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The Relationship Between Fear of COVID -19, Insomnia and Depression in Pregnant Women during The Pandemic Period (Structural Equation Modeling)

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ABSTRACT

Aim: This study aimed to determine the relationship between fear, insomnia and depression in pregnant women.

Material and Methods: This descriptive study was conducted on a web-based with 439 pregnant women. Data were collected using the "Descriptive Information Form", "COVID-19 Fear Scale", "Women's Health Initiative Insomnia Scale" and "Edinburgh Postpartum Depression Scale" via social media using a random sampling method. Descriptive statistics, Pearson correlation tests and structural equation model were used to evaluate the data.

Results: The pregnant women were found to have a COVID-19 fear score average of 22.00±5.83, and 32.1% risk of depression while 43.3% had insomnia. The COVID-19 fear score was found to have a positive effect on insomnia (β= 0.290; p<0.001) and on depression (β= 0.410; p<0.001). It was determined that the fear of COVID-19 affects the levels of insomnia and depression in pregnant women, and that insomnia also has a significant effect on depression. A one-unit increase in the COVID-19 fear levels of pregnant women led to an increase of 0.273 in the level of insomnia and 0.151 in the levels of depression. In addition, it was seen that 18.3% of the changes in insomnia and 34.5% of the changes in depression were explained by this model. It was seen that the fear of COVID-19 had statistically significant effect on insomnia (effect value = 0.43) and depression (effect value = 0.36). Moreover, it was determined that insomnia had a direct (effect value=0.34) effect on depression.

Conclusion: During the COVID-19 pandemic, it was determined that the fear of COVID-19 experienced by pregnant women affected pregnancy depression both directly and indirectly through insomnia. As a result, it can be said that insomnia significantly mediates the effect of fear of COVID-19 on depression in pregnant women.

Keywords: Depression; fear of COVID-19; insomnia; pandemic; pregnancy.

Pandemi Döneminde Gebelerde COVID-19 Korkusu, Uykusuzluk ve Depresyon Arasindaki İlişki (Yapisal Eşitlik Modellemesi)

ÖZ

Amaç: Bu çalışma gebelerde COVID-19 korkusu, uykusuzluk ve depresyon arasındaki ilişkiyi belirlemek amacıyla yapılmıştır.

Gereç ve Yöntemler: Tanımlayıcı tipte tasarlanan bu çalışma, 439 gebe kadınla web tabanlı olarak gerçekleştirilmiştir. Veriler "Tanıtıcı Bigi Formu", "COVID-19 Korku Ölçeği", "Kadın Sağlığı Girişimi Uykusuzluk Ölçeği" ve "Edinburgh Postpartum Depresyon Ölçeği" kullanılarak, sosyal medya üzerinden gelişigüzel örnekleme yöntemi ile toplanmıştır. Verilerin değerlendirilmesinde, tanımlayıcı istatistikler, pearson korelesyon testi ve yapısal eşitlik modeli kullanılmıştır.

Bulgular: Gebelerin COVID-19 korku puanı ortalamasının 22,00±5,83 olduğu, %32,1'inin depresyon, %43,3'ünün ise uykusuzluk riski taşıdığı belirlendi. COVID-19 korkusu ile uykusuzluk (β= 0,290; p<0,001) ve depresyon (β= 0,410; p<0,001) arasında pozitif yönde ilişki vardı. COVID-19 korkusunun gebelerde uykusuzluk ve depresyon düzeylerini etkilediği, uykusuzluğun depresyon üzerinde de önemli etkisi olduğu belirlendi. Gebelerin COVID-19 korku düzeyindeki bir birimlik artış, uykusuzluk düzeyinde 0,273, depresyon düzeyinde ise 0,151 oranında artışa neden oldu. Ayrıca uykusuzluktaki değişikliklerin %18,3'ünün, depresyondaki değişikliklerin ise %34,5'inin bu modelle açıklandığı görüldü. COVID-19 korkusunun uykusuzluk (etki değeri = 0,43) ve depresyon (etki değeri = 0,36) üzerinde istatistiksel olarak anlamlı bir etkiye sahip olduğu görüldü. Ayrıca uykusuzluğun depresyona doğrudan (etki değeri=0,34) etkisinin olduğu belirlendi.

