduates (42.75). While the level of Trait Anxiety was the highest with pandemic in those with high-risk pregnancy with threatened preterm labor and preterm ruptures of membranes (58.0), those with thrombophilia were the lowest (50.88).
The State Anxiety level and Beck Anxiety Score of those with maternal systemic disease were the highest (53.32 and 45.53), while those with thrombophilia were the lowest (46.96 and 40.08).
The scores of Trait Anxiety (56.38), State Anxiety (52.14), Beck Anxiety (43.94) were statistically higher during the pandemic in those hospitalized at least once ($p < 0.05$).
Conclusion: High-risk pregnant women require routine anxiety and depression screening and psychosocial support during the COVID-19 pandemic. High-risk pregnancy patients have comorbid conditions most of the time, hence they not only at more risk for getting infected, but also have higher anxiety scores because of the stress caused by COVID-19 pandemic.
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Introduction

The novel coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome–coronavirus-2 (SARS-CoV-2) is a highly infectious disease that was first described by Huang et al. from Wuhan, China [1]. It has been declared as a pandemic by the World Health Organization (WHO) on 11 March 2020 [2]. According to WHO data, as of August 18, 2020, the total number of cases reported all over the world was 21,756,357 and the number of deaths was 771,635 [3]. As 18 of August, 2020, there were 250,542 cases with a definite diagnosis in Turkey; the total number of deaths was 5996 [4].

There are still few cases of pregnant women with novel corona virus 2019 (COVID-19) in the literature. However, most of the cases were with mild symptoms, infection leads to severe lung involvement and multiorgan failure in some cases with serious disease [5]. There is currently not sufficient knowledge about pregnant women and their complications. Limited data we have suggests that symptoms in pregnant women are similar to other people, and that there is no evidence for higher maternal or fetal risks [6]. A pandemic could be a stress factor in pregnant women all over the world, as in every person.

A high-risk pregnancy has been defined as a pregnancy with an unexpected medical or obstetric condition associated with

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the fetus or pregnancy that poses a potential hazard to the health of the mother or fetus [7]. This includes different pathologies which translate into a high-risk of morbidity or mortality for the mother, the fetus or the newborn; either before or after birth [8]. About 10 % of all pregnancies are considered to be high-risk [8,9].

It is known that approximately 13 % and up to 21.7 % of pregnant women experience antenatal depression and anxiety, respectively [10]. Among hospitalized women for obstetrical risk, rates of antenatal depression can be as high as 19 % [11]. High-risk pregnancies increase the risk of depression and anxiety [12], and yet hospitalization can worsen the state of anxiety and depression of high-risk pregnant women [13].

Studies of the SARS outbreak in 2003 have shown that, pregnant women experienced high levels of anxiety and worries about being infected [14]. Although a significant amount of time has passed since the outbreak of the COVID-19 pandemic, there is still limited information about the possible effects of the virus on pregnant women and its transmission from mother to fetus [15]. Apart from all other unknown effects, this lack of information about such a severe disease poses a great risk on pregnant women in terms of depression and anxiety.

Although previous studies have shown that anxiety and depression increase in high-risk pregnancies [12,13], there is no data searching the influence of the COVID-19 pandemic on high-risk pregnant women. It has been reported that patients with comorbidities are more vulnerable to COVID-19 [16,17]. Hence, comorbid patients such as most of the high-risk pregnant women might expose a higher level of anxiety and as a result may be in need of support more than usual.

In our study, for the first time, we aim to analyze the changing level of anxiety during COVID-19 pandemic in pregnant women, with and without high-risk indicators separately.

Material and methods

Participants and procedure

This cross-sectional study was carried out between May-July 2020 at Ministry of Health Ankara City Hospital, the main public maternity hospital which handles above 10.000 deliveries yearly and covers all surgical and medical disciplines. Our clinic is a tertiary referral center where the majority of pregnant women carry a high-risk pregnancy. The study protocol was approved by the Turkish Ministry of Health and ethical approval for this study was obtained from Ankara City Hospital Ethical Committee (E1-20-904).

