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# THE EFFECTS OF LABOR INDUCTION ON POSTPARTUM MOTHER-INFANT BONDING AND ANXIETY LEVELS

# EFECTELE INDUCȚIEI TRAVALIULUI ASUPRA LEGĂTURII POSTPARTUM MAMĂ-COPIL ȘI A NIVELULUI DE ANXIETATE

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**Abstract**

*Introduction:* Labor induction may cause anxiety for the expectant mother.

*Objective:* This study was conducted to examine the effects of oxytocin induction in labor on postpartum mother-infant attachment and anxiety levels.

*Materials and Methods:* The study was conducted with 416 women. Women who received oxytocin induction in labor constituted the case group, and those who did not receive oxytocin induction constituted the control group. The data were collected with a "Personal Information Form", the "Mother-Infant Attachment Scale" and the "State-Trait Anxiety Inventory".

*Results:* In the study, the mean mother-infant attachment and state anxiety scores of the case group were found to be significantly higher than those of the control group.

*Conclusion:* It was concluded that women who were administered oxytocin induction in labor had lower levels of mother-infant attachment and higher levels of state anxiety than those who were not.

**Rezumat**

*Introducere:* Inducerea travaliului poate provoca anxietate pentru mama însărcinată.

*Obiectiv principal al studiului:* Acest studiu a fost realizat pentru a examina efectele corelației dintre inducția travaliului cu oxitocină, atașamentul postpartum mamă-copil și nivelul de anxietate.

*Rezultate:* Studiul a fost realizat pe 416 femei. Femeile care au primit inducerea oxitocinei în travaliu au constituit grupul de cazuri, iar cele care nu au primit inducția oxitocinei au constituit grupul de control. Datele au fost colectate cu un "Formular de informații cu caracter personal", "Scala de atașament mamă-copil" și "Inventarul anxietății trăsăturilor de stat".

*Concluzii:* Concluzionând, femeile cărora li s-a administrat oxitocina pentru inducerea travaliului au avut niveluri mai scăzute de atașament mamă-copil și niveluri mai ridicate de anxietate.

**Key-words:** *anxiety, labor, mother-infant attachment, oxytocin induction*
**Cuvinte cheie:** *anxietate, travaliu, atașament mamă-copil, inducție oxitocină*

## Introduction

Childbirth is a natural event that is anticipated by expectant mothers with excitement. One of the most important factors for the pregnancy and childbirth process to continue and end without affecting one's health negatively is the mode of delivery *(Eser A. et al, 2016).* Based on the nature of this process, as labor can be allowed to happen spontaneously, there can also be situations where interventions are needed. One of such interventions is labor induction. Labor induction can be implemented in cases where cervical ripening has occurred, labor has started, and there is no complication in the pregnant woman or the fetus. Labor induction prevalently involves the use of synthetic oxytocin *(Demirel G, Çelik D.B, 2013, Budak M.S. et al, 2016).* In comparison to spontaneous labor, the complication rates in pregnant women who are subjected to induction with synthetic oxytocin are higher. The complications of oxytocin induction include hyperstimulation, cesarean section delivery, hypotension, antidiuretic effects, neonatal hyperbilirubinemia, uterine rupture, and fetal distress. In the labor process, these complications may create anxiety in the

