Original Article

REFLECTIONS OF THE COVID-19 PANDEMIC ON THE PSYCHOSOCIAL HEALTH OF PUERPERAL WOMEN AND MOTHER-INFANT ATTACHMENT

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Abstract

Aim: This study aims to determine the level of fear of contracting COVID-19, anxiety, and mother-infant attachment of women in the postpartum period.

Method: Research data were collected from 453 mothers who gave birth in a public hospital between September and November 2020.

Findings: The mean fear score of mothers in the postpartum period was determined as 22.69 ± 5.44, the average anxiety score was 14.97± 11.47, and the average mother-infant attachment

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Makale gönderim tarihi: *28.09.2023*
Makale kabul tarihi: *22.12.2023*

Künye Bilgisi: Körükcü, Ö., Boran Ö.F., Özkaya, M., Elmas Ç., vd. (2023). Reflections of The COVID-19 Pandemıc on the Psychosocial Health of Puerperal Women and Mother-Infant Attachment. *Selçuk Sağlık Dergisi,* 4(3), 432-455.

score was 5.78 ± 4.99. According to the multiple regression analysis conducted in the study, there is a statistically significant relationship between the level of fear of COVID-19, the state of anxiety, and the anxiety felt because of following news and social media during the pandemic period ($p<0.0001$). The independent variables included in the modeling have the power to explain the COVID-19 fear level by 33%.

Results: The study determined that the level of fear of the mothers in the postpartum period was high during the pandemic period, while the levels of anxiety and attachment were low. The factors that affect the mother-infant attachment are mothers' depression level, breastfeeding anxiety during the pandemic, concern about the baby's health, fear of contracting COVID-19, and education level.

Keywords: Anxiety, mother-infant attachment, Coronavirus, fear

COVID-19 salgınının postpartum dönemdeki kadınların psikososyal sağlığına ve anne-bebek bağlanmasına yansımaları

Öz

Amaç: Bu çalışma, doğum sonrası dönemde kadınların COVID-19'a yakalanma korkusu, anksiyete düzeyi ve anne-bebek bağlanması düzeylerini belirlemeyi amaçlamaktadır.

Yöntem: Araştırma verileri Eylül-Kasım 2020 tarihleri arasında bir devlet hastanesinde doğum yapan 453 anneden toplanmıştır.

Bulgular: Annelerin doğum sonu dönemde korku puan ortalaması 22.69 ± 5.44, anksiyete puan ortalaması 14.97 ± 11.47, anne-bebek bağlanma puan ortalaması 5.78 ± 4.99 olarak belirlenmiştir. Araştırmada yapılan çoklu regresyon analizine göre, pandemi döneminde COVID-19 korkusu düzeyi, anksiyete durumu ve haber/sosyal medya takibi nedeniyle duyulan kaygı arasında istatistiksel olarak anlamlı bir ilişki bulunmaktadır ($p< 0,0001$). Modellemeye dahil edilen bağımsız değişkenler, COVID-19 korku düzeyini %33 oranında açıklama gücüne sahip olduğu saptanmıştır.

Sonuç: Araştırmada, pandemi döneminde doğum sonrası dönemdeki annelerin korku düzeylerinin yüksek, kaygı ve bağlanma düzeylerinin ise düşük olduğu belirlenmiştir. Anne-bebek bağlanmasını etkileyen faktörler arasında annelerin depresyon düzeyi, pandemi döneminde emzirme kaygısı, bebeğin sağlığına ilişkin endişeler, COVID-19'a yakalanma korkusu ve eğitim düzeyi yer almaktadır.

Anahtar Kelimeler: Anksiyete, anne-bebek bağlanması, Koronavirüs, korku

1.INTRODUCTION

The COVID-19 pandemic, which affects the whole world, maintains its seriousness, and continues to occupy the agenda as the most critical public health problem despite the acceleration of vaccine studies and the increase in vaccination rates day by day (Vieira vd., 2020:388-398, Boran vd., 2022: e12442). The pandemic still causes an increase in morbidity rates to a large extent and continues to harm economically and socially (Oluklu vd., 2021:4043-4047). Various risk factors can be listed as the fact that women have to go to the hospital for antenatal care during the pandemic, giving birth in a hospital environment, coming to the hospital for control after discharge, and quarantining the mother and baby in the hospital despite a possible risk of transmission of COVID-19 infection (Guvenc vd., 2021:1449-1458, Oluklu vd., 2021:4043-4047). In addition, COVID-19 infection continues to threaten pregnant women and postpartum maternal health due to reasons such as not applying social distance rules during pregnancy and childbirth, examinations, and postpartum care, and underproportioned vaccination rates (Vieira vd., 2020:388-398, Duarte vd., 2021:100020).

Vaccination during pregnancy is essential for antenatal care as it protects the baby and mother against infectious diseases (Oluklu vd., 2021:4043-4047, Stafford vd., 2021:484-495). Studies on the effects of COVID-19 infection on breastfed infants and newborn health are limited (Duarte vd., 2021: 100020, Merewood vd., 2021:578, Rimmer, 2021: n64, Stafford vd., 2021:484-495). However, many authorities recommend that mothers be vaccinated during breastfeeding, and they can continue breastfeeding immediately after vaccination (Duarte vd., 2021: 100020, Rimmer, 2021: n64). Especially during pregnancy and the puerperal period, mothers' avoidance of vaccination had deadly consequences on maternal and child health, while the number of pregnant women treated in intensive care due to COVID-19 increased, maternal mortality rates also increased (Garg vd., 2021:685-699, Oluklu vd., 2021:4043-4047).

