



The Effect of COVID-19 Pandemic on Depression, Anxiety and Stress Levels of Pregnant Women

Hamile Kadınlarda COVID-19 Pandemisinin Depresyon, Anksiyete ve Stres Düzeyleri Üzerine Etkisi

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Abstract

Objective: Coronavirus disease-2019 (COVID-19) pandemic has negatively affected the psychology of the society. In this study, it was aimed to determine the stress, anxiety and depression levels in pregnant women during the COVID-19 pandemic and to investigate the delivery method attitudes using various scales.

Method: The study included 151 pregnant women admitted to the obstetrics and gynecology clinic of our tertiary hospital for follow-up. A 31-question questionnaire containing demographic information and questions about COVID-19, impact of event scale (IES-R), depression anxiety stress scale-21 (DASS-21) and revised pregnancy-related anxiety questionnaire-revised (PRAQ-R) scales were applied.

Results: According to the classifications made in DASS-21 subgroups, 16.5% of the pregnant women had severe or extreme depression, 35.1% had severe or extreme anxiety, 11.2% had severe or extreme stress level. The mean IES-R and PRAQ-R scores were found to be significantly higher in those under 35 years of age than those aged 35 years and over ($p=0.02$ and $p=0.01$, respectively). PRAQ-R ($p<0.001$), DASS-21 total ($p=0.019$), DASS-21 anxiety ($p=0.012$) and DASS-21 stress ($p=0.014$) scores were significantly higher in those who had their first pregnancy compared to experienced pregnant women.

Conclusion: In the present study, it was determined that the pandemic had a negative effect on the depression, anxiety and stress levels of pregnant women, and this effect was higher especially in younger pregnant women and in those experiencing their first pregnancy.

Keywords: Anxiety, COVID-19, depression, pandemic, pregnancy

Öz

Amaç: Koronavirüs hastalığı-2019 (COVID-19) salgını toplumun psikolojisini olumsuz etkilemiştir. Bu çalışmada, gebelerde COVID-19 salgını sırasında yaşanan stres, anksiyete ve depresyon düzeylerinin belirlenmesi ve çeşitli ölçeklerle doğum yöntemi tutumlarının incelenmesi amaçlanmıştır.

Yöntem: Çalışmaya üçüncü basamak hastanemizin kadın hastalıkları ve doğum kliniğine takip için başvuran 151 gebe dahil edildi. Gebelerin hepsine demografik bilgilerini içeren ve COVID-19, olay etkisi ölçeği (IES-R), depresyon anksiyetesi stres ölçeği-21 (DASS-21) ve gözden geçirilmiş gebelik ile ilgili anksiyete anketi (PRAQ-R) ile ilgili soruları içeren 31 soruluk bir anket uygulandı.

Bulgular: DASS-21 alt gruplarında yapılan sınıflandırmalara göre, gebelerin %16,5'i şiddetli veya aşırı depresyon, %35,1'i şiddetli veya aşırı anksiyete, %11,2'si şiddetli veya aşırı stres düzeyine sahipti. Otuz beş yaşın altındakilerde ortalama IES-R ve PRAQ-R puanları 35 yaş ve üzerinelere göre anlamlı derecede yüksek bulundu (sırasıyla $p=0,02$ ve $p=0,01$). İlk defa hamile olanlarda PRAQ-R ($p<0,001$), DASS-21 toplam ($p=0,019$), DASS-21 anksiyete ($p=0,012$) ve DASS-21 stres ($p=0,014$) puanları daha önce gebelik geçiren kadınlara göre yüksekti.

Sonuç: Bu çalışmada, salgının gebelerin depresyon, anksiyete ve stres düzeylerini olumsuz etkilediği, bu etkinin özellikle genç gebelerde ve ilk gebeliğini yaşayanlarda daha da yüksek olduğu tespit edilmiştir.

Anahtar kelimeler: Anksiyete, COVID-19, depresyon, hamilelik, pandemi

Introduction

Pregnancy is a condition in which psychological sensitivity increases due to many hormonal and physiological factors. The threshold value for psychological disorders may decrease and abnormal psychological conditions can be seen more frequently in pregnancy (1,2). Psychological disorders that can be seen during pregnancy can mostly be well tolerated. However, in some cases, the excessive increase of the level of these disorders can lead to adverse situations and complications for the pregnant woman, pregnancy and the baby. Therefore, the psychological status of pregnant women should be closely followed up (1-3).

