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ORIGINAL ARTICLE

Is There A Difference Between Postpartum Depression and Mother-baby Bonding in Pregnant Women Who Had and Did Not Have COVID-19?

COVID-19 Geçiren ve Geçirmeyen Gebelerde Doğum Sonrası Depresyon ve Anne-bebek Bağlanması Arasında Fark Var mıdır?

Gülnaz Karatay[1], Nazan Gürarslan Baş[1], Aslı Yüksekol[2]

[1]Department of Nursing, Munzur University Faculty of Health Science, Tunceli, Turkey
[2]Clinic of Neurology, Median Clinic, Flechtingen, Germany

Abstract

Objective: This study was conducted to examine the effect of being diagnosed with coronavirus disease-2019 (COVID-19) during pregnancy on postpartum depressive symptoms and infant-mother bonding.

Method: This comparative cross-sectional study was conducted in a city in eastern Turkey. Using the purposeful sampling method, 210 postpartum women (106 had COVID during pregnancy, 104 did not) constituted the sample of the study. The data were collected through face-to-face interviews between 15 March and 30 May 2022. Data were collected using the mother introductory information form, mother-infant bonding scale, and Edinburgh postnatal depression scale. The obtained data were analyzed using percentages, means, t-test, chi-square, Mann-Whitney U, and regression analysis.

Results: According to the findings of the study, a significant relationship has been observed between contracting COVID-19 and both the birth weight of the baby and the week of birth. Moreover, having COVID-19 negatively affected infant-mother bonding and increased postpartum depressive symptoms.

Conclusion: According to the findings of the study: it was observed that the babies of mothers who had COVID-19 had lower birth weight, were born before the full term, mother-baby bonding was lower, and postpartum depression was higher in mothers.

Keywords: Coronavirus disease-2019, bonding, pregnancy, postpartum depression, newborn

Öz

Amaç: Bu çalışmada, gebelik sırasında koronavirüs hastalığı-2019 (COVID-19) tanısı almış olmanın, doğum sonrası depresif belirtiler ve anne-bebek bağlanması üzerine etkisinin incelenmesi amacıyla yapıldı.

Yöntem: Karşılaştırmalı türde planlanan bu kesitsel çalışma, Diyarbakır il merkezinde gerçekleştirildi. Amaçlı örnekleme yöntemi kullanılarak seçilen 210 postpartum dönemindeki kadın (106'sı gebelikte COVID geçiren, 104'ü geçirmeyen) çalışmanın örneklemini oluşturdu. Çalışmanın verileri 15 Mart-30 Mayıs 2022 tarihleri arasında yüz yüze görüşme yöntemi ile toplandı. Veriler; anne tanıtım bilgi formu, anne-bebek bağlanma ölçeği ve Edinburgh doğum sonrası depresyon ölçeği kullanılarak toplandı. Elde edilen veriler SPSS veri tabanında yüzdelikler, ortalamalar, t-test, ki-kare, Mann-Withney U ve regresyon analizi kullanılarak analiz edildi.

Bulgular: Çalışmadan elde edilen bulgulara göre; COVID-19 enfeksiyonu geçirme durumu ile doğum haftası ve bebeğin doğum ağırlığı arasında anlamlı ilişki olduğu; benzer şekilde COVID geçirmenin anne bebek bağlanmasını olumsuz yönde etkilediği ve postpartum dönemde depresif yakınmaları artırdığı görüldü.

Sonuç: Çalışmada elde edilen bulgulara göre; Covid-19 geçiren annelerin bebeklerinin daha düşük doğum ağırlıklı olduğu, normal doğum haftasından daha erken dünyaya geldikleri, anne-bebek bağının daha düşük, annelerde doğum sonrası depresyonun daha yüksek olduğu görüldü.