Even in the absence of COVID-19 infection, the physiological and psychological processes experienced in the first few weeks after birth affect the mental health of the mother and increase the risk of postpartum psychological illness (Anjum vd., 2020:245-250, Guvenc vd., 2021:1449-1458). Due to its nature, the postpartum period necessitates psychosocial changes for mothers and makes them prone to psychological diseases (Korukcu, 2019). Adapting to the dynamic process with the change in living conditions due to the pandemic in the postpartum period affects maternal psychology negatively (Hermon vd., 2019:85-91, Avraham vd., 2020:681-688, Pariente vd., 2020:767-773). During this period, women who experience physiological and psychological difficulties are psychosocially more affected by the pandemic (Matvienko-Sikar vd., 2020:309, Mukhtar and Rana, 2021:595-599). Critical changes such as the visitor restriction to maternity services during the COVID-19 pandemic, the decrease in the

frequency of antenatal check-ups, and the decrease in family and friend visits due to avoidance of crowded environments have reduced the positive psychosocial effect of social support in the postpartum period (Hermann vd., 2021:123-124, Korukcu vd., 2022:61-70). Additionally, studies show that mental health problems in the mother are associated with short- and long-term risks in terms of establishing the mother-baby bond (Fernandes vd., 2021:1997-2010). For this reason, it is important to clarify the effect of the pandemic on the psychosocial health of mothers in the postpartum period and on mother-infant attachment.

2.SUBJECTS AND METHODS

2.1 Aim

This study aims to determine the level of fear of contracting COVID-19, anxiety level, and mother-infant attachment level of women in the postpartum period.

2.2. Participants

The data were collected within the first two days postpartum. Research data were collected from 453 mothers who gave birth in a public hospital in Turkey between September and November 2020. The sample size was calculated with G*Power 3.1.9.2 program, and according to the power analysis, it was found that it was sufficient to reach 374 postpartum women for 90% power and 0.05 Type-1 error. However, despite possible data loss, it was aimed to exceed 400 data, and in this context, the study was terminated with 453 mothers who were in the postpartum period. To minimize the risk of transmission of infection during the COVID-19 pandemic process, study data were collected by preparing an online questionnaire. The link to the online questionnaire was sent to the women who had postpartum follow-ups via e-mail and phone messages. Women who are literate in Turkish, over the age of 18, diagnosed with a psychiatric disease that requires lon-term drug use, who are breastfeeding their baby and who do not have a condition that prevents breastfeeding, who do not have COVID-19 symptoms and signs or have had a positive test result and who volunteered to participate in the study were included in the study by random sampling method.

2.3. Data Collection Tools

Personal Information Form, Beck Anxiety Inventory, and Mother-Infant Attachment Scale, Coronavirus-19 (COV-19S) Fear Scale, developed by the researchers and including demographic questions, were used to evaluate the psychosocial health of mothers in the postpartum period. The Personal Information Form consists of 11 questions that include information about women in the postpartum period, such as age, pregnancy, education level, and breastfeeding status.

Coronavirus-19 (COV-19S) Fear Scale; COV-19S is a 5-point Likert scale consisting of 7 items. The lowest possible score for each item is 1, and the highest score is 5. A total score is obtained by summing the item scores (7 to 35). The higher the total score obtained, the higher the fear of COVID-19 women have. There are no negatively charged questions to be calculated by inverting them in the scale. Ahorsi vd., (2020) Cronbach alpha value of the scale is 0.82. The Cronbach Alpha value of the scale, which was adapted to Turkish culture by Körükcü vd., (2020), is 0.89. The Cronbach alpha value in this study was calculated as 0.85.

Beck Anxiety Scale (BAI); BAI is a 4-point Likert scale consisting of 21 items. The lowest possible score for each item is 0, and the highest score is 3. While the score obtained from the scale varies between 0-63, in line with the increase in the score obtained from the scale, the severity of the anxiety experienced by the individual increases. There are no negatively charged questions to be calculated by inverting them in the scale. The Cronbach alpha value of the scale, which was developed by Beck vd., in 1988, was 0.92 in the original study, and 0.93 in the Turkish validity and reliability study conducted by Ulusoy vd., (1998). The Cronbach alpha value in this study was calculated as 0.93.

Mother-Infant Attachment Scale (MIAS); MIAS is a 4-point Likert scale consisting of 8 items. The answers consisting of four options scored between 0-3, the lowest score that can be obtained from the scale is 0, and the highest score is 24, regarding the evaluation. The first, fourth, and sixth items in the scale measure positive emotions, while the second, third, fifth, seventh, and eighth items measure negative emotions. A high score indicates a problem in mother-infant attachment. While the Cronbach alpha value of the scale developed by Taylor vd., (2005) was determined as 0.71, it was determined as 0.79 in the validity and reliability study conducted by Karakulak and Alpaslan (2016). The Cronbach alpha value in this study was calculated as 0.84.

2.4. Analysis of data

The data of the study conducted with mothers in the postpartum period were analyzed with the SPSS v 24 package program. Number, percentage, mean, and standard deviation values were used to evaluate the socio-demographic characteristics of mothers in the postpartum period. It was determined that the total scores of the Coronavirus-19 Fear Scale, Beck Anxiety Scale, and Mother-Infant Attachment Scale were suitable for normal distribution after evaluating the conformity with the normal distribution using the Shapiro-Wilks test. Bivariate analysis was applied to determine the relationship between the individual characteristics of mothers in the postpartum period and their fear, anxiety, and attachment scores. For bivariate analysis, the t-test was used in independent groups to determine the mean scores when the independent variable was in two groups, and the One-Way Analysis of Variance (post hoc

Scheffe test) was used when there were more than two groups. The relationship between the scales was calculated with the Pearson Correlation Coefficient. In this context, a statistically significant moderate positive correlation was found between the scale of COV19S and BAI total scores (Table 3; r= 0.52, p< 0.01). Multivariate Linear Regression analysis was performed to determine the factors that determine the fear of COVID-19 in postpartum mothers.