pregnant woman *(Clark S.L. et al, 2009).* Anxiety is usually defined as a state of expectation about the future that saddens and distresses the person, a state of worry. It is also a state of nervousness accompanied by feelings of insecurity that arise alongside physical symptoms such as tremors, palpitations, sweating, and elevated heart rate *(Beck A.T, Emery G, 2006).* Women may experience fear and anxiety in labor as they do not exactly know and understand what happens in this process. The potential of practices that are performed in labor or some risks that may develop to harm the infant can make the mother anxious. Additionally, the anxiety levels of expectant mothers may also increase due to their probability of encountering situations that they are not used to such as physical injury, pain, and loss of control of their bodies during labor. Therefore, labor induction may also lead the expectant mother to experience anxiety because it is an intervention made in labor, and it involves uncertainty. As a consequence of this anxiety, their risk of fetal stress, hemorrhage, prolonged labor, and precipitous labor may increase. It was also stated that anxiety arising in the mother during labor may affect mother-infant bonding in the postpartum period negatively *(Üst Z.D. et al, 2013).* Mother-infant bonding is a form of bonding that starts with pregnancy and is assumed to continue in the postpartum period, and it is considered a deep and close relationship that has significant effects on the perception and development of motherhood roles *(Müller M.E, 1996, Nacar E, Gökkaya F, 2019).* Likewise, this bonding affects the establishment of relationships and sustenance of a healthy life not only in infancy but also in childhood, adolescence, and adulthood *(Nacar E, Gökkaya F, 2019).* For all these reasons, it is important to reduce the anxiety levels of the mother during labor and examine in detail the effects of labor induction, which may be expected to influence the anxiety levels of the mother, on mother-infant health. Thus, in this study, the effects of labor induction on mother-infant bonding and anxiety levels were investigated, and it was aimed to draw attention to the issue by raising awareness in healthcare professionals based on the obtained findings.

*Research Questions*

(1) Does labor induction with oxytocin effect postpartum mother-infant bonding?

(2) Does labor induction with oxytocin effect postpartum state anxiety levels?

(3) Does labor induction with oxytocin effect postpartum trait anxiety levels?

(4) Is there a relationship between mother-infant bonding and state-trait anxiety levels in women undergoing labor induction and those who are not?

**Method**

*Design*

This analytical case-control study was carried out at the Postpartum Inpatient Clinic of the Dr. Ali Kemal Belviranlı Obstetrics, Gynecology and Pediatrics Hospital affiliated with the Provincial Directorate of Health in Konya, Turkey.

*Participants*

Using the convenience sampling method, the sample of the study included a total of 416 women, including 208 in the case group (underwent labor induction) and 208 in the control group (did not undergo labor induction). The minimum required sample size was calculated as 400 (case group: 200, control group: 200) by using the known population method *(Sümbüloğlu K, Sümbüloğlu V, 1990)* based on the number of women who gave birth vaginally in 2019 (4061), in a 95% confidence interval ($\alpha$=0.05), and at p=0.05. In total, 428 women were invited to participate in the study. Among these women, 5 women did not agree to participate in the study, and 7 women did not fill out the data collection instruments completely. Consequently, the study was completed with 416 women. The inclusion criteria were being a woman at or over the age of 18, giving birth to a single and living infant, having a healthy infant who stayed with the mother, agreeing to participate in the study, and being able to speak and understand Turkish. The exclusion criteria included having any pregnancy complication or systemic and neurological disease, receiving interventions during labor such as episiotomy, amniotomy, forceps, and vacuum, undergoing labor induction methods other than oxytocin induction, and having an infant who was taken to an incubator or the newborn intensive care unit. While assigning the women to the groups, their

information was obtained from their pregnancy files, and among the women who met the inclusion criteria, those who underwent oxytocin induction were allocated to the case group, while those who did not undergo oxytocin induction were allocated to the control group.

*Data Collection*

The data of the study were collected using a "Personal Information Form", the "Mother-Infant Bonding Scale (MIBS)", and the "State-Trait Anxiety Inventory (STAI)".

*Personal Information Form*

The form was developed by the researchers in line with the literature. This form included a total of 20 questions about the sociodemographic and obstetric characteristics of the participants *(Kavlak O, Şirin A, 2009, Taşar M.A. et al, 2016).* The form was filled out by the researcher in face-to-face interviews.