Anahtar Kelimeler: Koronavirüs hastalığı-2019, bağlanma, gebelik, doğum sonrası depresyonu, yeni doğan

Corresponding Author:
Gülnaz Karatay, gkaratay@gmail.com

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Introduction

Coronavirus disease-2019 (COVID-19), which emerged as a global pandemic in early 2020, directly affects reproductive and perinatal health through direct infection, as well as indirectly due to changes in healthcare, social policies, or socio-economic circumstances (1). Therefore, pregnant women who are a unique group concerning mental and physical health needs had to cope with the burden of the pandemic during a critical care period as well as the usual stressors of the pre-and postnatal period (2).

Recent studies indicate that the virus's severity during pregnancy leads to increased morbidity and mortality (1,3-5). As the cardiorespiratory, circulatory, and immune systems undergo significant physiological changes during pregnancy, pregnant women become more vulnerable to various infections, including COVID-19 (6). Although intrauterine infection and vertical transmission of COVID-19 seem to be rare, the infection has been reported to cause an increased risk of pre-eclampsia, preterm birth, miscarriage, stillbirth, and low birth weight infants (4,7,8). On the other hand, beyond the direct effects of the pandemic stemming from infection, the repercussions of pandemic control policies, strain on health infrastructure, societal dynamics, and the global economy have directly impacted vulnerable groups, including pregnant women. In particular, the uncertainty of the impacts of COVID-19 on pregnancy, the concerns about its effects for generations and that these impacts will last for a long time in infants and children, the inability to establish cause-effect relationships related to the disease in general, hesitations about vaccination, limitations in access to healthcare, lack of evidence-based treatment options in pregnant women, domestic violence and increased poverty were among the factors that increased the psychological stress burden in pregnant women during this process (1,9).

Stress is a risk factor for postpartum depression, and it has been learned globally that the COVID-19 pandemic is a major source of stress. Published studies on the postpartum bonding experiences of mothers indicate that the burden of psychological stress increases in pregnant women due to the fear of COVID-19 during the pandemic, and this burden negatively affects the bonding process of mothers with their babies (2,10,11).

There are data indicating that the risk of postpartum depression is increased in women who have had COVID-19. Potential reasons for this include: the anxiety experienced by women during pregnancy becoming more pronounced in the postpartum period; the desire to stay strong for the baby during pregnancy giving way to emotional relaxation in the postpartum period; the physiological and psychological destruction that the disease process can cause; the fear of losing the baby; and many other factors such as the medications used. These factors can also negatively affect the mother-baby bonding process (1,2,8,11).

This study aims to explore the effect of having COVID-19 during pregnancy on postpartum depressive symptoms and infant-mother bonding in a city located in southeast Turkey: where people live in poverty, fertility is high, and education level is relatively low.

Main Points

- Having coronavirus disease-2019 (COVID-19) during pregnancy threatens both the baby's and mother's health.
- Bonding is negatively affected in mothers who have had COVID-19 during pregnancy.
- Having COVID-19 during pregnancy can lead to postpartum depressive symptoms.

Research Questions

1. Is there the relationship between having COVID-19 during pregnancy and birth characteristics?

2. Does contracting COVID-19 during pregnancy affect infant-mother bonding?

3. Does contracting COVID-19 during pregnancy affect postpartum depressive symptoms?

Material and Method

Study Design and Setting

This study was planned as a comparative cross-sectional study. The research was carried out in family health centers located in the city center. The province where the study was conducted was chosen because of its high fertility rates and its status as one of the riskiest provinces due to its demographic and cultural structure throughout the COVID-19 pandemic.

The study population comprised mothers residing in the city center, who sought vaccination for their babies against Hepatitis B at family health centers by the end of the first month. However, due to the large population, the study population was determined by two family health centers located in districts representing the most populous, poor, and middle-rich neighborhoods. G-Power analysis was used to determine the sample size. The sample size was calculated as 104 for each group and 208 people in total, taking alpha: 0.05, effect size: 0.5, and power: 0.95. Thus, considering the data losses, the study was completed with 210 participants.

Data Collection Tools

Research data were collected using the introductory information form, the mother-infant bonding scale (MIBS), and the Edinburgh postnatal depression scale (EPDS).