2.5. Research Ethics

Before starting the study, permission was obtained from a public hospital. An ethical consent document was obtained from the Akdeniz University Faculty of Medicine Clinical Research Ethics Committee (Decision No: 404; Decision date: 12.06.2020). The research was conducted in line with the principles of the Declaration of Helsinki.

3. RESULTS

3.1. Demographic Features of the Participants

Within the scope of the study, data were collected from 453 postpartum mothers. The average age of the mothers in the postpartum period was 30.35± 5.26. Most of the mothers (98.7%) are married, and 53.6% of them are university graduates. It was determined that 78.8% of the mothers in the postpartum period had a history of pregnancy, 82.1% got pregnant naturally, 77.5% had children, and 76.2% breastfed their babies. Due to the COVID-19 pandemic, 25.8% of the mothers were concerned about breastfeeding their babies, 68.9% were worried about their baby's health, and 67.5% were negatively affected by social media and news about the pandemic. When the physical, social, and psychological changes in the mothers' lives due to the pandemic were questioned, 37.1% stated that their lifestyle had changed, 15.2% of them stated that they experienced social isolation, and 13.9% experienced fear (Table 1).

Table 1. Demographic features of mothers in the postpartum period

Sociodemographic Features	**Mean ± SS**
Age (years)	30.35 ± 5.26
COVID-19 Fear Score	22.69 ± 5.44
Beck Anxiety Score	14.97 ± 11.47
Mother-Infant Attachment Score	5.78 ± 4.99
Sociodemographic Features	**n (%)**
Marital Status	
Married	447 (98.7)
Single	6 (1.3)
Educational Status	
Primary Education	51 (11.3)
High school	123 (27.2)
University	243 (53.6)
Graduate	36 (7.9)

Table 1. Demographic features of mothers in the postpartum period (Continue)

Pregnancy History	
Yes	357 (78.8)
No	96 (21.2)
Pregnancy with assisted reproductive techniques	
Yes	81 (17.9)
No	372 (82.1)
Childbearing Status	
Yes	351 (77.5)
No	102 (22.5)
Concern about breastfeeding the baby due to the pandemic	
Yes I am very worried	117 (25.8)
I'm partially worried	171 (37.7)
I'm not worried	165 (36.4)
Feeding method	
Breastfeeding	345 (76.2)
Expressing the breastmilk	15 (3.3)
Expressing the breastmilk and bottle	24 (5.3)
I do not breastfeed	69 (15.3)
Concern for the baby's health due to the epidemic	
Yes	312 (68.9)
Partially	105 (23.2)
No	36 (7.9)
Negative impact from social media and news	
Yes	306 (67.5)
Partially	132 (29.1)
No	15 (3.3)
Physical, social and psychological changes due to the epidemic	
Restlessness	57 (12.6)
Fear	63 (13.9)
Social Isolation	69 (15.2)
Lifestyle changes	168 (37.1)
Mask usage habits	42 (9.3)
Cleaning	33 (7.3,)
Nutrition habits	21 (4.6)

3.2. Mothers' Level of Fear of COVID-19

The mean COV-19S score of mothers in the postpartum period is 22.69± 5.44. It was determined that the mean fear score increased as the education level of the mothers increased (F=3.76, p=0.011). Researchers found that the fear point average of the university graduate mothers ($\bar{X}$=23.22, SD=5.00) was higher than the mothers who graduated from primary school ($\bar{X}$=20.65, SD=6.34), and the fear of catching the coronavirus was the highest among the mothers who had a postgraduate education degree ($\bar{X}$=24.58, SD=4.89) (Table 2).

The mean COV-19S score varies significantly depending on the negative effects of social media and news (F= 20.602, p<0.01). During the pandemic period, the COVID-19 fear score averages of mothers who were negatively affected by social media and news ($\bar{X}$ = 23.74, SD= 5.04) were higher than

mothers who stated that they were partially affected ($\bar{X}$ = 20.77, SD=5.22) and unaffected ($\bar{X}$ =18.20, SD=8.21) (Table 2).

It was determined that the physical, social and psychological changes in the lives of mothers due to the COVID-19 pandemic significantly affected the mean COV-19S score (F=3.951, p<0.001). It was observed that the highest level of fear of COVID-19 was in mothers who stated that they experienced restlessness during the pandemic process ($\bar{X}$=25.68, SD=3.69), and the lowest mean score of COV-19S was in mothers who stated that their eating habits had changed during the pandemic process ($\bar{X}$=19.82, SD=5.37) (Table 2).

