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Does time change the anxiety and depression scores for pregnant women on Covid-19 pandemic?

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Abstract

Objective: Post-traumatic stress disorder, the tip form of stress disorder, is considered as delayed onset if the symptoms occur at least 6 months after the main effect. The aim of our study was to evaluate the severity of anxiety and depression in pregnant women during the coronavirus disease (COVID-19) pandemic, in addition to investigating the demographic and economic aspects affecting maternal anxiety and depression scores, 6 months after the onset of the COVID-19 pandemic.

Methods: Our study was a cross-sectional descriptive study. Pregnant women who had presented to the Akdeniz University, Gynecology and Obstetrics Department, Pregnancy Outpatient Clinic, and Kepez State Hospital, Pregnancy Outpatient Clinic between September 2020 and October 2020 were included in the study. The Spielberger State–Trait Anxiety Inventory (STAI) was used to evaluate the state of anxiety, and the Beck Depression Inventory-II (BDI-II) was used to assess the state of depression. Patients who had encountered any obstetric and/or fetal abnormality that could cause anxiety and depression during pregnancy follow-up and pregnant women previously diagnosed with a psychiatric disease were not included in the study.

Results: A total of 322 pregnant women who agreed to participate in the study and fulfilled the study criteria within the afore-mentioned timeframe were included in the study and the relevant forms were filled out. The mean age of the pregnant women was found to be 29 ± 5.64 years, the mean number of gravida was 1.84 ± 0.86, and the mean gestational age was 29.06 ± 9.80 weeks. The mean score of the state anxiety scale was 41.7 ± 5.56 and the mean trait anxiety score was 47.68 ± 5.85. The mean state–trait anxiety score was determined as 42.5 in primigravid women and as 41.1 in multigravid women. The State–trait anxiety score was statistically significantly higher in primigravid women compared to multigravid women ($p = 0.027$). The mean state–trait anxiety score did not demonstrate a significant difference according to the occupational status, having a chronic disease, educational level, and the income level. The mean trait anxiety score did not differ statistically and significantly according to the occupational status, having a chronic disease, being primigravid, educational status, and the income level. According to BDI-II, 69.3% of pregnant women were evaluated to have minimal depression, 12.4% as mild depression, 12.4% as moderate depression, and 5.9% as severe depression.

Conclusion: Although more than 6 months have passed since the onset of the COVID-19 pandemic, pregnant women still have increased anxiety and depression scores. In addition, it should be kept in mind that pregnant women are at risk in terms of post-traumatic stress disorder during the antenatal and the postnatal periods, and it should be considered that psychological and social support should be provided.

Key words: anxiety, coronavirus, COVID-19 pandemic, depression, pregnancy.

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Introduction

Coronavirus disease (COVID-19) emerged and turned to a serious health threat with the declaration of a new pandemic by the World Health Organization (WHO) on 11 March 2020.[1] The first COVID-19 case in Turkey was also announced on 11 March 2020 and the first loss due to the disease was reported on 17 March. By 6 January 2021, the total number of COVID-19 cases has reached 2 270 101 and the total number of deaths has reached 21 879.[2]

Like all serious health issues, the spectrum of related problems of COVID-19 consists of not only the biological hazards but also the relatively disregarded consequences as psychological effects. Anxiety, stress, and depressive disorders due to the COVID-19 pandemic has previously investigated in some previous studies just after the announcement of the pandemic process.[3,4]

The duration required to diagnose post-traumatic stress disorder (PTSD), the tip form of stress disorder, is at least 4 weeks after the traumatic event. If symptoms last 3 months or more, the situation is accepted as chronic and finally, PTSD is considered as delayed onset if the symptoms occur at least 6 months after the trauma.[5] Due to this perspective, 6-month duration is the longest time for PTSD symptoms to resolve.