Mother Introductory Information Form

The form was developed by the researchers through a comprehensive review of the literature and subsequently validated through expert opinion. To evaluate the validity of the questionnaire, it was preliminarily applied to five participants, after which the questionnaire was formed.

The questionnaire included a total of 17 questions about the introductory characteristics of a mother (6 questions), the characteristics of fertility (5 questions), and the basic variables that may affect infant-mother bonding (6 questions).

Mother-infant bonding scale: MIBS, developed by Taylor et al. (12), is a 4-point Likert-type scale consisting of 8 items. There is a strong correlation between the bonding scores measured by the scale at the 3rd week, and at the 12th week. The scale is scored on a range of 0 to 24, with the lowest score being 0 and the highest being 24. In the assessment, the 1st, 4th, and 6th items denote positive emotional expressions and are scored as 0,1,2, or 3. Conversely, the 2nd, 3rd, 5th, 7th, and 8th items represent negative emotional expressions and are scored as 3,2,1, or 0 in reverse order. It was reported in the study of Taylor et al. (12) that the inter-rater reliability of the scale was 0.71 and the Cronbach alpha coefficient was 0.66. In the adaptation study conducted by Karakulak and Alparslan (13) in Turkey, the Cronbach alpha value of the scale was found to be between 0.66 and 0.85. In this last study, the Cronbach's alpha value was calculated as 0.61.

Edinburgh postnatal depression scale: EPDS was developed by Cox et al. (14) in 1987 to screen for postpartum depression in women. In our country, the validity and reliability of the scale were studied by Engin Deniz in 1996. The scale comprises 10 items, each evaluated on a 4-point Likert scale ranging from 0 to 3. scores range from 0 to 30, with higher scores indicating greater severity of depressive symptoms. For items 3, 5, 6, 7, 8, 9, and 10, scoring is reversed (3,2,1,0). A cut-off score of 12 is used, with individuals scoring above it considered at risk for depression. The Cronbach's alpha value for the scale was reported as 0.87 in previous studies and 0.86 in the current study, indicating high internal consistency.

Data Collection

The study data were collected between 15 March and 30 May using face-to-face interviews. Thus, breastfeeding rooms in family health centers were used. The period when the mother breastfed her baby or the baby slept was preferred during the interview, which lasted for 8-10 minutes on average. In cases where reliable data collection was not possible, the interview was ended.

Inclusion Criteria

- The mothers are in the first month of the postpartum period

- Babies are healthy and present at the family health centers for vaccination

- Mothers have no communication barriers

- Mothers do not have any acute psychiatric problems

Statistical Analysis

The data obtained in the study were analyzed using percentages, means, student's t-test, chi-square, Mann-Whitney U, and regression analysis after being transferred to the computer-aided SPSS database. The results were considered significant at the 95% confidence level and $p<0.05$.

Ethical Dimention

The Munzur University Non-interventional Research Ethics Committee permission was obtained for the collection of research data and the implementation of the research (approval no.: 2022/04-04, date: 25.02.2022). The study was conducted with consideration of the principles of the Declaration of Helsinki, informing the mothers about the purpose of the study, and obtaining consent from each mother who agreed to participate.

Results

The findings obtained in this study, which aimed to explore the effect of having COVID-19 during pregnancy on infant-mother bonding and postpartum depressive symptoms, are given below.

The descriptive data of both groups are similar. It was observed that 39.5% of the mothers included in the study had primary-secondary school education, 70.0% were not working, and 61.4% had income that covered their expenses (Table 1).

Considering some of the data on marriage and fertility of mothers with and without COVID-19: 5.2% of the mothers did not marry willingly, nearly half (49.0%) had 1-2 pregnancies, 43.3% had a miscarriage, the majority (73.3%) had 1-2 live births, 91.0% of them stated that their last pregnancy was planned, 42.4% of them stated that they got pregnant with medical treatment. When the sex of the babies is evaluated, it was seen that 57.1% of the births were female, and 57.1% of the mothers did not care about the sex of their baby (Table 2).

