## Original Article

# Effects of Breastfeeding on Premature Infants' and their Mothers' Comfort

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**Abstract**

**Background**: Although it has been recommended that within the scope of the baby-friendly hospital the breastfeeding rate which was 42% in 2008 according to the Turkey Demographic and Health Surveys (TDHS)-2008 declined to 30% in 2013 according to the TDHS-2013, which suggests that although exclusive breastfeeding is recommended, this is not the case in practice.

**Aim:** The aim of this study is to determine the effects of breastfeeding on premature infants' and their mothers' comfort.

**Methodology:** This descriptive and cross-sectional study was carried out at the Neonatal Intensive Care Unit of a University Hospital between February 01, 2018 and June 30, 2018. The sample of the study included all the premature infants (n = 100 infants) whose gestational ages ranged between 34 weeks and 37/6 weeks admitted to the Neonatal Intensive Care Unit between the aforementioned dates and their mothers. The mothers gave their written consent indicating that they agreed to participate in the study after the purpose of the study was explained to them.

**Results:** The comparison of the Premature Infant Comfort Scale(PICS) scores obtained at different times, demonstrated that the differences between the scores obtained before and during breastfeeding, the scores obtained before and after breastfeeding and the scores obtained during and after breastfeeding were significant (p<005).

**Conclusions:** The results of this research indicated that breastfeeding affected the comfort levels of the premature babies.

**Keywords: Comfort, Premature, Breastfeeding, Mother**

## Introduction

Although it has been recommended that within the scope of the baby-friendly hospital, continuous trainings involving the provision of counseling on breast milk and breastfeeding should be conducted and that infants should be breastfed exclusively, unfortunately, the breastfeeding rate which was 42% in 2008 according to the Turkey Demographic and Health Surveys (TDHS)-2008 declined to 30% in 2013 according to the TDHS-2013, which suggests that although exclusive breastfeeding is recommended, this is not the case in practice (TDHS, 2013). According to holistic thinking, the concept of comfort refers to the meeting of basic human needs in order to feel relieved, to be untroubled by worries and to overcome problems (Kolcaba, 1992; Kolcaba, 1994; Kolcaba, 2001). Breastfeeding, one of the non-pharmacological methods used to relieve pain, not only meets the basic nutritional needs of the baby but also ensure sits comfort. While babies are given care in the neonatal intensive care unit by fulfilling their vital needs, their parents should be relieved with a supportive approach by providing a suitable physical and psychosocial environment to meet their comfort needs. In the neonatal intensive care units, a complex physical environment with advanced technological devices and materials, parents should be supported with individualized developmental

care by defining their comfort needs and the factors affecting these needs without ignoring the importance of parent-infant attachment. Mothers whose infants are hospitalized in the neonatal intensive care unit report that they want social support provided with reassuring approaches regarding the care and feeding of their baby at home (Cırlak & Erdemir,2012). Midwives and nurses working in neonatal intensive care units should observe the baby very well within the scope of "touch less, observe more" policy, assess the baby's pain using an appropriate pain scale and ensure its comfort by taking non-pharmacological or pharmacological measures to prevent pain. The most appropriate feeding method for healthy full-term newborns is to be breastfed by their own mother. However, in premature infants, it is difficult to decide what the most appropriate feeding method is (Turkish Neonatology Association, Preterm Baby Nutrition Guide, 2018). Premature infants stay in the hospital longer due to respiratory distress, feeding disorders resulting from sucking and swallowing difficulties, and risk of exposure to infections. During their stay in the hospital, their nutritional needs should be met with two or more methods. When deciding which method should be preferred, health professionals take the newborn's gestational age, clinical status and oral feeding ability into consideration. This process is long, tiring and frustrating for both the mother and the baby. Midwives and nurses working in neonatal intensive care units should help the mother and the baby relax by making a systematic assessment and planning in order to determine whether the baby is ready for oral feeding (Cay ve Geylani Gülec, 2015). It is necessary to provide comfort for the quality of life of infants as much as that of healthy or sick individuals. This study was designed to investigate effects of breastfeeding on premature babies' and their mothers' comfort.

## Methodology

**Setting, study design and ethical concerns:** This descriptive and cross-sectional study was conducted in the neonatal intensive care unit of a university hospital. In the unit, 1 Neonatology Specialist, 2 physician associates, 38 nurses and 2 midwives serve the newborns. The unit has 14 beds for tertiary care, 7 beds for secondary care and 15 beds for primary care.