There are previous studies about depression, anxiety, and post-traumatic stress disorder during pregnancy. Karataylı et al. found that the levels of anxiety and depression were high in all trimesters of pregnancy.[6] Khoramroudi found that PTSD was common during pregnancy and postpartum and recommended the assessment of these situations.[7] Singh et al. declared the need for the urgent evaluation for the psychological impact of COVID-19 on pregnant women.[8]

In this study, we aim to evaluate the anxiety and depression levels of pregnant women during Covid-19 pandemic, even after 6 months from the first case in Turkey, and also to explore the risk factors for maternal anxiety and depression.

Materials and Methods

Our study was a cross-sectional descriptive study. Pregnant women who had presented to the Akdeniz University, Gynecology and Obstetrics Department, Pregnancy Outpatient Clinic and Kepez State Hospital, Pregnancy Outpatient Clinic between 01 September 2020 and 01 October 2020 were included in the study. The study was evaluated by the Akdeniz University, Faculty of Medicine Clinical Research Ethics Committee and was approved with the decision dated July 08, 2020 and numbered KAEK-468. STAI was used to evaluate the state of anxiety in pregnant women and BDI-II was used to evaluate the state of depression.

The exclusion criteria were determined as pregnant women who had previously been diagnosed with a psychiatric disease or faced with any condition that could cause anxiety and depression during pregnancy (e.g., personal history or family history of COVID-19, situations that complicate pregnancy like systemic disorders, fetal growth restriction, placental insufficiency, fetal screening abnormalities, and so on).

The study material comprised three parts: The first part consisted of a descriptive information form created by the researchers; the second part was the BDI-II questionnaire form consisting of 21 questions, and the third part included another questionnaire form, the STAI, consisting of 40 questions.

In the descriptive information form, the participant's age, gestational week, gravidity status, educational status, having a chronic disease, occupational and income status were questioned. When evaluating the income status, a low-income level was considered as less than 500 USD, moderate-income level as 500–1000 USD, and a high-income level as more than 1000 USD.

There are a total of 40 items in the Spielberger State–Trait Anxiety Inventory. The first 20 items measure the state, and the next 20 items measure the trait anxiety level. In the state anxiety inventory, the answer options collected in four classes are as follows: (1) none, (2) some, (3) much, and (4) totally, and in the trait anxiety scale, they were as follows: (1) almost never, (2) sometimes, (3) much time, and (4) almost always. There are 10 reverse expressions in the Spielberger state anxiety scale. These are items 1, 2, 5, 8, 10, 11, 15, 16, 19, and 20. In the trait anxiety scale, the number of reverse expressions is seven and these constitute the 21st, 26th, 27th, 30th, 33rd, 36th, and 39th items. While the reverse expressions were being scored, those with a weight value of 1 were converted into 4, and those with a weight value of 4 were converted into 1. In the direct expressions, answers with a value of 4 indicated that anxiety was high. In contrast, in the reverse expressions, answers with a value of 1 indicated high anxiety, and those with a value of 4 indicated low anxiety. Two separate

values were obtained by summing the direct and reverse expressions separately. The total weighted score of the reverse expressions was subtracted from the total weighted score obtained for direct expressions, and a predetermined and constant value was added to this number. This constant value was 50 for the state anxiety scale and 35 for the trait anxiety scale. The last value obtained was accepted as the individual's anxiety score.

In the BDI-II assessment, there is a total of 21 items in the scale, and each item scores as 0, 1, 2, or 3. The scores of all the items were summed up. Those with a total score between 0 and 13 were evaluated as minimal depression (BDI-II-0), those with a score of 14–19 as mild depression (BDI-II-1), those with a score between 20 and 28 as moderate depression (BDI-II-2), and those between 29–63 were accepted as severe depression (BDI-II-3).

Statistical Analysis

Statistical analyses were performed using the SPSS version 20 software. The descriptive findings were presented with mean, standard deviation, minimum, maximum for the numerical variables, and frequency and percentage for the categorical variables. In comparison of the means of state and trait anxiety scale and the Beck depression scale scores in terms of the descriptive variables, the *t*-test, the Kruskal–Wallis and the ANOVA analyses were used in the independent groups. The Pearson's correlation test was used to examine the relationship between the State–Trait Anxiety Inventory and the numerical variables of the gestational week, number of pregnancies and age. The cases in which the Type-1 error level was below 5% was interpreted as the diagnostic value of the test was statistically significant.