Various scales have been created to determine the psychological conditions, the presence of stress, anxiety and depression, and their levels in pregnant women (4). Some of these scales measure the psychological effects of environmental events on pregnant women, while others only determine the levels of anxiety about pregnancy and baby. The mental state of a pregnant determined by these scales can provide the necessary precautions to be taken more appropriately and early and an appropriate rehabilitation program to be implemented (4,5).

Coronavirus disease-2019 (COVID-19), known as the new coronavirus disease, has caused a major pandemic in 2020 and 2021. The COVID-19 pandemic has negatively affected the psychology of the pregnant women (6). In this study, it was aimed to determine the stress, anxiety and depression levels of pregnant women during the COVID-19 pandemic using various scales.

Materials and Methods

Approval was obtained from the University of Medipol Ethics Committee for non-interventional clinical trials within our institution (date: 02.01.2020; number: 001212). It was made with the permission of the Ministry of Health (2020-05-19T13_03_28). Written informed consent was obtained from all participants.

Patients

The study included 151 pregnant women who were admitted to the gynecology and obstetrics clinic of our tertiary care hospital for follow-up purposes and who had no health problems. Pregnant women who developed pregnancy-related complications, who had a previous history of psychiatric disease, and who had a history of a chronic disease were excluded from the study. All of these 151 patients were followed by the same author until the end of pregnancy.

Some scales have been developed to determine the levels of anxiety and depression in pregnant women. While these scales may have some advantages over each other, they may also have some shortcomings (7). Therefore, four separate scales were used in the present study and the effects of COVID-19 on pregnant women were tried to be determined from different aspects. A survey of 31 questions including demographic information and questions about COVID-19, impact of event scale (IES-R), depression anxiety stress scale-21 (DASS-21) and revised pregnancy-related anxiety questionnaire-revised (PRAQ-R) scales were applied to all participants. The scales were evaluated and analyzed by an experienced psychiatrist.

IES-R

IES-R is a scale that defines trauma-related psychological effects. It consists of 22 questions in total and is scored as never (0), a little (1), more or less (2), quite (3), and extreme (4). In this study, the main event was identified as the COVID-19 pandemic and questions were asked. Higher score means higher level of exposure (5,8).

Scores are classified as follows:

24-32: Those with these high scores, who do not have full post-traumatic stress disorder (PTSD), will have partial PTSD or at least some of the symptoms (9).

33-38: This represents the best cutoff for a probable diagnosis of PTSD (10).

39 and above: This is high enough to suppress your immune system's functioning (even 10 years after an impact event) (11).

DASS-21

DASS-21 is a questionnaire consisting of 21 questions about depression, anxiety and stress. The questions are scored as never (0), sometimes or occasionally (1), quite often (2) and always (3). Accordingly, each category was classified as normal, mild, moderate, severe and extreme (7,12). "Severe" was evaluated as 11 points and above in the depression subscale, as 8 points and above in the anxiety subscale, and as 13 points and above in the stress subscale.

PRAQ-R

PRAQ-R is a questionnaire consisting of 10 questions determining the anxiety levels of pregnant women related to pregnancy, birth and baby. The questions are scored as "strongly disagree" (1), "disagree" (2), "slightly agree" (3), "agree" (4) and "strongly agree" (5). The score can be between 10 and 50 points. Higher score means higher level

of exposure (13,14).

Statistical Analysis

All statistical analyses in the study were done using SPSS 25.0 software (IBM SPSS, Chicago, IL, USA). Descriptive data were given as numbers and percentages. In terms of categorical variables, comparisons between groups were made with the Pearson's chi-square test and Fisher's Exact test. Whether continuous variables were suitable for normal distribution was confirmed by the Kolmogorov-Smirnov test. The differences between the groups in terms of continuous variables were analyzed using the Student's t-test, and the comparison of mean values between multiple groups by variance analysis. The relationship between continuous variables was tested using the Spearman's correlation analysis. The results were evaluated within the 95% confidence interval, and $p < 0.05$ values were considered significant. Bonferroni correction was made where appropriate.

Results

The median age of the pregnant women included in the study was 30 years (22-44 years, minimum-maximum). A total of 129 women were under the age of 35 years, and 22 of them were 35 years old or older. The median week of gestation in women was 28 weeks (10-39 weeks, minimum-maximum) (Table 1).