Table 2. Determination of the change of Coronavirus-19 Fear, Beck Anxiety and Mother-Infant Attachment Levels according to the demographic characteristics of the mothers according to the Bivariate and One-Way Analysis of Variance

	COV-19S		**BAI**		**MIAS**	
	Mean ± SS	**Statistics**	**Mean ± SS**	**Statistics**	**Mean ± SS**	**Statistics**
Marital Status						
Married	22.72 ± 5.45	t= 1.219 p=0.223	15.05 ± 11.52	t= 1.286 p= 0.199	5.81 ± 5.01	t= 1.043 p=0.297
Single	20.00 ± 2.29		9.00 ± 2.19		3.67 ± 2.88	
Educational Status						
Primary Education	20.65 ± 6.34[a]	F= 3.76 p= 0.011	11.82 ± 12.87[a]	F= 2.75 p= 0.042	7.47 ± 6.28[a]	F=7.147 p < 0.001
Highschool	22.80 ± 5.83		16.00 ±38 14.62 ± 10.49[a]		6.80 ± 5.12[b]	
University	23.22 ± 5.00[a]		18.33 ± 11.65		4.81 ± 4.51[a,b]	
Graduate	24.58 ± 4.89				6.39 ± 4.26	
Pregnancy History						
Yes	22.53 ± 5.58	t= 1.203 p= 0.230	14.65 ± 11.58	t= 1.169 p= 0.195	5.17 ± 4.64	t= 5.250 p < 0.001
No	23.28 ± 4.87		16.19 ± 11.02		8.08 ± 5.57	
Pregnancy with assisted reproductive techniques						
Yes	23.07 ± 4.33	t= 0.703 p= 0.482	14.30 ± 10.21	t= 0.586 p= 0.558	5.12 ± 4.43	t= 1.302 p= 0.194
No	22.60 ± 5.65		15.12 ± 11.73		5.92 ± 5.10	
Childbearing Status						
Yes	22.70 ± 5.48	t= 0.088 p= 0.930	15.56 ± 11.59	t= 2.011 p= 0.045	4.72 ± 4.32	t= 9.082 p < 0.001
No	22.65 ± 5.31		12.97 ± 10.85		9.41 ± 5.44	

Table 2. Determination of the change of Coronavirus-19 Fear, Beck Anxiety and Mother-Infant Attachment Levels according to the demographic characteristics of the mothers according to the Bivariate and One-Way Analysis of Variance (Continue)

Concern about breastfeeding the baby due to the epidemic	24.46 ± 4.78[a,b]	F= 9,287 p < 0.001	17.85 ± 11.21[a]	F= 8.109 p < 0.001	5.00 ± 5.05	F= 1.934 p= 0.146
Yes I am very worried	22.39 ± 5.46[a]		15.46 ± 11.42		6.01 ±5.05	
I'm partially worried	21.75 ± 5.59[b]		12.44 ± 11.22[a]		6.09 ± 4.85	
I'm not worried						
Feeding Method						
Breastfeeding	22.47 ± 5.58	F= 1.029 p= 0.380	15.16 ± 11.36	F= 6.037 p < 0.001	5.49 ± 4.94[a]	F= 6.734 p < 0.001
Expressing the breastmilk	24.40 ± 5.58		18.80 ± 15.91		8.20 ± 7.09	
Expressing the breastmilk and bottle	22.88 ± 3.29		21.38 ± 8.71[a]		9.63 ± 5.01[a,b]	
I do not breastfeed	23.50 ± 5.35		11.00 ± 10.45[a]		5.36 ± 4.00[b]	
Concern for the baby's health due to the epidemic						
Yes	23.63 ± 5.23[b,c]	F= 16.980 p < 0.001	16.46 ± 11.73[b,c]	F= 13. 299 p < 0.001	5.29 ± 5.09[b]	F= 6.027 p= 0.003
Partially	20.91 ± 4.48[a]		13.31 ± 10.56[a,c]		6.50 ± 4.14	
No	19.67 ±5.44[a]		6.92 ± 7.00[a,b]		7.92 ± 5.65[a]	
Negative impact from social media and news						
Yes	23.74 ± 5.04	F= 20.602 p < 0.001	15.59 ± 11.67[a]	F= 6.071 p= 0.003	5.97 ± 5.16	F= 3.869 p= 0.022
Partially	20.77 ± 5.22[a]		14.66 ± 10.91[a]		5.02 ± 3.82[a]	
No	18.20 ± 8.21[a]		5.20 ± 7.36		8.40 ± 8.60[a]	
Physical, social and psychological changes due to the epidemic	25.68 ± 3.69	F= 3.951 p < 0.001	18.62 ± 11.93	F= 6.774 p < 0.001	8.96 ± 6.81[a]	F= 6.007 p < 0.001
Restlessness	23.90 ± 5.94		13.08 ± 9.35[a]		5.75 ± 5.39	
Fear	22.43 ± 5.38		14.29 ± 9.40		5.97 ± 4.65	
Social Isolation	24.00 ± 4.38		9.50 ± 6.31		10.17 ±2.62[a]	
Lifestyle changes	24.50 ± 9.31		10.89 ± 8.44[a]		5.25 ± 4.48	
Mask usage habits	20.96 ± 5.04[a]		14.58 ± 13.32		6.09 ± 2.89	
Cleaning	19.82 ± 5.37[a]		9.73 ± 8.92[a]		4.57 ± 2.51	
Nutrition habits						

Note: COV-19S: Coronavirus-19 Fear Scale; BAI: Beck Anxiety Inventory; MIAS: Mother to Infant Attachment Scale According to Scheffe analysis, the difference between groups with the same letter for each variable is significant (p<0.05

3.3. The anxiety level of mothers

The mean BAI anxiety score of the mothers was 14.97 ± 11.47. A statistically significant difference was found between the mean anxiety score of mothers in the postpartum period and their educational status (F= 2.75, p= 0.042). However, according to the results of the Scheffe test performed to determine which groups the difference was, no difference was found between the groups (Table 2).