**Setting and sample:** The study sample included 100 premature infants whose gestational ages ranged between 34 weeks and 37/6 weeks and who were hospitalized in the Neonatal Intensive Care Unit between February 01, 2018 and June 30, 2018 and their mothers who had no communication problems (language problems, speech and hearing problems, etc.) and gave their written informed consent after the purpose of the study was explained to them.

**Ethical consideration:** Medical ethics was approved by the Non-Interventional Clinical Research Ethics Committee of Cumhuriyet University (Decision No: 2018-01 / 38). The written permission of the institution was obtained from Sivas Cumhuriyet University Health Services Application and Research Hospital where the study was to be conducted. Before the study was started, the purpose of the study and how it would be performed were explained to the mothers who agreed to participate in the study by the researchers and their written informed consent was obtained.

**Measurements:** The study data were collected through face-to-face interviews using the Descriptive Characteristics Questionnaire for Mothers, Descriptive Characteristics Questionnaire for Premature Babies, Postpartum Comfort Scale, Premature Infant Comfort Scale, and Breastfeeding Observation Form.

**Descriptive Characteristics Questionnaire for Mothers:** The questionnaire prepared by the researchers has 11 items questioning the mothers' socio-demographic characteristics such as age, age at first marriage, occupation, educational status, social security, socioeconomic status, family type, type of marriage, and pregnancy- and birth-related characteristics such as the number of pregnancies, the number of births, the number of living children, gestational age, the number of abortions, pregnancy plan, mode of delivery.

**Descriptive Characteristics Questionnaire for Premature Babies:** The questionnaire prepared by the researchers questions newborns' age, sex, gestational age, birth weight, birth height, head circumference, APGAR score (at the $1^{st}$and $5^{th}$minutes), feeding type (breastfeeding, breastfeeding + oral feeding with an injector, breastfeeding + Orogastric / nasogastric feeding). During the study, an item questioning whether the infant had a comorbid disease was added to the questionnaire.

**Postpartum Comfort Scale (PCS):** The scale developed by Karakaplan and Yıldız (2010) is a reliable and suitable scale to measure postpartum comfort levels of mothers who undergo vaginal birth or cesarean section, to meet their

postpartum comfort needs and to assess the output which is a concrete indicator of the results (Karakaplan & Yıldız Eryılmaz, 2007). The scale consists of 34 items (The validity and reliability study of the scale was conducted on 55 items, but after the analysis, the number of the items was reduced to 34). The responses given to the items are rated on a 5-point Likert scale ranging from 5 (strongly agree) to 1 (strongly disagree). While the choice "strongly agree" corresponds to the best comfort (5 points) in positively keyed items, it corresponds to low comfort (1 point) in negatively keyed items. Accordingly, the lowest and highest possible scores to be obtained from the scale were 34 and 170 respectively. By dividing the total score obtained from the scale by the number of items, the mean score is determined, and the result is shown within the range of 1 to 5. While a score of 1denotes a low level of comfort, a score of 5 denotes a high level of comfort. In the present study, in order to measure the mothers comfort levels at different times (before, during and after breastfeeding), they were asked to give their responses according to the specified time intervals. Then, the items were marked according to these time intervals. Premature Infant Comfort Scale (PICS): This form contains information on the premature baby's such characteristics as alertness, calmness / agitation, respiratory response, physical movements, muscle tone, facial tension, and average heart rate. The PICS developed by Ambuel et al. (1992) to measure pain and stress levels in children aged 0-18 years admitted to a pediatric intensive care unit was then adapted to premature infants whose gestational age ranged between 28 and 37 weeks by Monique et al. (2007) (Monique et al., 2007). The PICS is a multidimensional scale used in the assessment of comfort and pain behaviorally and psychologically. The PICS assesses the following 7 parameters: alertness, calmness / agitation, respiratory response (only in case of mechanical ventilation support) or crying (not assessed because it is scored only in children with spontaneous breathing), physical movements, muscle tone, facial tension, and average heart rate. Each item is rated on a 5-point Likert type scale, ranging from 1(bad) to 5 (good). According to the PICS, the total score is used to assess the comfort level of the baby. While a score of 35 corresponds to the lowest level of comfort, 7 corresponds to the highest level of comfort. The higher the score is the lower the comfort level is. The cut-off point of the scale is

≥17. It is the limit value for the comfort level of the baby and indicates that a pain-reducing intervention is needed. While the PICS was evaluated in the present study, to ensure that the scoring was objective, the infant's heart rate and oxygen saturation levels measured before, during and after breastfeeding were recorded by means of a probe attached to the baby's hand or foot with the help of pulse oximeter devices present in the unit.