When the relationship between the mothers' status of having COVID-19 during pregnancy and birth characteristics was evaluated, it was found that while the mean gestational week was 37.28±2.10 weeks in mothers who had COVID-19, it was 38.61±0.72 weeks in those who did not. It was observed that the duration of pregnancy between the groups was statistically significantly different in favor of those who did not have COVID-19 ($t=6.096$, $df=208$, $p=0.001$). Similarly, while the average birth weight of the baby was 3041.89±588.676 grams in mothers who had COVID-19, it was 3516.54±405.690 grams in those who did not have it, and the difference was statistically significant in favor of those who did not have COVID-19 ($t=6.791$, $df=208$, $p=0.001$) While having COVID-19 was not found to be a factor affecting the mode of delivery ($U^*=5286.00$, $p=0.493$), it was observed that it significantly changed the initiation of breastfeeding ($U^*=4633.500$, $p=0.038$) (Table 3).

Table 1.
Some descriptive characteristics of the participants

Characteristics	Mother having COVID-19 (%)	Mother not having COVID-19 (%)	Total (%)
Age ($\bar{X}$ ± SD)	2.74±5.168	29.29±4.845	29.51±5.004 (min.:19, max.:41)
Education			
Illiterate	6 (5.7)	14 (13.5)	20 (9.5)
Literate	6 (5.7)	- (-)	6 (2.9)
Primary-secondary school	25 (23.6)	26 (25.0)	51 (24.3)
High school	39 (36.8)	44 (42.3)	83 (39.5)
University and above	14 (28.3)	20 (19.2)	50 (23.8)
Employment			
Working	31 (29.2)	32 (30.8)	63 (30.0)
Not working	75 (70.8)	72 (69.2)	147 (70.0)
Income			
Income less than expense	30 (28.3)	29 (27.9)	59 (28.1)
Income equals expense	62 (58.5)	67 (64.4)	129 (61.4)
Income more than expenses	14 (13.2)	8 (7.7)	22 (10.5)
Total	**106 (50.5)**	**104 (49.5)**	**210 (100.0)**

COVID-19=coronavirus disease-2019, SD=standard deviation, min.=minimum, max.=maximum

Table 2.
Some characteristics of the participants regarding fertility

Characteristics	Mothers having COVID-19 n (%)	Mothers not having COVID-19 n (%)	Total n (%)
Marrying willingly			
Yes	94 (88.7)	83 (79.8)	177 (84.3)
No	6 (5.7)	5 (4.8)	11 (5.2)
Undecided	6 (5.7)	16 (15.4)	22 (10.5)
Number of pregnancies			
1-2 pregnancy	52 (49.1)	51 (49.0)	103 (49.0)
3-4 pregnancy	47 (44.3)	46 (44.2)	93 (44.3)
5 and above pregnancy	7 (6.6)	7 (6.7)	14 (6.7)
Miscarriage status			
Yes	43 (40.6)	48 (46.2)	91 (43.3)
No	63 (59.4)	56 (53.8)	119 (56.7)
Number of live births			
1-2	79 (74.5)	75 (72.1)	154 (73.3)
3-4	25 (23.5)	29 (27.8)	54 (25.7)
5 and above	2 (1.9)	- (-)	2 (1.0)
Willingly get pregnant			
Yes	95 (89.6)	96 (92.3)	191 (91.0)
No	11 (10.4)	8 (7.7)	19 (9.0)
Mode of conception			
Medical treatment	37 (34.9)	52 (50.0)	89 (42.4)
Naturally	69 (65.1)	52 (50.0)	121 (57.6)
Baby's sex			
Girl	47 (44.3)	43 (41.3)	90 (42.9)
Boy	59 (55.7)	61 (58.7)	120 (57.1)

Table 2. ***Continued***			
Preference for sex of child			
Girl Boy Does not matter	18 (17.0) 30 (28.3) 58 (54.7)	16 (15.4) 26 (25.0) 62 (59.6)	34 (16.2) 56 (26.7) 120 (57.1)
COVID-19=coronavirus disease-2019, SD=standard deviation			