It was determined that the mean anxiety score of the mothers during the COVID-19 pandemic period differed significantly according to the status of having a child (t=2.011, p=0.045). It was determined that the mean anxiety score of the mothers who had children ($\bar{X}$=15.56, SD=11.59) was higher than the mothers who did not have children ($\bar{X}$=12.97, SD=10.85) (Table 2).

Due to the COVID-19 pandemic, the anxiety scores of mothers in the postpartum period increased as their concerns about breastfeeding increased (F=8.109, p<0.001). It was determined that the mean BAI score of the mothers who were anxious about breastfeeding their babies was higher than the mothers who were not anxious (X=17.85, SD=11.21) (Table 2).

A statistically significant difference was found between the mothers' mean anxiety scores and the way of breastfeeding during the pandemic period (F=6.037, p<0.001). It was determined that the anxiety score average of the mothers who expressed they gave breast milk with a bottle ($\bar{X}$=21.38, SD=8.71) was higher than the anxiety score of the mothers who did not breastfeed ($\bar{X}$=11.00, SD=10.45) (Table 2).

During the COVID-19 pandemic, mothers who worried about their baby's health had a higher anxiety score ($\bar{X}$=16.46, SD=11.73) than mothers who were partially worried ($\bar{X}$=13.31, SD=10.56) and not worried ($\bar{X}$= 6.92, SD=7.00) was found to be high (F=13. 299, p<0.001). In addition, the anxiety scores of partially worried mothers ($\bar{X}$=13.31, SD=10.56) were higher than mothers who were not worried ($\bar{X}$=6.92, SD= 7.00) (Table 2).

A statistically significant difference was found between the state of being affected by social media and news and the mean anxiety score (F= 6.071, p= 0.003). It was determined that the mean anxiety score of mothers who were not affected by social media during the pandemic period ($\bar{X}$ = 5.20, SD = 7.36), and mothers who were partially affected ($\bar{X}$ = 14.66, SD = 10.91) and affected ($\bar{X}$ = 15.59, SD = 11.67) were lower than the anxiety score averages of mothers. (Table 2).

A statistically significant difference was found between the changes in mothers' lives due to the COVID-19 pandemic and the mean anxiety score (F=3.951, p<0.001). It was observed that the mothers who had the highest anxiety scores ($\bar{X}$=18.62, SD=11.93) stated that they experienced restlessness during the pandemic, while the lowest average score was found in the mothers who stated that there was a change in their lifestyle during the pandemic ($\bar{X}$=9.50, SD=6.31).

3.4. Mother-Infant Attachment Level

The average score of attachment to the baby of mothers in the postpartum period is 5.78± 4.99. It was determined that the attachment score increased as the education level of the mothers in the postpartum period decreased (F=7.147, p<0.001). It was determined that the mother-infant attachment average of the mothers who graduated from primary school ($\bar{X}$=7.47, SD= 6.28), high school graduate ($\bar{X}$= 6.80, SD= 5.12), and university graduates ($\bar{X}$=4.81, SD=4.51) was higher than the mother-infant attachment score. While the mean mother-infant attachment score increased in women without a history of pregnancy (t=5.250, p<0.001), it was not significantly affected in women who became pregnant with assisted reproductive techniques (Table 2).

It was determined that the mean attachment score of mothers during the COVID-19 pandemic period differed significantly according to the status of having a child (t=9.082, p<0.001). Researchers found that the mean attachment score of mothers who did not have children ($\bar{X}$=9.41, SD=5.44) was higher than mothers who had children ($\bar{X}$=4.72, SD=4.32) (Table 2).

A statistically significant difference was found between the mean attachment score of the mothers and the way of breastfeeding during the pandemic period (F= 6.734, p<0.001). It was determined that the mean attachment score ($\bar{X}$ = 9.63, SD= 5.0) of mothers who express breastmilk and give with a bottle is higher than the attachment score of mothers who do not breastfeed ($\bar{X}$= 5.36, SD= 4.00) and mothers who breastfeed ($\bar{X}$ = 5.49, SD= 4.94). (Table 2).

It was determined that the mean attachment score of the mothers who aren't concerned about their baby's health due to the COVID-19 pandemic ($\bar{X}$ = 7.92, SD= 5.65) was higher than the mean attachment score of the mothers who were worried ($\bar{X}$ = 5.29, SD= 5.09), that is, with the situation of worrying about the health of their baby due to the pandemic.

It was determined that there was a significant relationship between the mean attachment score (F= 6.027, p<0.001) (Table 2). A statistically significant difference was found between being affected by social media and news and the mean attachment score (F= 3.869, p= 0.022). It was determined that the mean attachment score of mothers who were not affected by social media during the pandemic period ($\bar{X}$ = 8.40, SD= 8.60) was higher than the mean attachment score of mothers who were partially affected ($\bar{X}$ = 5.02, SD= 3.82) (Table 2).

A statistically significant difference was found between the most important change in mothers' lives due to the COVID-19 pandemic and the mean attachment score (F= 6.007, p<0.001). It was observed that the highest mean attachment score was observed in mothers who stated that the most important change in their life during the pandemic period was the change in their social life ($\bar{X}$ =10.17, SD=2.62). It was

determined that the group with the lowest mother-infant attachment was among mothers who stated that there was a change in their eating habits during the pandemic ($\bar{X}$ = 4.57, SD= 2.51) (Table 2).

When Table 3 is examined, the mean between the fear score and the anxiety score of the mothers in the postpartum period is moderate, positive, and significant (r= 0.520, p<0.01), the mean attachment score and the fear score mean low, positive, and significant (r= 0.137, p<0.01), and there is a low, positive and significant relationship between the attachment point average and the anxiety point average.