**Breastfeeding Observation Form (BOF):** This form proposed by the WHO and UNICEF in 1992 assesses the moment of breastfeeding. The breastfeeding observation form focuses on the mother and the baby. Criteria used in measurement are as follows: the mother's body position, the baby's behavior, emotional attachment, anatomy, sucking and time spent on sucking. This form composed of two parts ("breastfeeding is going well" and "signs of possible difficulties") is a standard and universal form and is recommended by the Ministry of Health-Turkey as well. The breastfeeding observation form does not have a scoring system. While the observed criteria are marked, those not observed are left blank. In the study, negative items were scored as "0", unanswered items as "1" and positive items as "2" (Kurnaz, 2014). In the present study, while breastfeeding was observed, the time when breastfeeding started and ended was recorded on the form too.

**Data collection:** Before the application was started, premature infants who were hospitalized in our unit and whose gestational ages ranged between 34 weeks and 37/6 weeks, and their mothers who agreed to participate in the study were identified. Then, the purpose of the study was explained to the mothers and their written consent was obtained. From the time of their admissions to the unit, the mothers were supported by providing them with continuous trainings on the importance of breastmilk and breastfeeding. They were told that they should be near the baby half an hour before the breastfeeding time, and the Descriptive Characteristics Questionnaire for Premature Babies was filled in based on the data in the infant's file kept by the nurse or midwife. After the mothers were face-to-face interviewed, the items in the Descriptive Characteristics Questionnaire for Mothers were read out to them and the questionnaire was filled in. Until the time the baby was ready for breastfeeding, whether the peripheral catheter was in its place, and whether the baby's bottom was clean were checked and

recorded on the Breastfeeding Observation Form. To protect the privacy of the mother and the baby, a private area was created by placing a folding screen or by allocating a private room to them for breastfeeding. In the meantime, the baby's pre-breastfeeding heart rate and oxygen saturation values, and the data on the Descriptive Characteristics Questionnaire for Premature Babies were recorded on the form and then the baby was placed into the mother's lap. After the time when breastfeeding was started was recorded, observation of breastfeeding was initiated by taking into account the parameters listed in the breastfeeding observation form. In 12 infants, to ensure effective breastfeeding, nipple shield (if the mother had very large nipples or did not want to breastfeed the baby due to cracks or wounds on the nipple) was used. On the other hand, the baby's heart rate and oxygen saturation values measured during breastfeeding, and the data on the Descriptive Characteristics Questionnaire for Premature Babies were recorded on the form. As soon as the baby stops sucking, the time when breastfeeding ended was recorded. While 23 of the babies sucked the second breast after the mothers burped them, 77 sucked did not. After breastfeeding was completed (each baby sucked for an average of 14 minutes), the baby's post-breastfeeding heart rate and oxygen saturation values, and the data on the Descriptive Characteristics Questionnaire for Premature Babies were recorded on the form. After breastfeeding was over, the mother, midwife and nurse moved to the nurses' station to fill in the Postpartum Comfort Scale, all the items in the form were read out to the mother one by one, and she was asked to answer them considering the feelings and thoughts she had before, during and after breastfeeding. The responses given by the mother were recorded on the form. Finally, the mother was thanked for agreeing to participate in the study and the interview was ended. Interviews held with each mother who agreed to participate in the study lasted 30-45 minutes on average.

**Data analysis:** Data obtained from the study were analyzed in the SPSS (Statistical Package for Social Sciences) for Windows 22.0. In the analysis, Kolmogorow-Simirnov test, the test for the significance of the difference between two means in independent groups, ANOVA, Tukey test, repeated measures ANOVA, Bonferroni test, Mann Whitney-U test, Kruskall-Wallis test, Friedman test, Wilcoxon test, and correlation

analysis test were used. In the tables, the data were given as arithmetic mean, standard deviation, median, minimum value, maximum value, the number and percentage of individuals by taking the margin of error as 0.05.