Outpatient women with high-risk pregnancies, covering all trimesters, between the ages of 18–40 and followed-up by the high-risk pregnancy clinic were included in the study. As the control group, outpatients with a single, healthy pregnancy who are not categorized as high-risk pregnancy and who admitted to the antenatal pregnancy clinic for routine controls were included in the study. Other inclusion criteria included proficiency in reading and writing Turkish. Those who are not mentally competent to answer survey questions and have psychiatric illness were excluded from the study. Verbal and written informed consent were obtained from all research participants after the study was described.

High-risk pregnancies were defined as the presence of one or more of the following: past adverse obstetric history, preexisting medical conditions, threatened preterm labor or preterm ruptures of membranes, thrombophilia, hypertensive diseases of pregnancy, intrauterine growth restriction, placenta previa, fetal anomaly, multiple pregnancy, gestational and pregestational diabetes, or others such as, polyhydramnios, oligohydramnios.

During the pandemic, 246 randomly selected pregnant women who admitted to the high-risk pregnancy outpatient clinic were included in the study group. Among the patients who admitted to the antenatal pregnancy outpatient clinic during the same period, 200 of them with similar age and gestational week were included in the control group.

Questionnaires

Socio-demographic information & obstetric medical history

Socio-demographic information and obstetric medical history were obtained through a questionnaire. The variables were maternal age, gestational age, gravida, parity, abortion history, educational level, employment status, disposable income, drug-substance use, vitamin use, whether the pregnancy is planned or not, spousal support, smoking habit, whether an invasive procedure was performed in pregnancy, means of daily news (tv, social media, medical professionals etc.), as well as the presence of mental disorders (current and in the past).

State-trait anxiety inventory—trait subscale (STAI-T)

The Spielberger State-Trait Anxiety Scale questionnaire (STAI-T) [18], which was validated in Turkish [19] and consists of two subscales, was used to evaluate the anxiety levels of the pregnant women about the general and current situation.

The state scale was a measure of situational anxiety that participants were asked to respond according to "how you are feeling right now". The trait anxiety scale was a general measure of the tendency to be anxious when asking participants to respond based on "how you generally feel". Each subscale consisted of 20 items scored in a 4-point Likert type (sum score $\geq$ 47 clinically relevant). If more than three statements were not answered, the completed form was considered invalid and not scored. In the state anxiety scale, the answer choices collected in four classes were: (1) None, (2) Some, (3) Much, and (4) Totally; options in the Trait Anxiety Scale were (1) Almost never, (2) Sometimes, (3) Much time, and (4) Almost always. There were two types of expressions on the scales. The first type was called direct or straight expressions, and the second type as inverted expressions. Direct expressions express negative emotions while reversed expressions express positive feelings. While inverted expressions were scored, values of 1 and 4 were interchanged. Answers with a value of 4 in direct expressions indicated that anxiety was high. In inverted statements, answers with a value of 1 indicated high anxiety, and those with a value of 4 indicated low anxiety. The expression "I am restless" was a direct example, and "I feel calm" was an example of inverted expressions. There were ten reversed statements in the state anxiety scale. In the trait anxiety scale, the number of reversed statements was seven. During the interpretation, the scores obtained from both scales theoretically varied between 20 and 80. Higher scores meant high anxiety level while low scores meant low anxiety level. The average score reported by several applications ranges from 36 to 41. The STAI questionnaire had quality criterions and standard values. The internal consistency coefficient was 0.90, and retest reliability coefficients of the trait scale were 0.68–0.96.

In this study, the research participants were asked to fill-in the STAI questionnaire two times; one to report their situational and trait anxiety as if they had been in the days before the pandemic, and the second one to report their status at the time of filling the questionnaire during the pandemic. State Anxiety score was only evaluated for the latter (at the time of the COVID-19 pandemic) while the Trait Anxiety score was evaluated both for the before pandemic and during the pandemic periods to perform a comparative analysis between the Trait anxiety scores of these two times.