*Mother-Infant Bonding Scale (MIBS)*

The scale was developed in a way that it can be administered starting with the first day in the postpartum period, and it allows the mother to express the feelings she has for her infant using single words. The scale shows the relationship between the bond established between the mother and the infant and the mental state of the mother in the early postpartum period. The minimum and maximum scores that can be obtained from MIBS that was developed by Taylor et al. are 0 and 24. Higher scores indicate lower levels of mother-infant bonding. The interrater reliability coefficient of the scale was reported as 0.71, while its Cronbach's alpha internal consistency coefficient was reported as 0.66. In the study conducted by the authors who developed the scale, a strong correlation between the bonding scores on the 3rd day and at the 12th week was reported ($r=0.54$ $p<0.001$) *(Taylor A. et al, 2005)*. The scale was adapted to Turkish by Karakulak and Alparslan, who found the Cronbach's alpha coefficients of the scale as 0.69 at the first stage and 0.68 at the second stage *(Karakulak H.A, Alparslan O, 2016).* In this study, the Cronbach's alpha coefficient of MIBS was calculated as 0.71. MIBS was filled out based on the self-reports of the participants

*State-Trait Anxiety Inventory (STAI)*

The State-Trait Anxiety Inventory (STAI) was developed by Spielberger et al. (1964). Öner and Le Compte adapted it to Turkish in the years 1974-1977 *(Öner N, Le Compte A, 1998).* Both the original and Turkish versions of the inventory are four-point Likert-type scales. The State Anxiety Subscale (STAI-I) is concerned with the description of how a person feels at a certain moment and under certain conditions. The Trait Anxiety Subscale (STAI-II) is concerned with the description of how a person feels in general. Each subscale has a total score varying between 20 and 80, where higher scores indicate higher levels of anxiety *(Öner N, Le Compte A, 1998).* In the Turkish adaptation of the inventory, the Cronbach's alpha coefficients were found to be in the range of 0.83 to 0.92 for state anxiety and 0.83 to 0.87 for trait anxiety *(Akman K.E, 2015).* In this study, the Cronbach's alpha coefficients of the inventory were calculated to be in the range of 0.78 to 0.85 for state anxiety and 0.81 to 0.88 for trait anxiety. STAI was filled out based on the self-reports of the participants.

*Pilot Implementation*

To ensure the comprehensibility and applicability of the Personal Information Form that was developed by the researchers, opinions and recommendations were obtained from five faculty members working in the fields of Midwifery and Obstetrics and Gynecology Nursing. Additionally, a pilot implementation was made with 10 women (5 who underwent oxytocin induction and 5 who did not undergo oxytocin induction) at the postpartum inpatient clinic where the study was conducted. After the pilot implementation, no change was deemed necessary in the form. The data collected in the pilot implementation were not included in the analyses.

**Ethical Considerations**

Preliminary approval was obtained with the decision dated 04/05/2020 and numbered E.25099 from the Health Sciences Faculty Non-Interventional Clinical Studies Ethics Committee at Aydın Adnan Menderes University. Written permission was obtained from the Konya Provincial Directorate of Health to conduct the study at the Dr. Ali Kemal Belviranlı Obstetrics, Gynecology, and Pediatrics Hospital. Permission was received from Hatice Aydemir Karakulak by e-mail to use the Mother-Infant Bonding Scale (MIBS) in the study. Consequently, final approval was obtained with the decision dated 04/06/2021 and numbered 35320 from the Health Sciences

Faculty Non-Interventional Clinical Studies Ethics Committee at Adnan Menderes University.

**Data Analyses**

The Statistical Package for the Social Sciences (SPSS) 18 package program was used to analyze the data. Frequency, percentage, mean, and standard deviation values are presented as descriptive statistics. Skewness and kurtosis values were examined to check the normality of the distribution of the data, and it was found that the data were normally distributed. Independent-samples t-test or chi-squared test was used to compare the sociodemographic and obstetric characteristics of the case and control groups. The mean MIBS, STAI-I, and STAI-II scores of the case and control groups were compared using t-tests. Furthermore, Pearson's correlation analyses were conducted to examine the relationships of MIBS scores with STAI-I and STAI-II scores.