Table 3. ***The relationship between having COVID-19 during pregnancy and birth characteristics***			
Characteristics	**Mothers having COVID-19 n (%)**	**Mothers not having COVID-19 n (%)**	**Total n (%)**
Birth week ($\bar{X}$ ± SD)	37.28±2.10	38.61±0.72	37.94±1.71
Significance test	t=6.096, df=208, p=0.001		
Type of birth			
Vaginal birth Interventional birth Cesarean birth	23 (21.7) 1 (0.9) 82 (77.4)	26 (25.0) 2 (1.9) 76 (73.1)	49 (23.3) 3 (1.4) 158 (75.2)
Significance test	U*=5286.00, p=0.493		
Baby's birth weight (grams) ($\bar{X}$ ± SD)	3041.89±588.676	3516.54±405.690	
Significance test	t=6.791, df=208, p=0.001		
First breastfeeding period after birth			
Immediate Within 1-2 hours Within 3-4 hours 4 hours or more	11 (10.4) 34 (32.1) 15 (14.2) 46 (43.4)	13 (12.5) 32 (30.8) 40 (38.5) 19 (18.3)	24 (11.4) 66 (31.4) 55 (26.2) 65 (31.0)
Significance test	U*=4633.500, p=0.038		
**Mann-Whitney U* *COVID-19= coronavirus disease-2019, SD= standard deviation*			

Within the scope of the study, the relationship between having COVID-19 during pregnancy and MIBS and EPDS was evaluated. While the mean MIBS score was 22.264 ±2.089 in mothers who had COVID-19, it was 23.817±1.439 in those who did not, and the difference was statistically significant (t=6.260, df=208, p=0.001). Similarly, while the mean EPDS score was 10.905±6.255 in mothers who had COVID-19, it was 7.269±3.899 in mothers who did not, and the difference was statistically significant (t=5.044 df=208 p=0.001) (Table 4).

In the multinomial logistic regression analysis conducted to understand the predictive factors affecting infant-mother bonding, such factors as education, income, and employment status, willingly marrying and becoming pregnant, mode of delivery, baby's sex, and COVID-19 status were evaluated together. It was found among these variables that COVID-19 status (p=0.01), education (p=0.02), income status (p=0.016), mode of conception (p=0.039), and baby's sex (p=0.05) were predictive factors for infant-mother bonding. Among these factors, it was determined that the most influential factor according to the p-value was the state of having COVID-19 (Table 4).

Discussion

Pregnant women are identified as the group experiencing the most problems during the COVID-19 pandemic, as they go through a complex and sensitive process (15). When the literature is examined, the available literature reports that acute stress during pregnancy has negative effects on maternal health. Uncertainties about COVID-19 disease, defined as an acute environmental stressor, social isolation due to being exposed to COVID-19, inability to access necessary care, and concerns about the disease harming the fetus can cause increased psychological distress, especially in mothers in the perinatal period. It has been reported that COVID-19 disease may affect the level of postpartum depression and infant-mother bonding in mothers during the postpartum period (16,17). However, no study has been found in the literature comparing the level of postpartum depression and infant-mother bonding in mothers with and without COVID-19. In this study, the levels of MIBS and EPDS in mothers with and without COVID-19, as well as related factors, were examined in the light of the literature.

It was observed in this study that the average gestational week and average birth weight of the baby of mothers who had COVID-19 during pregnancy were lower than those who

Table 4.
The relationship between having COVID-19 during pregnancy and MIBS and EPDS

Characteristics	Mothers having COVID-19 ($\bar{X}$ ± SD)	Mothers not having COVID-19 ($\bar{X}$ ± SD)	Total $\bar{X}$ ± SD
MIBS	22.264±2.089	23.817±1.439	23.033±1.954
Significance test	t=6.260, df=208, p=0.001		
EPDS	10.905±6.255	7.269±3.899	9.104±5.520
Significance test	t=5.044, df=208, p=0.001		