Table 3. Correlation between the Coronavirus-19 Fear Scale, Beck Anxiety Scale, and Mother-Infant Attachment Scale

	COV-19S	BAI	MIBS
FCV-19S	1		
BAI	0.520**	1	
MIBS	0.137**	0.279**	1

COV-19S: Coronavirus-19 Fear Scale; BAI: Beck Anxiety Scale; MIAS: Mother to Infant Attachment Scale

**p< 0.01

A multiple regression analysis table is given above to identify the factors that determine the postpartum mothers' fear of COVID-19 (Table 4). In the context of the findings obtained from the regression analysis, there is a statistically significant relationship between the level of fear of COVID-19, the state of anxiety, and the anxiety felt as a result of following news and social media during the pandemic period (p<0.0001). The independent variables included in the modeling have the power to explain the COVID-19 fear level by 33% (Table 4).

Table 4. Factors determining Fear of COVID-19

	B	**SS**	**95% CI**		**t**	**p**
Variables			**LL**	**UL**		
Concern about Breastfeeding Due to COVID-19	0.396	0.285	-0.165	0.956	1.386	0.166
Concern about the baby's health being adversely affected	0.440	0.398	-0.269	1.223	1.106	0.269
Anxiety Status (Beck Anxiety Scale)	0.223	0.020	0.183	0.263	11.016	0.0001
Mother-Infant Attachment (Mother to Infant Attachment Scale)	0.010	0.020	-0.083	0.102	0.210	0.834
Past Pregnancy Experience	-0.331	0.532	-1.376	0.714	-0.622	0.535
Fear Due to COVID-19 News	2.031	0.429	1.188	2.875	4.731	0.0001

CI= Confidence interval**, LL:** Lower limit**, UL:** Upper limit

R^2: 0.33, **F:**36.638 **p:**0.0001

What is the effect of fear of contracting COVID-19 infection and depression level on mother-infant attachment level? To answer this question, analysis was carried out through modeling. The Mother-Infant Attachment Scale score, which is used as a dependent variable in the modeling, consists of eight items that include the emotional states that the mother feels for the baby after birth. Each item is answered on a four-unit Likert-type rating scale with ends from "(0) a lot" to "(3) never". Five of the items indicate negative emotion and are rated in reverse (3-0). A higher score indicates a problem in mother-infant attachment.

The total score of the Mother-Infant Attachment Scale should be 0 at the lowest and 24 at the highest. While the model was being constructed, the total score was divided by the number of questions, and the value of the total score was defined in the range of 0-3. The total scores defined in the 0-3 range were again categorically grouped within the ranges given in the table above and were coded as separate data, with 0 indicating that there is a problem in mother-infant attachment, 0 "never" and 3 "too much". Since the number of participants with "too much" attachment problem in the new categorical variable is quite low (n=4), this sub-category was added to the "very" category, which is the 2 closest to it, and a total of 3 separate levels were created.

Mothers who stated that they had mild or severe problems in mother-infant attachment had a higher level of depression compared to mothers who did not experience "no" at all. The probability of having mild attachment problems is 4.5 times (OR: 4.517) and the probability of having "very" problems is approximately 20 times (OR: 20.559) for mothers who did not have children before birth. Concern about the baby's health due to the coronavirus-19 pandemic is a factor that affects mother-infant bonding. Mothers who are not worried about the baby's health are 3 and 4.5 times more likely (OR: 3.143, 4.755) to have mild and high attachment problems. The level of fear of COVID-19 has a significant effect on mothers with severe attachment problems, and as the fear of infection increases, the likelihood of attachment problems increases. On the other hand, it is seen that mothers who are high school and primary school graduates have more attachment problems than mothers with university or higher education levels. Mothers who became pregnant with assisted reproductive technologies did not show a statistically significant difference in attachment level compared to other mothers (Table 5).

Table 5. Factors affecting the level of mother-to-infant attachment

		Probability Ratio (95% CI)		
	***B* (SE)**	**LL**	**OR**	**UL**
Mother to Infant Attachment-Mild x None				
Mild	-2.790 (0.663)***			
Beck Anxiety Score	0.046 (0.013)***	1.021	1.047	1.075
Coronavirus-19 Fear Score	-0.009 (0.024)	0.945	0.991	1.038
High school and below education (Referenced to undergraduate)	0.455 (0.244)*	0.978	1.576	2.541
Assisted Reproductive Technologies (Referenced to yes answer)	0.470 (0.314)	0.864	1.600	2.962
Do you have children? (Referenced to Yes)	1.508 (0.303)***	2.492	4.517	8.185
Concern about Breastfeeding (Referenced to Yes)	0.891 (0.300)**	1.354	2.438	4.391
Concern for Baby's Health (Referenced to Yes)	1.145 (0.258)***	1.896	3.143	5.209
Mother-Baby Attachment-Very x Not at all				
A lot	-8.337 (1.304)***			
Beck Anxiety Score	0.119 (0.019)***	1.086	1.127	1.169
Coronavirus-19 Fear Score	0.092 (0.045)**	1.004	1.097	1.198
High school and below education (Referenced to undergraduate)	1.318 (0.378)***	1.780	3.738	7.846
Assisted Reproductive Technologies (Referenced to yes answer)	0.099 (0.478)	0.433	1.104	2.815
Do you have children? (Referenced to Yes)	3.023 (0.428)***	8.889	20.559	47.547
Concern about Breastfeeding (Referenced to Yes)	0.713 (0.434)	0.870	2.039	4.777
Concern for Baby's Health (Referenced to Yes)	1.559 (0.423)***	2.076	4.755	10.890

CI= Confidence interval, **LL:** Lower limit, **UL:** Upper limit, **OR:** Probability Ratio
$\mathbf{R^2}$ = 0.351 (Cox and Snell) $\mathbf{R^2}$ = 0.410 (Nagelkerke) $\boldsymbol{\chi}$**2(14)=**196.185
*: p<0.10 **:p<0.05 ***p<0.001

4. DISCUSSION

Since women in the postpartum period are at higher risk of depression compared to other periods of life, they are expressed as the vulnerable group in terms of psychological symptoms due to the need for social support for newborn care and the long-term effects of previous COVID-19 infection on the baby (Matsushima vd., 2021:100903). The present study aims to add new insights to better understand the psychosocial health of postpartum women by exploring the association between fear of COVID-19, anxiety, and maternal attachment.