Beck anxiety inventory (BAI)

Anxiety was also assessed using the BAI. The BAI was designed by Beck et al. [20] to detect the frequency of symptoms of anxiety in adults and adolescents. The Turkish version of the BAI was developed by Ulusoy et al. [21] and has a Cronbach's alpha of 0.93. The inventory comprises of 21 items descriptive of subjective, somatic, or panic-related symptoms of anxiety. Self-reported answers were based on a 4-point Likert scale ranging from responses of 'not at all' to 'severe' regarding the experience of that symptom over the past month. A high total score shows more severe levels of anxiety.

All questionnaire applications were conducted by the principal researcher and an assistant researcher. Scoring was completed by the principal researcher by evaluating the responses to the questionnaires.

Statistical analysis

SPSS for Microsoft Windows 25.0 (SPSS Inc., Chicago, IL, USA) used for statistical analyses. For categorical variables, frequency (n) and percentage (%), for numerical variables mean (X) and standard deviation (sd) statistics were calculated.

In this study, the relationship between the scale scores was analyzed by the Pearson correlation test. The relationship between the numerical variables and high-risk pregnancy status was analyzed with independent samples *t*-test and one-way ANOVA test, while the relationship between the categorical variables and high-risk pregnancy status was analyzed with chi-square test. The analysis of the level of trait anxiety with respect to time was performed by using repeated measures ANOVA test. $p < 0.05$ indicates a significant correlation and $p > 0.05$ means there is no significant correlation during the analysis.

Results

Participant characteristics

500 women between the ages of 18–40 were invited to participate in this study. Of these, 54 refused because they felt that there were too many questionnaires to fill out. The patients of high-risk pregnancy group and the normal pregnancy group did not differ in terms of age, gestational week, number of children/parity, planned or anticipated pregnancy, and employment (Table 1). There was a statistically significant difference between high-risk pregnancies and normal pregnancies in terms of education level and spousal support ($p < 0.05$). Remaining variables had no statistically significant relationship while comparing high-risk pregnancies and normal pregnancies ($p > 0,05$).

Table 2 presents the distribution of the high-risk patients with respect to the diagnosed disease types. Hypertensive diseases of the pregnancy were the leading cause of the high-risk pregnancies with a ratio of 29.5 % as shown in the table.

Questionnaire scores

We found that that there was a statistically significant difference between those with and without high-risk pregnancy in terms of Trait Anxiety and State Anxiety scores with COVID-19 pandemic ($p < 0.05$). Although the anxiety score was higher in high-risk patients compared to the normal pregnancies, there was no statistically significant difference in Trait Anxiety before the pandemic between those with and without high-risk pregnancy ($p > 0.05$) as presented in Table 3.

The comparison of Beck Anxiety and the Trait Anxiety and State Anxiety scores with obstetric variables in high-risk group is seen in Table 4.

There was a statistically significant difference in terms of Trait and State Anxiety scores before the pandemic between high-risk pregnant women who use medication and those who do not ($p < 0.05$). Those who were not on medication before the pandemic had a higher Trait Anxiety level (39.78), and those who used medication had a higher State Anxiety level (50.27) during the pandemic.

The scores of Trait Anxiety (56.38), State Anxiety (52.14), Beck Anxiety (43.94) were statistically higher in those hospitalized at least once with the pandemic ($p < 0.05$).

There was no statistically significant difference in terms of Trait-State Anxiety and Beck Anxiety scores according to abortion history or smoking habit in pregnancies, before and during the pandemic ($p > 0.05$).

There was a statistically significant difference in terms of Trait-State Anxiety, and Beck Anxiety scores before and during the pandemic in pregnancies who use vitamins (such as vitamin D, omega 3, multivitamin) and those who do not ($p < 0.05$). Those who do not use vitamins have had higher levels of Trait Anxiety, State Anxiety (50.01), Beck Anxiety (42.92) before (39.62) and during the pandemic (54.17).

There was no statistically significant difference in terms of Trait Anxiety score before and during the pandemic between high-risk pregnancies who use medicine and those who do not ($p > 0.05$).

There was a statistically significant difference in State Anxiety score and Beck Anxiety score between pregnancies who use medicine and those who do not ($p < 0.05$).

Table 1
Obstetrics and Socio-demographic characteristics of the sample.