In women, the mean total IES-R score was 24.9 ± 12.2 , the mean total PRAQ-R score was 27.4 ± 7.4 , the mean total DASS-21 score was 9.7 ± 7.7 . Among the DASS-21 subgroups, the mean depression score was 2.8 ± 2.8 , the anxiety score was 2.8 ± 2.6 , and the stress score was 4.1 ± 3.2 (Table 1).

Table 1. The mean values of age, gestational week and total score percentages

	Mean	SD	Minimum	Maximum
Age (years)	30 (Median)	-	22	44
Pregnancy week (week)	28 (Median)	-	10	39
IES-R	24.9	12.2	0	53
PRAQ-R	27.4	7.4	11	49
DASS-21	9.7	7.7	0	38
DASS-21 depression score	2.8	2.8	0	15
DASS-21 anxiety score	2.8	2.6	0	11
DASS-21 stress score	4.1	3.2	0	13

IES-R: Impact of events scale, PRAQ-R: Pregnancy-related anxiety questionnaire, DASS-21: Depression anxiety stress scale-21, SD: Standard deviation

A total of 72.8% of the women had a university or higher education, 57% were working in a paid job. According to the classifications made in DASS-21 subgroups, 16.5% of the pregnant women had severe or extreme depression, 35.1% had severe or extreme anxiety, 11.2% had severe or extreme stress level. The rate of pregnant women who changed hospitals or physicians due to COVID-19 was 21.2% (Table 2).

The mean IES-R and PRAQ-R scores were found to be significantly higher in those under 35 years of age than those aged 35 years and over ($p=0.02$ and $p=0.01$, respectively). There was no difference in scale scores between the group with a family diagnosed with COVID-19 and the group with no relatives with COVID-19. DASS-21 ($p=0.019$), PRAQ-R ($p<0.001$), DASS-21 anxiety ($p=0.012$) and DASS-21 stress ($p=0.014$) scores were significantly higher in those who were experiencing their first pregnancy (Table 3).

There was no significant difference between education and job groups in terms of scale scores. PRAQ-R score was significantly higher in those living on minimum wage compared to other groups ($p=0.011$). The IES-R and DASS-21 scores were significantly lower in those who said they had sufficient or fair knowledge about COVID-19 than those who said they had little or moderate knowledge ($p=0.022$ and $p=0.001$, respectively) (Table 4).

Scale scores were found to be significantly correlated with each other in correlation analysis. Week of gestation was significantly correlated only with the IES-R score ($p=0.016$; $r=0.185$) (Table 5).

It was seen that the highest scores in the IES-R scale belonged to the perceptions about the pandemic, the DASS-21 scale to the unreasonable fears, and the PRAQ-R scale to the questions about pain, birth and baby's health. According to all scales, the anxiety about a possible harm to the baby and not getting medical help were found to be significant during the pandemic period (Table 6).

Discussion

In this study, it was determined that the pandemic had a negative effect on the depression, anxiety and stress levels of pregnant women, and this effect was higher especially in younger pregnant women and in those experiencing their first pregnancy. Therefore, women who are thinking of pregnancy during the pandemic process should be given information about the effects of the COVID-19 virus on pregnancy and support should be provided to reduce anxiety.

Table 2. Distributions of some variables and DASS-21 subgroups

	n	%
Education status		
Primary school	9	6.0
High school	32	21.2
University	100	66.2
Postgraduate	8	5.3
Doctorate	2	1.3
Working condition		
Self employed	8	5.3
Paid employee	78	51.7
Not working	65	43.0
COVID-19 in the family	10	6.6
Changing physician/hospital due to COVID-19	32	21.2
Anxiety of getting COVID-19		
Extreme	4	2.6
Very	10	6.6
Moderate	73	48.3
Little	47	31.1
None	17	11.3
Anxiety about harm to the baby		
Extreme	18	11.9
Very	43	28.5
Moderate	55	36.4
Little	25	16.6
None	10	6.6
DASS-21 subgroups	n	%
DASS-21 depression		
Extreme	12	7.9
Severe	13	8.6
Moderate	28	18.5
Mild	29	19.2
Normal	69	45.7
DASS-21 anxiety		
Extreme	32	21.2
Severe	21	13.9
Moderate	28	18.5
Mild	21	13.9
Normal	49	32.5
DASS-21 stress		
Extreme	7	4.6
Severe	10	6.6
Moderate	27	17.9
Mild	14	9.3
Normal	93	61.6