**Results**

Table 1 shows the distributions of the sociodemographic characteristics of the participants in the case and control groups. The participants in both groups were statistically similar in that most of them were secondary school graduates (case: 33.7%, control: 27.8%), the vast majority were not employed (case: 85.1%, control: 83.7%), and the income of most was equivalent to their expenses (case: 61.1%, control: 60.1%).

The groups were also similar in that most of the participants were living in the city (case: 69.2%, control: 69.7%), most had nuclear families (case: 76.9%, control: 72.1%), and almost all participants had civil marriages (case: 97.6%, control: 95.2%) (Table 1).

| Characteristics | Case Group (n=208), n (%) | Control Group (n=208), n (%) | $\chi^2$/p |
|---|---|---|---|
| **Education Level** | | | |
| Literate with no formal degree | 8 (3.8) | 7 (3.4) | 2.609/0.625 |
| Primary school | 35 (16.8) | 42 (20.2) | |
| Secondary school | 70 (33.7) | 58 (27.8) | |
| High school | 56 (26.9) | 54 (26.0) | |
| University or higher | 39 (18.8) | 47 (22.6) | |
| **Employment Status** | | | |
| Employed | 31 (14.9) | 34 (16.3) | 0.164/0.685 |
| Not employed | 177 (85.1) | 174 (83.7) | |
| **Income Level** | | | |
| Income lower than expenses | 59 (28.3) | 66 (31.7) | 1.049/0.592 |
| Income and expenses equivalent | 127 (61.1) | 125 (60.1) | |
| Income higher than expenses | 22 (10.6) | 17 (8.2) | |
| **Place of Residence** | | | |
| City | 144 (69.2) | 145 (69.7) | 2.677/0.444 |
| District | 26 (12.5) | 26 (12.5) | |
| Town-village | 38 (18.3) | 37 (17.8) | |
| **Family Type** | | | |
| Nuclear | 160 (76.9) | 150 (72.1) | 1.442/0.486 |
| Extended | 48 (23.1) | 58 (27.9) | |
| **Has Social Security** | | | |
| Yes | 163 (78.4) | 163 (78.4) | 0.210/0.989 |
| No | 45 (21.6) | 45 (21.6) | |
| **Had a Civil Marriage** | | | |
| Yes | 203 (97.6) | 198 (95.2) | 1.729/0.189 |
| No | 5 (2.4) | 10 (4.8) | |
| **Characteristics** | **X±SD (Min-Max)** | **X±SD (Min-Max)** | **t/p** |
| Age (years) | 26.94±5.73 (18-44) | 26.97±5.80 (18-43) | 0.600/0.953 |

*Table 1. Sociodemographic Characteristics of the Participants*

Table 2 shows the distributions of the obstetric characteristics of the participants in the case and control groups. The participants in both groups were statistically similar in that most were having their first pregnancy (case: 35.1%, control: 34.1%), and most had one living child

(case: 39.4%, control: 39.4%). Additionally, in both groups, the vast majority of the participants had no history of miscarriage (case: 83.7%, control: 81.2%), abortion (case: 92.8%, control: 95.7%), or stillbirth (case: 98.1%, control: 97.6%), and the vast majority did not experience a problem during their previous labor (case: 95.2%, control: 95.2%) and after their previous labor (case: 95.7%, control: 97.1%). Moreover, similarly in both groups, the vast majority of the participants were having planned pregnancies (case: 80.8%, control: 82.2%), and the time that had passed since their last pregnancy was 36 months or longer (case: 35.6%, control: 35.6%). Additionally, similarly in both groups, large proportions of the participants attended their pregnancy follow-ups at 4-6-week intervals (case: 50.0%, control: 51.0%), and most had not received antenatal education (case: 85.6%, control: 80.8%).