Results

The mean age of 322 pregnant women included in the study was 29 ± 5.64 years, the mean number of gravida was 1.84 ± 0.86 and the mean gestational age was 29.06 ± 9.80 weeks. Among them, 34.5% of pregnant women had primary education, 39.4% had secondary education, and 26.1% had university degrees (Table 1); 25.2% of pregnant women had professions and 12.7% suffered from chronic diseases; 57.1% of pregnant women previously reported pregnancy. When the income status was examined, 46% had low, 44.1% had moderate, and 9.9% had high incomes (Table 1). The mean score of the state anxiety scale was 41.7 ± 5.56 and the mean trait anxiety score was 47.68 ± 5.85.

The mean state–trait anxiety score did not show a significant difference according to the occupational status, having a chronic disease, educational level, and income level (Table 2). The mean Spielberger state anxiety score was found to be 42.5 in primigravid women and 41.1 in multigravid women. The State anxiety score was statistically significantly higher in primigravid women compared to multigravid women (Table 2, $p = 0.027$). The mean trait anxiety score did not differ statistically significantly according to the occupational status, having a chronic disease, number

Table 1 Descriptive findings of the study group

		Number (*n*: 322) /%	
Age (mean, SD)		29	±5.64
Gravidity (median, range)		1.84	1–4
Gestational week (mean, SD)		29.06	±9.80
Educational status	Primary education	111	34.5%
	Secondary education	127	39.4%
	University	84	26.1%
Profession	Present	81	25.2%
	Absent	241	74.8%
Income status ($)	Low (<500)	148	46%
	Moderate (500–1000)	142	44.1%
	High (>1000)	32	9.9%
Chronic disease	Present	41	12.7%
	Absent	281	87.3%
Previous pregnancy	Present	184	57.1%
	Absent	138	42.9%

Table 2 Comparison of the Spielberger trait and the state anxiety inventory according to descriptive features

		n	Trait anxiety Mean (±SD)	*P*-value	State anxiety Mean (±SD)	*P*-value
Profession	Present	81	47.69 ± 5.64	0.996	41.86 ± 5.84	0.284
	Absent	241	47.68 ± 5.94		41.65 ± 5.47	
Chronic disease	Present	41	47.07 ± 5.26	0.472	41.56 ± 5.13	0.855
	Absent	281	47.77 ± 5.94		41.73 ± 5.62	
Previous pregnancy	Present	184	47.17 ± 6.06	0.070	41.11 ± 5.52	***0.027***
	Absent	138	48.36 ± 5.51		42.5 ± 5.52	
Educational status	Primary education	111	48.54 ± 5.55	0.114	41.74 ± 5.51	0.644
	Secondary education	127	47.52 ± 6.33		41.39 ± 5.49	
	University	84	46.80 ± 5.39		42.13 ± 5.75	
Income status ($)	Low (<500)	148	48.08 ± 5.51	0.310	41.47 ± 5.38	0.732
	Moderate (500–1000)	142	47.52 ± 6.33		41.98 ± 5.67	
	High (>1000)	32	46.80 ± 5.39		41.59 ± 5.96	

of gravidity, educational status, and the income level ($p > 0.05$) (Table 2).