DASS-21: Depression anxiety stress scale-21, COVID-19: Coronavirus disease-2019

Table 3. Comparisons between mean score percentages according to some variables

	Age		p
	<35 years	≥35 years	
IES-R	25.9±11.5	19.4±14.2	0.020
PRAQ-R	28.1±7	23.7±9.1	0.010
DASS-21	9.9±7.7	7.5±7.4	0.166
DASS-21 depression score (%)	6±5	4.9±5.1	0.346
DASS-21 anxiety score (%)	6.8±5.5	5.1±5.2	0.164
DASS-21 stress score (%)	7±5.3	4.9±4.8	0.088
	COVID-19 in the family		p
	Present	Absent	
IES-R	23.4±12.2	25.1±12.2	0.675
PRAQ-R	29.6±5.3	27.3±7.6	0.356
DASS-21	12.4±6.8	9.3±7.7	0.224
DASS-21 depression score (%)	7.2±4.4	5.7±5	0.376
DASS-21 anxiety score (%)	8.9±4.4	6.4±5.5	0.164
DASS-21 stress score (%)	8.7±5.2	6.5±5.2	0.208
	Parity		p
	0-1	2-4	
IES-R	26.7±12.5	23.6±11.8	0.124
PRAQ-R	30.1±7	25.5±7.2	<0.001
DASS-21	11.2±8.4	8.3±6.8	0.019
DASS-21 depression score (%)	6.7±5.4	5.2±4.6	0.064
DASS-21 anxiety score (%)	7.8±6	5.6±4.8	0.012
DASS-21 stress score (%)	7.9±5.7	5.8±4.7	0.014

Independent samples t-test was used. IES-R: Impact of events scale, PRAQ-R: Pregnancy-related anxiety questionnaire, DASS-21: Depression anxiety stress scale-21, COVID-19: Coronavirus disease-2019

The COVID-19 pandemic has been a major public issue in terms of mental health (15). In a large-scale study, it was found that during the COVID-19 pandemic, pregnant women showed a significantly higher rate of depression and anxiety symptoms, dissociative symptoms, and PTSD symptoms compared to pregnant women before COVID-19 (16). Studies have reported that the level of depression and anxiety in pregnant women increased significantly during the COVID-19 pandemic (17-19). In this study, the mean IES-R, DASS-21 and PRAQ-R scores in women show that the COVID-19 pandemic causes an increase in anxiety, depression and stress levels in pregnant women. However, the fact that the PRAQ-R scale score is much higher than the other survey scores means that the pregnant women are in a state of stress associated with their pregnancy rather than anxiety against COVID-19. All these findings show that the COVID-19 pandemic generally causes negative psychological effects in pregnant women.

It has been found that younger age in pregnant women is associated with a higher rate of maternal psychological stress disorder caused by COVID-19 (16). Wu et al. (20) found that pregnant women under 35 years of age had a higher risk of depression and anxiety during the pandemic period. Dagklis et al. (21) found that pregnant women aged 35 years and over had a 1.1-fold higher risk of anxiety caused by COVID-19 compared to those under the age of 35 years. In the present study, the mean IES-R score, PRAQ-R score and DASS-21 stress score were found to be significantly higher in women under the age of 35 years. These findings show that younger pregnant women are significantly more affected by the psychology of the COVID-19 pandemic, and that these pregnant women have a higher risk for increase in anxiety, depression and stress levels.

It has been found that low education level in pregnant women is associated with a higher rate of maternal psychological stress disorder caused by COVID-19 (18).

Table 4. Comparisons between mean score percentages by variables (mean \pm SD)

		IES-R	PRAQ-R	DASS-21
Education level	p	0.735	0.706	0.308
Primary/high school		25.5 \pm 10.9	27.1 \pm 8	8.5 \pm 6.1
University or higher		24.8 \pm 12.6	27.6 \pm 7.3	9.9 \pm 8.2
Income level (5 groups)	p	0.942	0.011*	0.724
Working status	p	0.615	0.16	0.12
Self employed		22.3 \pm 8.3	26.1 \pm 7.8	5.7 \pm 4.4
Paid employee		24.4 \pm 12.2	28.7 \pm 8	10.6 \pm 8.6
Not working		25.9 \pm 12.6	26.3 \pm 6.7	8.9 \pm 6.6
Knowledge level	p	0.022	0.099	0.001
Little/moderate		28.6 \pm 12.3	29.2 \pm 7.1	12.2 \pm 7.4
Sufficient/quite		23.6 \pm 11.8	26.9 \pm 7.5	8.5 \pm 7.5