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Sonuç: COVID-19 pandemisinde, gebelerin deneyimlediği COVID-19 korkusunun, gebelik depresyonuna hem doğrudan hemde uykusuzluk yoluyla dolaylı olarak etki ettiği belirlendi. Sonuç olarak, uykusuzluğun, gebelerde COVID-19 korkusunun depresyon üzerine etkisinde önemli derecede aracılık ettiği söylenebilir.
Anahtar Kelimeler: Depresyon; gebelik; COVID-19 korkusu; pandemi; uykusuzluk.

INTRODUCTION

COVID-19 is caused by a new coronavirus called Severe Acute Respiratory Syndrome Corona Virus 2(SARS-CoV-2). First identified on 31 December 2019, the virus spread around the world, quickly becoming a global threat (1).

SARS-CoV-2 can result in severe pulmonary or extra-pulmonary diseases as well as death, and carries greater risk for individuals with cardiological, respiratory, renal, and metabolic co-morbidities (2). In pandemics, pregnant women and their fetuses were also at high risk (3). The results of the three major influenza pandemics of the past century (1918, 1957-1958 and 2009) show that women who are in the second or third trimester of their pregnancy have a considerably higher risk of being hospitalized or dying compared to the general population (4,5). The normal physiological, anatomic, and immunological changes accompanying pregnancy could cause pregnant women to have a higher risk of infection, severity of illness, pneumonia, morbidity, or mortality compared to the general population (2). Studies have shown that pregnant women are at risk for COVID-19 (2, 6,7).

As COVID-19 is a new disease, evidence supporting the best management practices for the infection during pregnancy is highly limited, and most questions remain unresolved (8). Pandemics involving new viral illnesses have always been cause for concern for those under the risk of getting infected and societies in general. This causes even greater concern among pregnant women, not only for themselves but also for their unborn babies. Following the spread of COVID-19 globally, various precautions were taken. All countries, in an effort to curb the spread of the virus, imposed preventative measures such as lock-downs and social distancing (9). Social isolation can have detrimental effects on the reproductive and sexual health of women, who need to have easy access to healthcare services before, during and after giving birth (8). The various challenges such circumstances cause pregnant women to experience anxiety regarding risk of infection, the effects of the illness on health, pregnancy and neonatal outcomes, social isolation, lack of social support, decreased household income, concerns about not being able to get care before during and after the delivery, the health of other family members, domestic violence, lock of support from family members during the birth. These fears and the uncertainties related to the disease can lead to anxiety in pregnant women. Anxiety, concern and stress experienced during pregnancy can in turn impact the sleep quality of pregnant women. Identifying the effects of the fear of COVID-19 that pregnant women experience during the pandemic and the impact of this fear on insomnia and depression could offer important clues for all healthcare workers offering prenatal care. To that end, this study was carried out in order to investigate the relationship between the COVID-19 related fear that pregnant women experience, and insomnia and depression.

Study questions

Question 1: Is there a relationship between the fear of COVID-19 and depression in pregnant women?

Question 2: Is there a relationship between the fear of COVID-19 and insomnia in pregnant women?

Question 3: Does insomnia have a mediating effect between fear of COVID-19 and depression?

MATERIAL AND METHODS

Study design and participants

This descriptive study aimed to examine the relationship between fear of COVID-19, insomnia and depression in pregnant women. The sample size was calculated as 385 using the unknown universe sampling formula, with an incidence rate of 0.50 and 0.05 level of a significance (95% confidence level). The data collection tools collected responses from 439 pregnant women between June 25, 2020 and July 27, 2020. Pregnant women who could read and write, had no communication problems, and volunteered to participate in the study were incluled in the study. High-risk pregnant women requiring hospitalization and those who were COVID-19 positive were excluded.

Measures

The web-based study was conducted in Turkey. The data was collected online using Google Forms. Since the contact information for pregnant women could not be obtained from any institution, random sampling method was used, as is commonly done in cases where it is difficult to reach the individuals constituting the sample (10). Face-to-face interviews were avoided to minimize contact-related risks during the pandemic. Upon opening the link sent to them, the women first viewed informed the consent form. Those agreeing proceeded to complete the questionnaire. Took approximately 5-10 minutes to fill out."

The data was collected using a Descriptive Information Form, the Fear of COVID-19 Scale (FCV-19S), the Women's Health Initiative Insomnia Rating Scale (WHIIRS) and Edinburgh Postpartum Depression Scale (EPDS).