| Characteristics | Case Group (n=208), n (%) | Control Group (n=208), n (%) | $\chi^2$/p |
|---|---|---|---|
| **Total Number of Pregnancies** | | | |
| One | 73 (35.1) | 71 (34.1) | 2.113/0.549 |
| Two | 49 (23.6) | 58 (27.9) | |
| Three | 40 (19.2) | 43 (20.7) | |
| Four or More | 46 (22.1) | 36 (17.3) | |
| **Number of Living Children** | | | |
| One | 82 (39.4) | 82 (39.4) | 6.202/0.102 |
| Two | 50 (24.0) | 69 (33.2) | |
| Three | 51 (24.5) | 35 (16.8) | |
| Four or More | 25 (12.1) | 22 (10.6) | |
| **Number of Miscarriages** | | | |
| One | 28 (13.5) | 33 (15.9) | 1.164/0.559 |
| Two | 6 (2.9) | 6 (2.9) | |
| None | 174 (83.7) | 169 (81.2) | |
| **Number of Abortions** | | | |
| One | 12 (5.8) | 7 (3.4) | 0.159/0.924 |
| Two or More | 3 (1.5) | 2 (1.0) | |
| None | 193 (92.8) | 199 (95.7) | |
| **Number of Stillbirths** | | | |
| One | 3 (1.4) | 4 (1.9) | 0.32/0.858 |
| Two | 1 (0.5) | 1 (0.5) | |
| None | 204 (98.1) | 203 (97.6) | |
| **Problem Experienced in Previous Labor** | | | |
| Preterm labor | | | |
| Labor dystocia | 5 (2.4) | 7 (3.4) | 2.619/0.270 |
| None | 5 (2.4) | 3 (1.5) | |
| | 198 (95.2) | 198 (95.2) | |
| **Problems Experienced after Previous Labor*** | | | |
| Movement restriction | | | |
| Breastfeeding problems | 4 (1.9) | 3 (1.4) | 4.732/0.316 |
| Hemorrhage, infection | 3 (1.4) | 3 (1.5) | |
| None | 2 (1.0) | - | |
| | 199 (95.7) | 202 (97.1) | |
| **Has a Planned Pregnancy** | | | |
| Yes | 168 (80.8) | 171 (82.2) | 0.143/0.705 |
| No | 40 (19.2) | 37 (17.8) | |
| **Time Since Last Pregnancy** | | | |
| 9-12 months | 11 (5.3) | 12 (5.8) | 0.303/0.960 |
| 13-24 months | 21 (10.1) | 24 (11.5) | |
| 25-36 months | 28 (13.5) | 26 (12.5) | |
| 36 months or longer | 74 (35.6) | 74 (35.6) | |
| Having first pregnancy | 74 (35.6) | 72 (34.6) | |
| **Frequency of Attending Pregnancy Follow-Ups** | | | |
| Never | | | |
| Every 1-3 weeks | 7 (3.4) | 3 (1.4) | 2.659/0.447 |
| Every 4-6 weeks | 25 (12.0) | 32 (15.4) | |
| Every 7 weeks or less frequently | 104 (50.0) | 106 (51.0) | |
| | 72 (34.6) | 67 (32.2) | |
| **Has Had Antenatal Education** | | | |
| Yes | 30 (14.4) | 40 (19.2) | 1.718/0.190 |
| No | 178 (85.6) | 168 (80.8) | |

*Table 2. Obstetric Characteristics of the Participants*

Table 3 shows the mean MIBS, STAI-I, and STAI-II scores of the participants in the case and control groups. Accordingly, the mean MIBS score of the case group (14.28±1.73) was significantly higher than that of the control group (12.91±2.25) (t=1.906, p=0.057). The mean

STAI-I score of the case group (31.71±7.82) was also significantly higher than that of the control group (28.56±6.91) (t=1.582, 0.011). Furthermore, the mean STAI-II score of the case group (41.89±8.07) was lower than that of the control group (42.00±7.39), but this difference was not statistically significant.