According to BDI-II, 69.3% of pregnant women had minimal depression (BD-II-0), 12.4% had mild depression (BDI-II-1), 12.4% had moderate depression (BDI-II-2), and 5.9% had severe depression (BDI-II-3) (Table 3). There was no statistically significant difference between the four groups formed by the BDI-II assessment in terms of age, gestational week and the number of pregnancies ($p > 0.05$). There was no statistically significant difference between the two groups formed by the BDI-II assessment in terms of age, gestational week, and the number of pregnancies ($p > 0.05$) (Table 3). When the BDI-II was evaluated according to the educational level, minimal depression levels were determined as 63.1% in primary school graduates, as 68.5% in secondary education graduates, and as 78.6% in university graduates. Mild, moderate, and severe depression levels were determined as 36.9% in primary school graduates, as 31.5% in secondary education graduates and as 21.4% in university graduates. As the education level increased, the percentages of mild, moderate, and severe depression were observed to decrease, but no statistically significant difference was observed between the groups ($p = 0.065$) (Table 3).

When BDI-II was compared according to the occupational status, among those who had a profession, minimal depression was found at a rate of 75.3%, and mild, moderate, and severe depression as 24.7%. For those who did not have a profession, these rates were determined as 67.2% and 32.8%, respectively. The depression severity was found to be increased in those who did not have a profession, but no significant statistical difference was observed between the groups ($p = 0.210$) (Table 3).

When compared in terms of the income status, it was found that minimal depression was 64.9% in patients with low income, 35.1% in patients with mild, moderate, and severe depression, and 71.8% and 28.2% in the moderate-income groups, and 78.1% and 21.9% in the high-income groups, respectively. As the income level increased, the severity of depression was found to decrease, and no statistically significant difference was observed ($p = 0.227$) (Table 3).

In those suffering from chronic disease, the minimal depression rate was 75.6%, the mild, moderate, and severe depression rates were 24.4%, and in those without chronic disease, these rates were 68.3% and 31.4%, respectively. Lower depression rates were found in those with chronic diseases and no statistically significant difference was observed ($p = 0.469$) (Table 3).

The mean state anxiety score was 42.17 in those with minimal depression (0–13 points) and 40.6 in those in the other groups (14–63 points). In patients with minimal depression, the state anxiety score was statistically significantly higher than the other groups ($p = 0.021$) (Table 3). The mean trait anxiety score was 46.9 in those with minimal depression (0–13 points) and 49.3 in those in the other groups (14–63 points). In those with minimal depression, the trait anxiety score was statistically significantly lower than that of the other groups ($p = 0.001$), (Table 3).

Numerical variables of age, number of pregnancies, gestational week, and state anxiety score were not correlated. Age, number of pregnancies, gestational

Table 3 Comparison of Beck depression scale-II according to descriptive features

		BDI-II (0) *n*:223	BDI-II(1, 2, 3) *n*:99	Total *n*: 322	*p*-value
Age (mean/SD)		29.26 ± 5.58	28.43 ± 5.58		0.227
Gestational week (mean/SD)		28.94 ± 9.82	29.33 ± 9.79		0.741
Number of pregnancies (mean/SD)		1.85 ± 0.83	1.80 ± 093		0.694
Profession	Present	61 (%75.3)	20 (%24.7)	81 (%100)	0.210
	Absent	162 (%67.2)	79 (%32.8)	241 (%100)	
Chronic disease	Present	31 (%75.6)	10 (%24.4)	41 (%100)	0.469
	Absent	192 (%68.3)	89 (%31.7)	281(%100)	
Educational status	Primary education	70 (%63.1)	41 (%36.9)	111(%100)	0.065
	Secondary education	87 (%68.5)	40 (%31.5)	127(%100)	
	University	66 (%78.6)	18 (%21.4)	84 (%100)	
Income level	Low	96 (%64.9)	52 (%35.2)	148 (%100)	0.227
	Moderate	102 (%71.8)	40 (%28.2)	142 (%100)	
	High	25 (%78.1)	7 (%21.9)	32 (%100)	
State anxiety score		42.17 ± 5.61	40.65 ± 5.30		***0.021***
Trait anxiety score		46.96 ± 5.83	49.3 ± 5.62		***0.001***

Note: Bold values represent statistically significant at $p < 0.05$. and Abbreviation: BDI-II, Beck depression inventory.