		High-risk Pregnancy mean (%)	Normal Pregnancy mean (%)	Total	p[a]
Age[b]		29.38 (23.65–35.11)	28.38(22.73–34.03)	28.93 (23.22–34.61)	0.064
Parity[b]		2.13(1.31–2.95)	2.26(1.33–3.19)	2.19(1.31–3.07)	0.121
Week of gestation[b]		25.07(18 32.14)	23.88(15.84–32.28)	24.53(16.82–32.24)	0.113
Education level	Primary school	13 (5.3)	21 (10.5)	34 (7.6)	**0.000**
	Middle school	56 (22.9)	48 (24)	104 (23.4)	
	High school	162 (66.1)	101 (50.5)	263 (59.1)	
	University and above	14 (5.7)	30 (15)	44 (9.9)	
Planned pregnancy	Yes	188 (76.4)	140 (70)	328 (73.5)	0.126
	No	58 (23.6)	60 (30)	118 (26.5)	
Spousal support	Yes	231 (93.9)	200 (100)	431 (96.6)	**0.001**
	No	15 (6.1)	0 (0)	15 (3.4)	
Employment status	Yes	68 (27.6)	53 (26.5)	121 (27.1)	0.660
	No	178 (72.4)	147 (73.5)	325 (72.8)	

[a] t/chi-square test.
[b] mean (min – max).

Table 2
Types of High-risk Pregnancy.

	n (%)
Hypertensive diseases of pregnancy	72 (29.5)
Gestational and pregestational diabetes	61 (25)
Thrombophilia	25 (10.2)
Poly/Oligohydramnios	30 (12.3)
Threatened Preterm labor/Preterm Ruptures of Membranes	12 (4.9)
Multiple pregnancy	16 (6.6)
Maternal systemic disease (Epilepsy, Asthma, Maternal Thyroid Disease)	19 (7.8)
Placenta previa/placental adhesion disorders	3 (1.2)
Fetal anomaly suspicion/presence	6 (2.5)

While the level of Trait Anxiety was the highest with pandemic in those with high-risk pregnancy with threatened preterm labor and preterm ruptures of membranes (58.0), those with thrombophilia were the lowest (50.88). The State Anxiety level and Beck Anxiety Score of those with maternal systemic disease were the highest (53.32 and 45.53), while those with thrombophilia were the lowest (46.96 and 40.08) (Table 5).

There was a statistically significant difference between the education level in high-risk pregnant women in terms of anxiety scores ($p < 0.05$). Beck Anxiety score was highest in high school graduates (42.75), and lowest in primary and secondary school graduates (40.59). There was a statistically significant difference between whether the pregnancy was planned or not in terms of Trait Anxiety and Beck Anxiety scores with the pandemic ($p < 0.05$). The levels of Trait Anxiety (54.53) and Beck Anxiety (43.4)

Table 3
Comparison of Pregnancy Risk Status by State Trait Anxiety Scores.

	High-risk Pregnancies (mean ± SD[a])	Normal Pregnancies (mean ± SD)	Total (mean ± SD)	p[b]
Trait Anxiety Score Before Pandemic	39.15 ± 5.95	38.06 ± 6.7	39.34 ± 6.39	0.069
Trait Anxiety Score During Pandemic	52.55 ± 8.26	43.26 ± 7.2	48.38 ± 9.06	**0.000**
State Anxiety Score	48.91 ± 7.84	39.23 ± 8.72	44.57 ± 9.55	**0.000**

[a] SD: Standard Deviation.
[b] t/chi-square test.

Table 4
Comparison of Beck Anxiety and the Trait Anxiety and State Anxiety scores with Obstetric Variables in High-risk Group.