Descriptive information form

The Descriptive Information Form was developed by the authors based on a review of the literature. This form contains a total of 26 questions addressing the socio-demographic characteristics of the pregnant women (12 questions), their obstetric characteristics (9 questions), any problems they have had during pregnancy (3 questions) and pandemic-related issues they have experienced (2 questions).

The Fear of COVID-19 Scale

The Fear of COVID-19 Scale (FCV-19S) developed by Ahorsu et al. (2020) and adapted for Turkey by Satıcı et al. (2020) was used in the study (11,12). The scale consists of a single dimension and comprises 7 items. The scoring of the items varies between 1 (completely disagree) and 5 (completely agree). The highest possible score is 35 and the lowest is 7. A higher score indicates a higher level of fear. The Cronbach Alpha coefficient of consistency value of the Turkish scale is 0.84 (12). The Cronbach's alpha value of the scale in this study was 0.88.

Women's Health Initiative Insomnia Rating Scale

The Women's Health Initiative Insomnia Rating Scale (WHIIRS) was developed by Levine et al. (2003), its validity and reliability in Turkish were established by Timur and Şahin among women in the menopausal period (13,14). An increase in the score obtained from the scale indicates that insomnia symptoms increase (Minimum score '0' maximum score '20'). A scale score of 10 or higher is indicative of insomnia in women. In the Turkish adaptation of the scale, Cronbach's alpha coefficient was 0.86 (14). The Cronbach's alpha value of the scale for this study was 0.81.

Edinburgh Postpartum Depression Scale

This scale was developed by Cox et al. and adapted to Turkish by Engindeniz et al. This scale, which is a four-point Likert type, consists of 10 items. The maximum value of the scale is 30 and the minimum value is 0. The cut-off point of the scale is 12/13. Cronbach's alpha value of the Turkish form of the scale is 0.79 (15,16). The Cronbach's alpha value of the scale for this study is 0.86.

Ethics Committee Approval

Ethics committee approval was received from the Non-invasive Research Ethics Committee (Number:2020.13.143). In addition, written approval was obtained from the 'Ministry of Health Scientific Research Platform'(2020-06-16T14_22_06).

Statistical Analysis

The data was analyzed using SPSS and AMOS program. Descriptive statistics are presented as number and percentage for categorical variables and mean±standard deviation for numerical variables. The Kolmogorov-Smirnov test was used to test the normal distribution assumption. The Pearson Correlation test was used to evaluate the relationship between continuous variables. Structural equation modeling was established to determine the effect and mediation effect between the variables. To evaluate the suitability of this established model, CMIN/df<3; RMSA<0.08 GFI>0.90; AGFI>0.90; and CFI>0.90 indices were examined (17,18). Model fit index values for this study were CMIN/df=2.01, CFI=0.95, AGFI=0.90, RMSEA=0.048, GFI=0.92. Moreover, the Bootstrap method was used to mediating effect. The significance level was taken as $p<0.05$.

RESULTS

It was determined that 44.2% of the pregnant women were between the ages of 25-29, 13.4% were 35 years old or older, 77.5% were university graduates, 68.3% lived in the city center, 65.4% had a medium income. 62.9% of pregnant women were employed, 51.3% were experiencing their first pregnancy In addition, 44.4% of the pregnant women were in the 3rd trimester of pregnancy and 42.4% of them were in the 2nd trimester of pregnancy (Table 1).

The mean scores for the participants were as follows: COVID-19 Fear Scale (FCV-19S), 22.00±5.83; Edinburgh Postpartum Depression Scale (EPDS), 9.26±5.16; and Women's Health Initiative Insomnia Rating Scale (WHIIRS), 10.19±4.93. Using a cutoff score of 12 for the EPDS, 32.1% of the pregnant women were found to be at risk for depression. Similarly, with a WHIIRS cutoff score of 10, 43.3% of the women experienced sleep disturbances (Table 2).