Table 4 Correlation of Spielberger state trait anxiety inventory scores with age, number of pregnancy and week of gestation

	$n = 322$	r (correlation coefficient)	p-value
Age (year)	State	−0.043	0.439
	Trait	−0.044	0.431
Number of pregnancies	State	−0.046	0.407
	Trait	−0.033	0.551
Gestational week	State	−0.071	0.204
	Tait	−0.031	0.575

week, and trait anxiety score were not correlated ($p > 0.05$) (Table 4).

Discussion

In this study, we investigated the presence and severity of depression and anxiety in pregnant women 6 months after the onset of the COVID-19 pandemic. The reason for determining a 6-month period was that this is the longest specified time to overcome post-traumatic stress disorder. As a result of our study, we found that 12.4% of pregnant women had mild depression, 12.4% had moderate depression, and 5.9% had severe depression. Increased anxiety symptoms were found in primigravid women, but there was no difference between the depression scores. Furthermore, no statistically significant difference was found in our study in terms of anxiety and depression related to age and chronic disease.

One of the known medical facts is that anxiety disorders and depressive disorders are more common in women.[9] With the onset of the COVID-19 pandemic, studies have been conducted to investigate the effects of the disease on the psychological outcomes of society and pregnancy. In the study by Özdin et al., which was conducted in the early stages of the pandemic and included 343 participants, higher levels of depression, anxiety, and health anxiety in women suggested that the psychiatric impact of the COVID-19 pandemic may be greater on women.[10] Similarly, in the study conducted by Wang et al., which included 600 participants in the People's Republic of China during the pandemic, it was reported that the rate of anxiety in women was 3.01 times higher than in men. It is thought that women who were pregnant during the COVID-19 pandemic may have been particularly affected, as women tend to report higher symptoms of anxiety and depression than men during disease outbreaks.[11] According to the study conducted by Broody et al. in the USA between 2013 and 2016, before the COVID-19 pandemic, the prevalence of depression in adults over the age of 20 was reported to be 8.1%.[12] In a meta-analysis performed

by Woody et al. in pregnant women with similar demographic characteristics in the pre-pandemic period, it was reported that perinatal depression affected 11.9% of the cases in any period of pregnancy.[13] When these studies conducted before the pandemic were evaluated, there was a higher frequency of depression in pregnant women compared to the society, even in normal living conditions. In our study, clinically significant depression was found in 30.7% of the pregnant women. When our findings were compared with the studies mentioned, we think that the pandemic process may have a significant effect on the increase in the frequency of perinatal depression.

The COVID-19 pandemic has affected many aspects of daily life worldwide, increasing anxiety in individuals globally, leading to mental health disorders.[14] In the initial period of the pandemic, in their study with 1210 participants in the People's Republic of China, Wang et al. reported 13.8% mild depression, 12.2% moderate depression, and 4.3% severe and very severe depression.[11] In the study conducted by Choi et al. in Hong Kong, the prevalences of depression and anxiety were reported as 19.8% and 14.2%, respectively.[15] In our study, 12.4% of the pregnant women had mild depression, 12.4% had moderate depression, and 5.9% had severe depression symptoms. When compared with the studies mentioned, the results suggest that pregnant women are psychologically affected partially more negatively during the COVID-19 pandemic. However, it can be thought that these results may have been affected by the differences in living conditions between countries, by different levels of economic opportunities and pregnancy itself being a stress factor. Furthermore, the unknown long-term effects of COVID-19 on the fetus is also a concern for pregnant women.

Individuals experiencing pregnancy for the first time may experience relatively more fear of birth, anxiety about the health status of the baby, and increased anxiety due to the physical changes they experience.[16] As a matter of fact, in our sample, more anxiety was found in primigravid women compared to multigravid women. Similar to our study, in the study of Lebel et al., which included 1987 participants, in whom the increased depression and anxiety symptoms in pregnant individuals during the COVID-19 epidemic in Canada were evaluated, clinically high depression symptoms were detected in 37% of the participants. Clinically, high anxiety symptoms were detected in 56.6% of the participants. In this study, when anxiety and depression symptoms were compared in terms of parity, they found that pregnancy-related anxiety symptoms were higher in nulliparous individuals ($p < 0.0001$). However, they stated that the anxiety and depression findings did not differ when compared in terms of parity.[17] In our study, increased anxiety was found in primigravid women, but no difference was found between the depression scores. As we mentioned at the beginning, it is thought that there may be an increase in anxiety caused by first pregnancy, fear of birth, maternal health, the health of the baby, first-time parenting, and financial and social competence.