		Trait Anxiety With Pandemic (mean ± SD)	p[a]	State Anxiety (mean ± SD)	p[a]	Beck Anxiety (mean ± SD)	p[a]
Medication use	Yes	53.53 ± 8.3	p = 0.170	50.27 ± 7.94	**p = 0.047**	42.84 ± 5.79	p = 0.121
	No	52.02 ± 8.22		48.19 ± 7.71		41.73±,5.1	
Hospitalization	Never	48.53 ± 8.7	**p = 0.000**	45.53 ± 7.97	**p = 0.000**	40.19 ± 6.05	**p = 0.000**
	At least once	56.38 ± 5.6		52.14 ± 6.2		43.94 ± 3.83	
Abortion history	Yes	52.82 ± 8.74	p = 0.662	49.07 ± 8.75	p = 0.803	42.2 ± 6.03	p = 0.846
	No	52.35 ± 7.93		48.81 ± 7.15		42.06 ± 4.86	
Smoking habit	Yes	51.79 ± 8.96	p = 0.333	48.74 ± 8.19	p = 0.814	41.65 ± 5.19	p = 0.360
	No	52.89 ± 7,92		48.99 ± 769		42.33 ± 5.45	
Vitamin use	Yes	47.05 ± 9.56	**p = 0.000**	45.2 ± 8.88	**p = 0.000**	39.39 ± 5.24	**p = 0.000**
	No	54.17 ± 7.09		50.01 ± 7.17		42.92 ± 5.15	

[a] Independent samples *t*-test.

Table 5
Comparison of Obstetric Pathology and Beck Anxiety, Trait-State Anxiety Scores in High-risk Pregnancies.

	Trait Anxiety Before the Pandemic mean ± SD)	p[a] 0.281	Trait Anxiety With the Pandemic (mean ± SD)	p[a] 0.027	State Anxiety (mean ± SD)	p[a] 0.033	Beck Anxiety (mean ± SD)	p[a] 0.004
Hypertensive diseases of pregnancy	38.86 ± 6		52.17 ± 8.28		48.96 ± 7.69		41.58 ± 5.29	
Gestational and pregestational diabetes	39.52 ± 6.25		51.54 ± 8.14		47.69 ± 8.18		42.1 ± 4.74	
Thrombophilia	39.56 ± 5.56		50.88 ± 8.27		46.96 ± 7.75		40.08 ± 5.17	
Poly/Oligohydramnios	36.93 ± 6.07		52.13 ± 7.71		49.2 ± 7.14		41.93 ± 4.46	
Threatened preterm labor/Preterm ruptures of membranes	40.75 ± 3.55		58 ± 5.85		52.42 ± 7.48		45.25 ± 4.99	
Multiple pregnancy	41.19 ± 6.16		54.88 ± 8.97		51.94 ± 7.91		44 ± 6.25	
Maternal systemic disease	39.32 ± 5.75		56.95 ± 7.54		53.32 ± 7.02		45.53 ± 5.62	

[a] One-way ANOVA test.

Table 6
Comparison of Trait-State Anxiety and Beck Anxiety Levels by Socio-Demographic Characteristics In High-risk Pregnancies.

		Trait Anxiety Before the Pandemic (mean ± SD)	p[a]	Trait Anxiety With the Pandemic (mean ± SD)	p[a]	State Anxiety (mean ± SD)	p[a]	Beck Anxiety (mean ± SD)	p[a]
Education	Primary/middle	39.41 ± 6.87	p = 0.711	51.61 ± 8.9	p = 0.522	48.54 ± 8.73	p = 0.878	40.59 ± 5.78	**p = 0.019**
	High	38.93 ± 5.7		52.97 ± 7.96		49.11 ± 7.5		42.75 ± 5.19	
	University and above	40.07 ± 3.89		52.5 ± 8.97		48.86 ± 7.73		42 ± 4.08	
Planned Pregnancy	Yes	39.11 ± 6.2	p = 0.835	51.94 ± 8.55	**p = 0.020**	48.39 ± 7.74	p = 0.058	41.72 ± 5.18	**p = 0.037**
	No	39.28 ± 5.12		54.53 ± 6.95		50.62 ± 7.96		43.4 ± 5.8	
Employment Status	Yes	38.99 ± 5.88	p = 0.794	53.46 ± 9.73	p = 0.341	49.75 ± 8.82	p = 0.302	43.18 ± 6.05	p = 0.055
	No	39.21 ± 6		52.2 ± 7.63		48.6 ± 7.43		41.71 ± 5.04	

[a] Independent groups t/one-way ANOVA test.

were higher with the pandemic in those who have unplanned pregnancy. In high-risk pregnancies, there was no statistically significant difference in terms of Trait-State Anxiety scores before and with the pandemic between those who work and those who do not work ($p > 0.05$) (Table 6).