4.1.Mothers' Level of Fear of COVID-19

Considering the negative effects of fear and stress during pregnancy and the postpartum period on maternal and infant health outcomes, it is necessary to determine the fear of COVID-19 faced by mothers in the postpartum period and the affecting factors (Lok vd., 2021:e050132). Mertens vd. (2020: 102258) suggested that health anxiety, media exposure, and concerns about the health of loved ones are predictors of fear of COVID-19. Our results are suggestive that fear of human-to-human infection is influenced by the relationship with the physical, social, and psychological changes due to the epidemic, such as restlessness, social isolation, lifestyle changes, mask using, cleaning, and nutrition habits.

In this study, mothers have higher educational attainment experienced higher coronavirus-related fear than those with lower educational attainment. Contrary to our study, Haktanir vd. (2022:719-727) found that healthy individuals from middle socio-economic status reported significantly higher coronavirus fear than those of high socio-economic status. The reason for the difference in these studies, both of which were conducted in Turkey, maybe that our study only included mothers in the postpartum period, while Haktanır's study was conducted with healthy individuals.

At the beginning of the pandemic process, the inadequacy of data on breastfeeding and the differing opinions of international organizations caused concern. With the increase in studies conducted with the process and the increase in information about the virus, these concerns and differences have disappeared, and it has been announced that mothers can breastfeed their babies after taking the necessary isolation precautions. In another study conducted in Turkey, it was determined that the fear scores of mothers who stated that the pandemic affected breastfeeding status were higher (Cagan vd.,2022:176-181). The similarity of the results of these two studies, which were conducted at different times of the pandemic process, reveals that mothers' fears of infecting their babies with viruses have persisted for a long time and that they need to be more informed about breastfeeding during the pandemic.

4.2.The Anxiety Level of Mothers

It is among our study findings that the education level of mothers in the postpartum period affects maternal anxiety. In studies conducted in Turkey (2020:197-198) and Brazil (2021:620), it was determined that the anxiety level of mothers with higher education levels increased. Our study results are similar to the literature. As the level of education increases, it is easier to reach accurate and reliable information, and it is thought that the anxiety levels of the mothers are higher.

In our study, it was determined that the anxiety levels of mothers who had children were high, while when we looked at the literature (Avery vd., 2021:688462; Yıldız vd., 2022:1448), it was determined that the anxiety levels of women who had children at the beginning of the pandemic were high. It is

thought that the fact that other children are at home and that mothers have to take care of their newborn babies increases anxiety levels due to reasons such as the closure of schools during the pandemic and distance education.

Fears of mothers transmitting viruses to their babies due to the lack of data on breastfeeding at the beginning of the pandemic affected their anxiety levels (Ceulemans vd. 2020:146-147, Fakari and Simbar 2020:e21, Yassa vd. 2020:3827-3834). According to our study results, it was determined that breastfeeding concerns of mothers during the pandemic period increased the fear of COVID-19 and anxiety level, but it did not affect the level of maternal attachment. In a study conducted with pregnant women in en (2021:6875), it was determined that the anxiety levels related to the restrictive measures during the pandemic, birth, postpartum, and breastfeeding are high. It was found that the majority of mothers thought that breastfeeding was not safe during the pandemic, they had no idea about breastfeeding, and they were concerned about breastfeeding and newborn care in the postpartum period (Ceulemans vd. 2020:146-147, Fakari and Simbar 2020:e21, Yassa vd. 2020:3827-3834). When we examined the literature, it was also found that mothers preferred to feed their babies with a bottle or formula because of the fear of infecting the baby with a virus, and these mothers also had high levels of anxiety (Liu vd.,2020:1229-1240; Zanardo vd., 2021:105286). As time goes on, with the increase in studies on breastfeeding, there are similar results with our study in the literature, but as time progresses, mothers' anxiety levels are still high.

Due to the uncertainty of the transmission routes of the SARS-CoV-2 virus at the beginning of the pandemic period, mothers had fear of infecting their babies with the virus, and therefore they reported that they were worried. In other studies conducted in Turkey, it was determined that the anxiety levels of mothers were high because they were worried about the health of their babies during the pandemic (Sahin and Kabakci, 2021:162-169; Aktaş and Iskender, 2022:339-350). We think that the similarity of the results of the study, the sudden onset of the pandemic in our country, the introduction of restrictions and the frequency of going to hospitals within these restrictions increase the anxiety levels of mothers.