Table 1. The socio-demographic and obstetric characteristics of the pregnant women

Characteristics	**n**	**%**
Age		
20-24	70	16.0
25-29	194	44.2
30-34	116	26.4
35 and above	59	13.4
Level of education		
Primary/ High School	99	22.5
University or higher	340	77.5
Geographic Region		
West	151	34.4
Central Anatolia	242	55.1
East	46	10.5
Location		
Province	300	68.3
Town	139	31.7
Income Level		
Expenditures exceed income	53	12.1
Expenditures equal income	287	65.4
Income exceeds expenditures	99	22.5
Work status		
Working	276	62.9
Not working	163	37.1
Husband work status at the time		
Flexible hours / Working from home	156	35.5
Set working hours	224	51.0
Not working	45	10.3
Other	14	3.2
Location of family		
Same city	237	54.0
Different cities	148	33.7
No relatives in same city	54	12.3
Pregnancy weeks		
1st trimester	58	13.2
2nd trimester	186	42.4
3rd trimester	195	44.4
Number of pregnancies		
1st pregnancy	225	51.3
2 or more	214	48.7
Number of deliveries		
1st	241	54.9
2 or more	198	45.1

Table 2. Average scores for pregnant women's fear of COVID-19, EPDS and WHIIRS

Scale	**mean± sd**	**(min-max)**
FCV-19S	22.00±5.83	7.00-35.00
EPDS	9.26±5.16	0.00-29.00
WHIIRS	10.19±4.93	1.00-20.00

Correlation is significant at the 0.001 level (2-tailed). A statistically significant, positive, and moderate correlation was found between the pregnant women's FCV-19 Score and their EPDS score (r=0.487, $p<0.001$). Moreover, a positive, weak, and statistically significant correlation was found between the pregnant women's FCV-19S score and their WHIIRS score (r=0.343, $p<0.001$). The women's WHIIRS score and their EPDS score were also found to have a statistically significant, positive, and high correlation (r=0.822, $p<0.001$) (Table 3).

Table 3. The relationship of pregnant women's FCV-19S and EPDS with their WHIIRS

	FCV-19S	EPDS	WHIIRS
FCV-19S	1		
EPDS	0.487**	1	
WHIIRS	0.343**	0.822**	1

** p<0.001

In this section, structural equation model analyses were conducted to reveal the effects of COVID-19 fear and insomnia on depression. Test results of the first structural equation model established some indices of statistics suitable for the model did not meet the recommended values. (CMIN/df=3.5, RMSEA=0.076, AGFI=0.82, GFI=0.85, CFI=0.87). For this reason, modifications were made to the established model. This model was modified considering the theoretical backgrounds and the statistical significance of the modification index values. The final parameters of the model are shown in Figure 1. The effect of each variable on depression values is summarized in Tables 4 and 5. When the fit statistics of the structural equation modeling in Figure 1, obtained because of the modifications created depending on the theoretical background and modification index values, were examined, it was seen that df=191, p<0.05. Because df>0, it was seen that the model was a fully saturated model, and because p<0.05 was small, model fit indices were checked and model fit index values were RMSEA=0.048, CMIN/df=2.01, AGFI=0.90, GFI=0.92, CFI=0.95 has been determined. These values indicate that the model is compatible with the data and the fit indices are acceptable(17,18).

Table 4. Regression weights, standardized regression weights and squared multiple correlations of the model

			Estimate				
Variables			Unstandardized β	Standardized β	S.E.	t	p
I	<---	CF	0.273	0.428	0.038	7.177	**0.001**
D	<---	I	0.226	0.339	0.041	5.578	**0.001**
D	<---	CF	0.151	0.356	0.026	5.863	**0.001**
SMC							
I				0.183			
D				0.345			

* I: Inomnia; CF: COVID Fear ;D: Depression*; S.E.:Standard Error; SMC: Squared Multiple Correlations*

Table 5. Standardized estimates of direct and ındirect effects on depression

		Bias-adjusted 95% (Confidence interval)	
		CF	I
Direct Effects	I	0.428 (0.318/0.522)*	-
	D	0.356 (0.239/0.473)*	0.339 (0.226/0.445)*
Indirect Effects	I	-	-
	D	0.145 (0.092/0.208)*	-

** I: İnsomnia; CF: fear of COVID 19; D: Depression; * p < 0.001.*

The results of the structural equation model analysis established to determine how much fear of COVID-19 and insomnia in pregnant women predict the depression levels of individuals are shown in Table 3 and Figure 1. It is seen that fear of COVID-19 affects insomnia and depression levels in pregnant women and this effect is statistically significant (p<0.001). Insomnia has been found to have a significant impact on depression (p<0.001). A one-unit increase in the COVID-19 fear levels of pregnant women caused an increase of 0.273 in the level of insomnia and 0.151 in the levels of depression. In addition, a one-unit increase in insomnia resulted in a 0.226-unit increase in depression levels. Similarly, one standard deviation change in fear of COVID-19 caused a standard deviation of 0.428 in insomnia and 0.356 in depression. In addition, one standard deviation change in insomnia in pregnant women produced a standard deviation of 0.339 in depression. In addition, it was seen that 18.3% of the changes in insomnia and 34.5% of the changes in depression are revealed by this model (Table 4).