Discussion

Mental health is one of the many areas that have been greatly affected by the COVID-19 pandemic. Pregnant women have also been psychologically affected by the numerous restrictive measures taken by the governments and societies, the uncertain future of the pandemic and most importantly the fear of getting infected and putting the infants in yet unknown risks. While pregnancy itself creates anxiety and risk of depression on women [22,23] the COVID-19 pandemic puts more pressure to pregnant women. On the other hand, high-risk pregnancy is a major stressing factor for pregnant women.

In this study, we had aimed to show whether high-risk pregnancies were affected by the COVID-19 pandemic more than normal pregnancies with no risk factors. We found an increased prevalence of anxiety during COVID-19 pandemic in high-risk pregnant women comparing to normal pregnancies without risk factors ($p < 0.05$). To the best of our knowledge, this is the first study to compare anxiety in high-risk pregnant women with anxiety in normal pregnant women during the COVID-19 pandemic.

High-risk pregnancies are a huge group consisting of many obstetric pathologies including maternal systemic diseases. Each pathologic condition in this family may have affected the level of anxiety and depression of the women individually. Therefore, we investigated the anxiety scores according to the obstetric pathologies and found statistically significant results for Trait Anxiety (during the pandemic), State Anxiety and Beck Anxiety scores ($p < 0.05$). Most of the high-risk pregnancies in our study were hypertensive diseases of pregnancy (29.5 %) and gestational and pregestational diabetes (25 %). Previously, it has been shown that anxiety rate increases in hypertensive disease of pregnancy, and gestational and pregestational diabetic women [24–26]. Our results support this finding in the sense that during the COVID-19 pandemic, compared to normal pregnancies anxiety is much higher in the high-risk pregnancy patients. On the other hand, it was reported that comorbid patients are more susceptible to COVID-19 [16,17]. Knowing that most of the high-risk pregnancy patients have comorbidities, we can conclude that they not only at more risk for getting infected, but also have higher anxiety scores because of the stress caused by COVID-19 pandemic.

Although high-risk pregnancies are highly inclined to depression and anxiety, there are few studies searching this issue in the literature. Powers P et al. were firstly investigated the psychiatric disorders in high-risk pregnancy in 1986. They demonstrated that anxiety and depression was higher in high-risk pregnancy patients compared to the normal pregnancy patients [27]. Few studies published subsequently also supported these results [28–31]. Similarly, in the current study, we reported that anxiety during COVID-19 pandemic was higher in high-risk pregnancies when compared to the normal pregnancies. Trait Anxiety Score (applied for the status during the pandemic) and the State Anxiety Score were significantly higher in high-risk pregnancy patients compared to the normal pregnancies ($p < 0,05$).

The participants of this study filled-in two instances of the questionnaire for Trait Anxiety of Spielberger; one for reflecting their answers considering the pandemic had not started yet, and another one reflecting their answers at the time of the questionnaire hence during the pandemic. Although it was calculated as statistically insignificant ($p > 0.05$), observing a higher Trait Anxiety Score before the pandemic for high-risk pregnancy patients is inline with the outcomes of respected research results as mentioned above. This statistically insignificant difference may be due to the bias in the responses of the participants since they tried to evaluate their past moods during the days of the COVID-19 pandemic. This was the major limitation of this study. The results for the Trait Anxiety Score during the pandemic and the State Anxiety Score which was also calculated for the days of COVID-19 pandemic significantly differs between high-risk pregnancy patients and normal pregnancies. This shows that the COVID-19 pandemic has more severe effects on high-risk pregnancy patients than the pregnant women with no risk factors.

After we observed significant difference of anxiety scores between the high-risk and normal pregnancy patients, we looked into the details of the anxiety in high-risk pregnancy patients by analyzing the results according to numerous variables such as medicine use, hospitalization, abortion history, smoking and vitamin use.