One-Way ANOVA method was used. *Higher in the minimum wage group compared to other groups. IES-R: Impact of events scale, PRAQ-R: Pregnancy-related Anxiety questionnaire, DASS-21: Depression anxiety stress scale-21, SD: Standard deviation

Table 5. Correlation analysis between gestational week and scale total scores

		Gestational week	IES-R	DASS-21
IES-R	r	0.185	-	-
	p	0.016	-	-
DASS-21	r	0.132	0.696	-
	p	0.085	<0.001	-
PRAQ-R	r	0.008	0.348	0.454
	p	0.920	<0.001	<0.001

IES-R: Impact of events scale, PRAQ-R: Pregnancy-related Anxiety questionnaire, DASS-21: Depression anxiety stress scale-21

Durankuş and Aksu (19) found that pregnant women with more education years had a lower level of depression. However, we did not find any difference between education groups. Similarly, Dong et al. (22) reported that there was no relationship between educational status and anxiety.

It has been stated that low income in pregnant women is associated with a higher rate of maternal psychological stress disorder caused by COVID-19 (16). Wu et al. (20) found that pregnant women with middle income had a higher risk of depression and anxiety during the pandemic. In the present study, the PRAQ-R score was significantly higher in the lowest income group living on the minimum wage compared to the other groups. This has shown us that the COVID-19 pandemic has a more negative psychological effect, especially in pregnant women with low income.

We found that COVID-19 had a more negative effect on the generally high stress levels of pregnant women experiencing the first pregnancy, and that these pregnant women were particularly concerned about their pregnancies and their children to be born. However, it has been reported that COVID-19 causes more negative psychological effects in pregnant women with more children (19). Dagklis et al. (21) reported that those with higher number of pregnancies had a 1.2-fold higher risk of anxiety caused by COVID-19 compared to women with first pregnancy. Conversely, Wu et al. (20) found that women experiencing the first pregnancy had a higher risk of depression and anxiety during the pandemic. According to these findings, it can be thought that the main concern in pregnant women with a high number of children is the pregnancy itself and not the child to be born, but their present children.

It has been stated that there is no significant relationship between the level of knowledge about COVID-19 and depression level caused by COVID-19 in pregnant women (19). In the present study, those who said they had sufficient or fair knowledge about COVID-19 were found to be significantly lower than those who said they had little or moderate knowledge in all three scales. The fact that the anxiety and depression scores due to COVID-19 are significantly lower in pregnant women who think that they have more knowledge may suggest that the information will have a positive effect on the psychological mood. Additionally, the rate of pregnant women infected by COVID-19 in their family was 6.6%. Although all scores were high in all of these cases, no statistical difference was observed. However, it was observed that this did not affect the overall depression, stress and anxiety scores.

Table 6. The mean scores according to the groups of concern about harm to the baby and the groups of anxiety not to get medical help

	Groups of anxiety about harm to the baby					p
	None	A little	Moderate	Very much	Extreme	
IES-R total score	6.8±6.5	21.6±8.7	23.7±11.1	27.7±11	36.8±10.4	<0.001
PRAQ-R total score	17.4±7.8	25.6±5.3	25.8±5.3	30.6±6.7	33.2±8.6	<0.001
DASS-21 total score	1.3±2.1	7.5±6.7	8.3±6	11.6±8	17.3±8.2	<0.001
DASS-21 depression	0.3±0.7	2.5±3.3	2.5±2.2	3.3±3.2	4.6±2.6	0.001
DASS-21 anxiety	0.2±0.4	1.7±2	2.4±2.2	3.4±2.3	5.8±3.2	<0.001
DASS-21 stress	0.8±1.8	3.3±2.6	3.4±2.6	4.9±3.3	6.9±3.6	<0.001
	Groups of anxiety about not getting medical help					p
	None	A little	Moderate	Very much	Extreme	
IES-R total score	21±11.1	27.1±9.2	33.7±10.9	30±0	42.2±12.6	<0.001
PRAQ-R total score	25.6±7.2	30±6.5	29.4±6.5	40±0	36±6.7	<0.001
DASS-21 total score	7.5±5.9	13.6±8.8	12.7±9.3	4±0	17.2±9.1	<0.001
DASS-21 depression	2.1±2	4.3±3.6	3.8±3.5	0±0	4.8±3	<0.001
DASS-21 anxiety	2.1±2.1	4±3	3.9±3.1	3±0	5±3	<0.001
DASS-21 stress	3.3±2.7	5.3±3.7	5±3.5	1±0	7.4±3.9	0.001