| Scales | Case Group (n=208) X±SD (Min-Max) | Control Group (n=208) X±SD (Min-Max) | t/p |
|---|---|---|---|
| **MIBS** | 14.28 ±1.73 (1-22) | 12.91±2.25 (2-24) | **1.906/0.057*** |
| **STAI-I** | 31.71± 7.82 (28-76) | 28.56±6.91 (24-77) | **1.582/0.011*** |
| **STAI-II** | 41.89± 8.07 (32-79) | 42.00±7.39 (30-75) | 0.146/0.884 |

*p<0.05, X: Mean, SD: Standard deviation, Min-Max: Minimum-Maximum, t: independent-samples t-test

*Table 3. Mean MIBS, STAI-I, and STAI-II Scores of the Participants*

Table 4 presents the results of the analyses on the relationship between the mean MIBS scores of the participants and their mean STAI-I and STAI-II scores. Accordingly, the mother-infant bonding levels of the participants in the case group had negative, moderate, and statistically significant relationships with their state anxiety (r= -0.421, p= 0.053) and trait anxiety (r= -0.542, p= 0.012) levels.

There were also negative, moderate, and statistically significant relationships between the mother-infant bonding levels of the participants in the control group and their state anxiety (r= -0.512, p= 0.006) and trait anxiety (r= -0.498, p= 0.023) levels (Table 4).

| Scales | MIBS | |
|---|---|---|
| | r | p |
| **Case Group (n=208)** | | |
| **STAI-I** | -0.421 | p=0.053 |
| **STAI-II** | -0.542 | p=0.012 |
| **Control Group (n=208)** | | |
| **STAI-I** | -0.512 | p=0.006 |
| **STAI-II** | -0.498 | p=0.023 |

r: Correlation coefficient

*Table 4. Relationships between the Mean MIBS Scores of the Participants and Their Mean STAI-I and STAI-II Scores*

## Discussion

In this study that was carried out with an analytical and case-control design to investigate the effects of labor induction by oxytocin on postpartum mother-infant bonding and anxiety levels, it was determined that in comparison to the participants in the control group, the participants in the case group had lower mother-infant bonding levels, higher state anxiety levels, and similar trait anxiety levels. Additionally, it was seen that in both groups, as the anxiety levels of the participants increased, their mother-infant bonding levels decreased. These results showed that performing labor induction increases the state anxiety levels of women in the postpartum period, and this affects mother-infant bonding negatively.

It was found in this study that the sociodemographic and obstetric characteristics of the participants in both the case and control groups were similar. This result was important in terms of showing that the two groups were homogeneously distributed, and their mother-infant bonding and anxiety levels could be compared.

In this study, the mother-infant bonding levels of the participants who underwent labor induction with oxytocin were found lower than those of the participants in the control group. Studies have shown that women want to manage and control their own labor process *(Gibbins J, Thomson A.M,, 2001, Zadoronzyj M, 1999).* However, pain, stress, helplessness, fear, loss of control, and confusing procedures such as labor induction and enemas that are experienced during labor may create obstacles to the management of the labor process by the woman herself *(Mete S, 2013, Akın Ö, 2018).* Performing labor induction may also lead women to have an unfavorable labor experience for reasons such as the fact that it interrupts the natural flow of labor, and it does not allow the woman to manage her own labor process. With such an unfavorable labor experience, as a result of increased levels of stress hormones, decreases occur in the frequency and intensity of the woman's contractions *(Alehagen S. et al, 2006, Mete S, 2013).* This may require increasing the dose of the induction agent. Considering that the mother-infant bonding process is an effective relationship

that starts with pregnancy, increases with the movements of the fetus, peaks at the time of labor and develops in the first year of life after childbirth, it may be stated that negative experiences during labor are highly effective on mother-infant bonding *(Karakulak H.A, Alparslan O, 2016, Özden S, 2019).* However, although the literature review that was conducted in this study revealed several studies that have examined various factors that could be effective on mother-infant bonding *(Kızrak S.B, 2019, Boukydis C.F.Z. et al, 2006, Righetti P.L. et al, 2005, Pretorius D.H. et al, 2006, Wong C.A, 2001, Dereli Yılmaz S, Kızılkaya Beji N, 2010),* it did not present any study that has examined the relationship between mother-infant bonding and the practice of labor induction. This shows that more studies examining this relationship are needed.