We found statistically significant relationships between the anxiety scores and the analyzed variables, such that, anxiety significantly increases in high-risk pregnancy patients who experienced hospitalization at least once during their pregnancy compared to the high-risk patients who have not hospitalized ($p < 0.05$). In the literature, there are several studies showing that anxiety rates are higher in pregnant women who smoke, with abortion history, and those who had been hospitalized during their pregnancy and used medicine [32–44]. In addition, in our study, we found that anxiety rates were lower in high-risk pregnant women using vitamins. This may be due to the thought that the use of vitamins during the pandemic period would protect them from COVID-19 infection.

A recent study by Yassa et al. published in April 2020 evaluated the impact of the COVID-19 pandemic on third-trimester pregnant patients and reported that the pandemic increased anxiety and concern of these pregnant women regarding the pregnancy and the baby [45]. The aforementioned study applied a non-validated

questionnaire on 172 research participants and reported that 52 % felt vulnerable and 80 % felt concerned while 35.5 % and 42 % constantly keep thinking they may get infected or the baby can get infected, respectively. While our results were inline with the results of the aforementioned study in the sense that the COVID-19 pandemic has severe effects on pregnant women, we applied validated questionnaires and performed a comparative statistical analysis between high-risk pregnancy patients and normal pregnancy patients to see the effect of the COVID-19 pandemic on anxiety. Moreover, we analyzed the anxiety scores of high-risk pregnancy patients with respect to several dimensions to reveal the correlations between those variables which are strongly related with the high-risk status of the pregnancies and anxiety.

The COVID-19 pandemic urged the scientific community, hence accelerated number of research studies started to be published. Yet, there were few studies concerning the psychological effect of the pandemic on pregnant women. Durankus and Aksu reported that among 260 research participants 35.4 % showed anxiety and depression symptoms and they found significant positive correlation between the years of education and the level of anxiety [46]. Inline with this result, in our study we also report a significant positive correlation between the years of education and Beck Anxiety score. We also report a statistically significant correlation between whether the pregnancy is planned or not and the anxiety scores with Beck and Trait Anxiety scales where unplanned pregnancies exhibit higher anxiety scores. In literature it has been shown that women with unplanned pregnancies experience high levels of anxiety and depression similar to our study [47,48].

The hospital that we performed this study is the largest hospital of Turkey, and it was announced as a pandemic hospital by the Turkish Ministry of Health. Although our knowledge about the effects of COVID-19 to pregnant women is limited, Sahin et al. published a study which evaluates 100 pregnant women with respect to COVID-19 from the very same pandemic hospital and effectively contributed to the associated literature with a large cohort study [49]. Within the pandemic hospital, a reorganization was planned for pregnant women and hospital visits were reduced for normal pregnancies. On the other hand, compared to the normal pregnancy patients, high-risk pregnancy patients require a higher number of hospital visits which they cannot delay or skip. Moreover, they are more likely to be hospitalized. These high-risk pregnancy patients were aware that there were many COVID-19 patients inside the hospital. Having to visit the hospital with this awareness may be considered as a major risk factor for the higher anxiety score of the high-risk pregnancy patients. Furthermore, another factor may be the fact that high-risk pregnancy patients were well-informed about the risks and possible outcomes which can be worsen by the added COVID-19 condition.

Conclusion

In conclusion, this study reports that the result of the COVID-19 pandemic increased the anxiety rates in high-risk pregnancies more than normal pregnancies. High-risk pregnant women require routine anxiety and depression screening and psychosocial support during the COVID-19 pandemic. The strength of our study was the face-to-face evaluation of the patients. To the best of our knowledge, this is the first study which focuses on the psychological effects of the COVID-19 pandemic on high-risk pregnancy patients by comparing with normal pregnancy patients and performing a detailed analysis with respect to a number of variables related with the high-risk status of the pregnancies. However, it was not a specific questionnaire for COVID-19 infection on psychological status. Further investigation needed to perform a validated specific questionnaire for COVID-19 infection on psychological status for correlating the results with the pandemic.

Declaration of Competing Interest

The authors report no declarations of interest.

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