COVID-19=coronavirus disease-2019, SD=standard deviation, MIBS=mother-infant bonding scale, EPDS=Edinburgh postnatal depression scale

did not, and that having COVID-19 changed the initiation of breastfeeding. In some studies, being COVID positive during pregnancy significantly increases the risk of low birth weight (1,7). These effects may be related to changes in nutritional patterns during the pandemic, decreased oxygenation levels due to disease, inadequate antenatal care, short gestation periods, and psychological distress. It was determined that the mean MIBS score in mothers who had COVID-19 was lower than those who did not and the mean EPDS score was higher than those who did not. The literature reports that during the pandemic, mothers in the postpartum period are worried about their health as well as the health of their loved ones, have mental problems, and that the process affects their parenting roles (9,18). Fernandes et al. (9) stated in their study that 27.5% of the mothers showed anxiety and depressive symptoms, and that mothers who gave birth during the COVID-19 pandemic had poorer and impaired infant-mother bonding than those who gave birth in the pre-pandemic period. Liu et al. (19) reported the mean postpartum depression score in mothers as 13.24 and the infant-mother bonding score average as 78.82. Suziki et al. (15) during the COVID-19 pandemic, it was reported that infant-mother bonding was poor in the first month after birth, and, in another study, postpartum depression increased during the 3-4 month period (20). Findings from this and other studies have shown that mothers who had COVID-19 during the pandemic are affected more negatively and that having COVID-19 has an effect on postpartum depression and infant-mother bonding.

In this latest study, it was found that having COVID-19, education and income status, mode of conception, and baby's sex were predictive factors for infant-mother bonding. Among these factors, the most influential factor was having COVID-19. In their study, Liu et al. (19) found a relationship between first pregnancy, young age, lack of support, and postpartum depression levels. It has been stated that experiencing COVID-19 related sadness was associated with low maternal bonding, while a high level of social support and maternal self-efficacy was associated with a high level of maternal bonding. It is stated in other studies as well that anxiety and sadness experienced during the pandemic process reduce the level of infant-mother bonding (2,21-23). Contrary to the results of this study, Layton et al. (24) reported that postpartum depression levels in pregnant women increased significantly during the pandemic process, but mother-infant bonding levels were not affected. Wilson et al. (25) stated that the visitor restriction during the pandemic and the fact that mothers spend more time at home and with their babies relax them and positively affect bonding. Handelzalts et al. (11) found that the higher COVID-19 anxiety, the higher the relationship between PDS and bonding. When examining the literature, it is emphasized that the prevalence of postpartum depression may be influenced by various factors, including the personal characteristics of the pregnant woman, societal factors, and extraordinary circumstances such as pandemics. Studies related to postpartum depression have reported prevalence rates ranging from 17.4% to 24% (10,26). Risk factors associated with postpartum depression include mental health issues, unintended pregnancies, low income, marital discord, and being a homemaker (26). According to the findings obtained from this and other studies, it is thought that the factors affecting the EPDS and MIBS levels of mothers vary during the pandemic process. This variability may be caused by sociological, economic, and cultural differences. Although the predictors affecting the MIBS level differ in the studies, it has been observed that the most important predictors related to the MIBS level are the education level of the mother and having COVID-19.

Study Limitations

The findings of the study are limited to the data obtained from pregnant women living in a province in Southeastern Turkey during the COVID-19 pandemic, and the results can only be generalized to this specific group.

Conclusion

The study found that mothers with COVID-19 gave birth to babies with lower birth weight, gave birth earlier than a normal week of delivery, and had lower MIBS and higher EPDS. It was determined that the most important factors affecting the MIBS level were the education level of the mother and having COVID-19. It is recommended that nurses and midwives make psychological assessments of pregnant and postpartum mothers they care for using scales during pandemic periods. In addition, planning and providing care to pregnant and postpartum mothers who are psychologically affected will play an important role in improving maternal and infant health.

Ethics Committee Approval: The study was approved by the Munzur University Non-interventional Research Ethics Committee (approval no: 2022/04-04, date: 25.02.2022).

Informed Consent: The study was conducted with consideration of the principles of the Declaration of Helsinki, informing the mothers about the purpose of the study, and obtaining consent from each mother who agreed to participate.

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