Most of today's interactions are conducted via telephone, computer, and social media such as video chats, phone calls, and text messages (Nanjundaswamy vd. 2020:787-790, Wiederhold, 2020:197-198). Technology use is increasing in times of crisis, and people think their phones are critical to staying connected. Although social media allows people to be aware of events all over the world, it is stated that it also causes panic among the public in emergencies such as pandemics (Wiederhold 2020:197-198; Bendau vd. 2021:283-291). Similarly, the finding obtained because of the study supports this information. We found that social media news increased mothers' fear and anxiety level of COVID-19 in the present study. In studies conducted during the pandemic process, it has been found that families

who use social media for both social support and information have high levels of anxiety and are worried about social media messages (Drouin vd., 2020:727-736, Nanjundaswamy vd., 2020:787-790). Studies conducted in different countries and studies conducted in our country show similar results as the COVID-19 outbreak continues to be uncertain. In the study conducted by Ollivier vd. (2021:102902), it was determined that the anxiety levels of mothers in the postpartum period increased due to the obligation to comply with public health rules such as the call to stay at home, social distancing, and wearing a mask, as well as the uncertainty about how long these rules would last. Our study findings differ from the literature findings. It is thought that this difference arises due to the pandemic rules applied by the countries in which the studies were conducted.

4.3.Mother-Infant Attachment Level

It is one of our study findings that as the education level of mothers decreases, the level of attachment increases. However, in the study conducted by Yesilcinar vd. (2017:1213-1220), it was determined that maternal attachment was not related to the educational level of the mother. As a result, there are quite different results in the literature on the subject (Kirca and Savaser, 2017:236-243, Yesilcinar vd., 2017:1213-1220, Koçak and Ozcan, 2018:78-86). However, in another study conducted during the pandemic process, it was found that as the education level of mothers increased, mother-infant attachment decreased (Liu vd., 2022:853-861). While it is stated in the literature that mother-infant attachment is higher in women who had their first pregnancy during the pandemic process (Liu vd., 2022:853-861), similar results were obtained in our study.

Babies should be breastfed within the first hour after birth, but if breastfeeding cannot be achieved, breast milk should be given by expression (Ozkaya vd. 2020:46-55). In our study, results show that the maternal attachment levels of mothers who milks the breastmilk and give it with a bottle were higher than those of breastfeeding and non-breastfeeding mothers. When we examine the literature, it shows that we obtained different results in our study (Scharfe, 2012:218-225, Kirca and Savaser 2017:236-243). In the study conducted by Scharfe (2012:218-225), it was determined that maternal attachment of breastfeeding mothers was high, and in the study conducted by Kırca and Savaşer (2017:236-243), there was no relationship between the maternal attachment of infants fed with breast milk and formula. It must be noted that the reason why our study findings are different from the literature is that there is no study in the literature on maternal attachment and breastfeeding during the pandemic period and that they are compared with the studies conducted before this period.

Since the beginning of the COVID-19 pandemic, it has caused some changes in various habits of the whole world (Pakpour and Griffiths 2020:58-63). Among the most important changes are public health

rules such as social distancing, hand washing, and wearing masks (Bostan vd. 2020:em237). Mothers, who are going through an important transition amid the uncertainty, chaos, and rapid change brought about by the pandemic, experience the anxiety of the pandemic in addition to the stress and anxiety they experience while trying to adapt to the postpartum process (Gümüşsoy vd. 2020:e53-e60). Our study determined that these physical, social, and psychological changes during the pandemic period increased mothers' fear of COVID-19, but their anxiety level was lower. In the study conducted by Ollivier vd. (2021:102902), it was determined that the anxiety levels of mothers in the postpartum period increased due to the obligation to comply with public health rules such as the call to stay at home, social distancing, and wearing a mask, as well as the uncertainty about how long these rules would last. Our study findings differ from the literature findings. It is thought that this difference arises due to the pandemic rules applied by the countries in which the studies were conducted.

In this study, it is seen that there is a statistically significant difference between mothers with medium MIBS total scores and with low MIBS total scores. According to the results of adjusted regression analysis, it was observed that mothers with moderate MIBS scores had higher depression levels, no previous birth experience, concern about breastfeeding, and were concerned for the health of the baby. On the other hand, mothers with high MIBS had more fear of COVID-19 than mothers with low scores of MIBS. It was determined that there were more differences in education levels and depression levels between these two groups of mothers. In summary, the MIBS values of mothers who had previous birth experience also changed, and the MIBS score increased in mothers with high depression levels.

5. CONCLUSION AND LIMITATIONS

The COVID-19 pandemic, which has caused rapid changes in all areas of our lives, has caused significant changes in the lives of mothers in the postpartum period. One of the critical findings of the study is that mothers' anxiety and fear levels increase for several reasons such as pandemic restrictions, postpartum mothers' concerns about their babies' health, and being negatively affected by social media and news also, this situation causes a decrease in postpartum attachment levels. In our study, it was found that as the education level of the mothers increased, their anxiety and fear levels increased, while their attachment levels decreased. This finding is one of the surprising results of our study. Conducting studies on awareness-based practices, coping strategies, and strengthening social support resources for crisis and stress management is important to reduce the anxiety level of mothers during the pandemic period.

Some limitations in the present study should be taken into consideration. First, the study was conducted in a single region of Turkey. Therefore, the study results cannot be generalized to the general population.

Further multicenter, large-scale studies are needed to confirm these findings. Moreover, although the data were collected through an online survey as the easiest and safest way to collect data during the COVID-19 pandemic, there might have been some misunderstanding of the questions compared to the face-to-face method. Furthermore, mothers with a positive COVID-19 test or suspected positivity were excluded from the study as they may have experienced different psychosomatic problems in the healing process.

Funding

"This study is supported by The Scientific and Technological Research Council of Turkey (TUBITAK) (Grant number: 120K416)".

Conflict of Interest

"The authors declare no competing interests".

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