IES-R: Impact of events scale, PRAQ-R: Pregnancy-related anxiety questionnaire, DASS-21: Depression anxiety stress scale-21

Dong et al. (22), in their study with 156 pregnant women, found no significant correlation between week of pregnancy and level of depression caused by COVID-19. In another study, it was found that anxiety level increased in the later trimesters (21). In the present study, in the correlation analysis performed, gestational week was found to be significantly correlated only with the IES-R score. These findings may show that pregnant women whose births were approaching may have been affected more negatively by the COVID-19 pandemic compared to the scale of the effects of the events.

Wu et al. (20) found that pregnant women working full-time have a higher risk of depression and anxiety during the pandemic. In the present study, there was no significant difference between the job groups in terms of scale scores. It may be more appropriate to evaluate the relationship of the job situation with the psychology of the COVID-19 pandemic together with the economic and social rights and socioeconomic status of pregnant women in each country.

In this study, it was observed that 35.1% of pregnant women had severe or very severe anxiety about harm to the baby due to COVID-19. Yang et al. (6) reported this rate as 7.8%. Ravaldi et al. (23) reported the rate of patients with anxiety symptoms as 21.7%. Corbett et al. (18) found that during the COVID-19 pandemic process, pregnant women experienced the most anxiety about their elderly relatives, children and unborn babies, respectively. Additionally, they

found that pregnant women had least but still significant anxiety about their own health. Fakari and Simbar (24) also reported that pregnant women were most anxious about their relatives and unborn babies during the COVID-19 pandemic, and they determined that these pregnant women were hesitant to go to the hospital for controls. Studies show that, similar to our study, the proportion of pregnant women concerned about the health of their unborn babies is high. (17,23).

It was seen that the highest scores in the IES-R scale belonged to the rate of thinking about the pandemic. This finding shows that pregnant women are aware of that the COVID-19 pandemic disturbs them, they unintentionally think about this pandemic and try to avoid this thought. It was observed that the highest scores in the DASS-21 scale belong to unreasonable fears. This finding may indicate that COVID-19 causes a negligible but significant deterioration in mental health of pregnant women. In the PRAQ-R scale, it was observed that the highest scores were related to pain, birth and the health of the baby. These items do not appear to be directly related to the COVID-19 pandemic. Scale scores were found to be significantly correlated with each other in correlation analysis. This finding shows that the scales are in accordance with each other.

Study Limitations

There were some limitations in the present study. Since the present study was planned on a cross-sectional and scale

basis, the changes in the psychological states of pregnant women after pregnancy were not observed and evaluation could not be made on this issue.

Conclusion

The COVID-19 pandemic is deeply affecting the mental health of pregnant women, and pregnancy-specific anxiety changes seem to be caused by factors independent of pregnancy. This study is one of the few studies examining the psychological effects of the COVID-19 pandemic in pregnant women with scale data. It was determined that the pandemic had a negative effect on the depression, anxiety and stress levels of pregnant women, and this effect was higher especially in younger pregnant women and in those experiencing their first pregnancy.

Ethics

Ethics Committee Approval: Approval was obtained from the University of Medipol Ethics Committee for non-interventional clinical trials within our institution (date: 02.01.2020; number: 001212).

Informed Consent: It was made with the permission of the Ministry of Health (2020-05-19T13_03_28). Written informed consent was obtained from all participants.

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Authorship Contributions

Concept: E.Ç.E., S.G.Ş., Design: E.Ç.E., S.G.Ş., Data Collection or Processing: E.Ç.E., Analysis or Interpretation: S.G.Ş., Drafting Manuscript: E.Ç.E., S.G.Ş., Final Approval and Accountability: E.Ç.E., Supervision: E.Ç.E., S.G.Ş.

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