It was observed in this study that the trait anxiety levels of the participants who underwent labor induction with oxytocin were lower than those in the control group. Nevertheless, this difference was not found statistically significant. On the other hand, the state anxiety levels of the participants who underwent labor induction with oxytocin were significantly higher than those in the control group. These results were important in terms of showing that performing labor induction is not significantly effective on the trait anxiety levels of women, but it has an effect that increases their state anxiety levels. The emergence of developments that reduce the pain experienced during labor and make the labor process easier has given rise to the concept of medicalization in labor. With medicalization, labor, which needs to occur naturally, has started to be seen as an event that is risky and requires intervention. Practices such as electronic fetal monitoring, episiotomy, and induction in labor have become prevalent, the view that labor is a risky event has started to be adopted, and the idea that labor must take place at a hospital under all conditions has become a conviction. While the data on the practice of induction in labor in Turkey are insufficient, it has been reported that it is a frequently applied medical intervention *(Demirci N. et al, 2005, Şahin M, Erbil N, 2019).* Besides, in pregnant women who undergo labor induction, the probability of another medical intervention increases, and it has been stated that labor induction may lead to complications such as fetal distress, uterine rupture, hypotension, and hyperstimulation *(Şahin M, Erbil N, 2019).* A previous study showed that induction with oxytocin during labor lowered the labor-related satisfaction levels of pregnant women *(Ezeanochie M.C. et al, 2013).* In light of all this information, it is an expected situation that performing induction during labor would increase the state anxiety level of the woman as it makes labor a more medicalized and complicated process. The result of this study was in parallel with the information in the literature, and it suggested the need for a detailed discussion on the concept of medicalization in labor and planning interventions to reduce its rates. Additionally, the fact that the literature review in this study did not reveal any previous study examining the effects of labor induction on the anxiety levels of women indicates the need for well-planned studies on this topic to be carried out in different samples.

In this study, a moderate, negative, and statistically significant relationship was identified between the mother-infant bonding levels and state-trait anxiety levels of the women who underwent labor induction with oxytocin. This result was significant in terms of showing that increased anxiety levels have a negative effect on mother-infant bonding. Bonding is a pattern of communication and interaction that develops and is established bilaterally between the mother and her infant. For individuals who are mentally and physically healthy to be brought up, while mothers are expected to develop a favorable bond with their infants starting from before childbirth and continuing after childbirth, similarly, the infant also needs to establish a favorable and secure bond with their mother. There are several factors that affect bonding *(Karakaş N.M, Dağlı F.S, 2019).* In the results of this study, anxiety levels were also found to be a factor that affects bonding. Therefore, it is important to plan and implement interventions for reducing the rate of labor induction practices that increase the anxiety levels of mothers.

**Limitations**

This study had some limitations. First, the data were limited only to the information shared in the self-reports of the participants, and the results only represent these participants. Second, the COVID-19 pandemic that was still going on

during the data collection process of the study was a limitation. The participants may have experienced concerns due to the fact that it was a critical period, and authorities tried to protect people by initiating precautions such as wearing facemasks and social distancing to reduce the risk of COVID-19 infection. These concerns may have increased the anxiety levels of the participants.

**Conclusion**

In this study, it was determined that labor induction applied with oxytocin reduced mother-infant bonding, increased state anxiety and did not significantly affect trait anxiety in the postpartum period. Moreover, there was a negative relationship between mother-infant bonding and anxiety levels, and as the anxiety levels of the mothers increased, their mother-infant bonding levels decreased. On the other hand, as their anxiety levels decreased, their mother-infant bonding levels increased. Based on these results, it is recommended that induction should not be applied during labor unless it is required, and in the antenatal period, healthcare professionals should provide information and counseling services to pregnant women about the labor process and unusual situations that can occur during labor.

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