It was seen that the fear of COVID-19 had a significant and statistically significant effect on insomnia (effect value = 0.43) and depression (effect value = 0.36) (p<0.001). In addition, it was determined that insomnia had a direct (effect value = 0.34) effect on depression (p<0.001). Finally, it has been determined that the fear of COVID-19 affects depression through insomnia (effect value=0.15) as well as its direct effect on depression (p<0.001). In this context, insomnia is a significant mediator between depression and fear of COVID-19 (Table 5).

DISCUSSION

In the study, the average fear of COVID-19 scores for the pregnant women studied was found as 22.00±5.83. Likewise, Salehi et al. (2020) found the fear of COVID-19 score average as 22.5 ±5.9 (19). Considering the similarity between the results of these two studies and that the highest possible score on the scale is 35.00, it could be said that pregnant women are significantly fearful of COVID-19.

Carried out during the pandemic, this study found the prevalence of depression among pregnant women as 32.1%. Other studies investigating the prevalence of depression among pregnant women during the pandemic have found rates varying between 31% and 56.3%. (20-25). Prior to the pandemic, the prevalence of depression among pregnant women had been shown as vary between 11.9% and 28.2% (26-29). Accordingly, it could be said that the COVID-19 pandemic has increased the prevalence of depression among pregnant women.

Studies conducted during the pandemic found insomnia prevalence during pregnancy ranging from 49.1% to 88.0% (30-32). In our study, we found that 43.3% of the pregnant women experienced insomnia. The wide range in the prevalence rates found in studies could be because they were conducted at different points in the pandemic, whether the pandemic was being taken seriously and individual responses to the pandemic.

It was determined that the fear of COVID -19 affects the levels of insomnia and depression in pregnant women, and that insomnia also has a significant effect on depression. A one-unit increase in the COVID -19 fear levels of pregnant women caused an increase of 0.273 in the level of insomnia and 0.151 in the levels of depression. In addition, it was seen that 18.3% of the changes in insomnia and 34.5% of the changes in depression were explained by this model. The literature shows that individuals experience problems such as stress, anxiety, depression, and sleep disorders during the COVID-19 pandemic (19, 33-35). Alan et al. (2020) found in their study on pregnant women carried out during the COVID-19 pandemic that an increase in their perceived level of stress adversely affected the quality of their sleep (29). Lin et al. (2021) found that sleep quality during pregnancy was related with anxiety and depression symptoms (22). In Romero-Gonzalez et al.'s study, perceived stress, pregnancy-specific stress, and insomnia were predictive variables for most COVID-19 related anxiety and depressive symptoms (36). Our study found that fear of COVID-19 not only affects depression but also causes depression through insomnia. Depression contributes significantly to perinatal morbidity in mothers and adverse outcomes in infants and children (26,37). The results of this study can be used by health professionals to plan interventions to prevent depression. Identifying the factors that increase fear, providing accurate information about the disease and preventing transmission, and helping pregnant women cope with their fears can be effective in reducing insomnia and depression.

Since pregnant women were reached through social media and whatsapp in the study, pregnant women who did not use a smartphone and did not have a social media account could not be reached. Most of the sample of the study consisted of pregnant women with high education levels and living in the province. Another limitation of the study was the inability to reach pregnant women living in rural areas with low education levels. Another important limitation was that pregnant women were in the majority in the central Anatolian region of the country. This is due to the fact that the researchers also live in this region. Cities in the Central Anatolian Region are relatively less densely populated. The riskiest regions in terms of transmission risk for COVID-19 were cities with a high population density.

CONCLUSION

As in the previous three pandemics, the COVID-19 pandemics were pandemics with a high risk of morbidity and mortality for pregnant women. Since the pandemic process will cause fear in everyone, it causes fear in more risky groups. It is important to know how much this fear will affect depression. This is important not only for the prevention of depression, but also for the success of the treatment of depression.

In this study, it was determined that one-third of the pregnant women were at risk of depression, nearly half experienced insomnia, and the fear of COVID-19 increased insomnia and depression. Additionally, the fear of COVID-19 experienced by pregnant women during the pandemic affected both insomnia and depression. The mediating effect of insomnia was also affected by depression.

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