In a retrospective study, they conducted in the People's Republic of China, Zhou et al. identified that advanced age and having concomitant chronic diseases were the most important risk factors for death due to COVID-19.[18] In addition, in the meta-analysis conducted by Wang et al., the risk of contracting the disease was found to be increased in individuals with chronic diseases and in elderly people.[19] Consistent with all these findings, an increase in depression and anxiety levels is expected in individuals with chronic diseases. However, in our study, there was no statistically significant difference in terms of age-related and chronic disease-related anxiety and depression. It can be thought that this result is due to the fact that the gestational period takes place at a certain age range and that the age difference between pregnant women does not vary significantly. The correlation between the educational and knowledge level may reduce the level of anxiety caused by not knowing. Individuals with higher education have higher levels of knowledge about COVID-19.[20] In our study, the prevalence of clinically significant depression was 36.9% in the primary school graduate group, 31.5% in the secondary school graduate group, and 21.4% in the university graduate group. These results show that the higher the educational level, the lower the clinically significant frequency of depression. Likewise, as the income level increased, the frequency of depression also decreased; the frequency of depression was found to be 35.1% in the low-income group, 28.2% in the moderate-income group, and 21.9% in the high-income group. However, no difference was found in terms of anxiety levels. Similar to the results of our study, in a study conducted by Wang et al. in the People's Republic of China, it was found that variables such as profession, education and the income level affected the anxiety and depression symptoms developing during the pandemic. They found that individuals with a bachelor's degree had a 0.39-fold increased risk of depression compared to those with a master's degree. In the online survey conducted by Shi Le et al. with 56 679 participants in the People's Republic

of China, it was found that participants with a job had fewer depression symptoms compared to those without a job. They found higher symptoms of depression in low-income participants.[21] Differently, they stated that there was no difference between the educational level and symptoms of depression.

Although it has been a year since the onset of the Covid 19 pandemic, it can be thought that depression and anxiety are high in the society, especially in pregnant women, in many studies conducted in the early period and up to this period, and as a result, the rates of PTSD may also be high. Questions with no definite answer such as when the epidemic will end and the treatment methods, constant exposure to the flow of information about the epidemic and its effects decrease in social relations due to the pandemic and suggestions such as isolation as much as possible can adversely affect the mental health of individuals. At the same time, the number of patients with the disease and the mortality rates continue to increase rapidly. Measures should be taken to determine the PTSD rates with future studies and to reduce the incidence through early diagnosis. All these factors can cause negative psychological effects during pregnancy. Given the potential consequences of untreated anxiety and depression symptoms during pregnancy on physical and psychological outcomes, psychological evaluations are needed to prevent and treat depression and anxiety.

The cross-sectional design of our study is one of the main limitations. For this reason, it is not possible to draw conclusions about its long-term outcomes. In addition, it was not possible to compare the anxiety and depression scores, since the control group could not be formed, and sampling methods could not be used in pregnant women in the same society due to the continuation of the pandemic.

As a result, pregnant women had increased anxiety and depression scores in the COVID-19 pandemic for a significant period (despite 6 months having passed) since the onset of the pandemic. In addition to all medical research and developments in the treatment of COVID-19, it should be kept in mind that all stages of this pandemic and new pandemics that will develop in the future, even if a certain period of time passes and habituation develops, may cause psychological damage and preparations should be made for the necessary support.

Conflict of Interest

None declared.

Data Availability Statement

Data openly available in a public repository that issues datasets with DOIs.

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