## Results

The analysis of the variables related to the demographic characteristics of the mothers demonstrated that while the mothers' mean age was 29.50 ($X^2 \pm$ SD: 29.60 ± 5.95), their mean age at marriage was 21 ($X^2 \pm$ SD: 21.43 ± 4.38). The mean number of pregnancies was 3 ($X^2 \pm$ SD: 3.07 ± 1.84), the mean number of living children was 2 ($X^2 \pm$ SD: 2.47 ± 1.37) and the mean gestational age was 35 ($X^2 \pm$ SD: 34.52 ± 2.26) weeks. The analysis of the distribution of the variables related to the demographic characteristics of the premature infants demonstrated that their mean age was 8 ($X^2 \pm$ SD: 12.06 ± 12.43), the mean 1st minute and 5th minute APGAR scores were 8 ($X^2 \pm$ SD : 7.16 ± 1.59) and 9 ($X^2 \pm$ SD : 8.62 ± 1.21) respectively. The mean birth weight of the premature infants was 2221.50 ($X^2 \pm$ SD: 2250.82 ± 579.77) grams, their mean height was 44.50 ($X^2 \pm$ SD: 44.75 ± 3.85) cm, and their mean head circumference was 32 ($X^2 \pm$ SD: 31.40 ± 2.49) cm. Of these premature babies, 52% were boys, 73% were fed by breastfeeding + oral feeding with an injector, 9% were breastfeed exclusively, and 18% were fed by breastfeeding + orogastric or nasogastric feeding, and 62% had no comorbid disease (Table 1).

Of the participating mothers, 14% were employed, 86% were not employed, 20% were university graduates and 31% were primary school graduates. As for the social security of the participants, 57% were the members of the Retirement Fund of Civil Servants, 16% were the members of the Social Security Administration for Workers, 16% were the members of the Social Security Organization for Artisans and the Self-Employed, and 11% were the members of other social security systems. Of the participating mothers, 56% perceived their socioeconomic status as moderate, 32% as good, 6.8% as bad, and 3% as very bad. While 80% of the mothers had a nuclear family, 60% had arranged marriages.

Of them, 60% had no miscarriages, 59% had a planned pregnancy, 78% delivered their babies by cesarean section, and 78% had no disease. Ten percent of the mothers with a disease had a

cardiovascular disease. As is seen in Table 2, the median score for the Breastfeeding Observation Form was 48 ($X^2 \pm$ SD: $47.30 \pm 2.54$) (Table 2).

The comparison of the heart rate values measured at different times demonstrated that the difference between the measurements was insignificant ($p > 0.05$). However, the difference between the SpO2 values measured at different times was significant.

When the measurements were compared in pairs, while the difference between the values obtained before and during breastfeeding was insignificant, the differences between the values obtained before and after breastfeeding, and between the values obtained during and after breastfeeding were significant ($p < 0.05$) (Table 3).

Table 4 shows that the difference between the results of the PCS measurements performed at different times was significant ($p < 0.05$). When the measurements were compared in pairs, while the differences between the values obtained before and during breastfeeding and between the values obtained before and after breastfeeding were significant ($p < 0.05$), the difference between the values obtained during and after breastfeeding was insignificant ($p > 0.05$).

The comparison of the PICS scores obtained at different times revealed that the differences between the PICS scores obtained before and during breastfeeding, between the PICS scores obtained before and after breastfeeding and between the PICS scores obtained during and after breastfeeding were significant ($p < 0.05$) (Table 4).

**Table1.**Distribution of the Demographic Characteristics of the Mothers and Babies (n=100)

| Variables | $X^2 \pm$SD* | Median |
|---|---|---|
| **Mean age of the mothers** | 29.60±5.95 | 29.50 |
| **Mean age of the mothers at marriage** | 21.43±4.38 | 21 |
| **The mean number of pregnancies** | 3.07±1.84 | 3 |
| **The mean number of births** | 2.56±1.35 | 2 |
| **The mean number of living children** | 2.47±1.37 | 2 |
| **The mean gestational age (weeks)** | 34.52±2.26 | 35 |
| **Variables** | **$X^2 \pm$SD*** | **Median** |
| **Mean age of the premature infants** | 12.06±12.43 | 8 |
| **APGAR Score 1st minute** | 7.16±1.59 | 8 |
| **APGAR Score 5th minute** | 8.62±1.21 | 9 |
| **Birth weight** | 2250.82±579.77 | 2221.50 |
| **Height** | 44.75±3.85 | 44.50 |
| **Head circumference** | 31.40±2.49 | 32 |
| **Parameters** | **Number** | **%** |
| **Sex** | | |
| Girl | 48 | 48 |
| Boy | 52 | 52 |
| **Feeding type** | | |
| Breastfeeding | 9 | 9 |
| Breastfeeding + oral feeding with an injector | 73 | 73 |

| Breastfeeding + Orogastric / nasogastric feeding | 18 | 18 |
|---|---|---|
| **Comorbidity** | | |
| Yes | 38 | 38 |
| No | 62 | 62 |
| **Total (n)** | 100 | 100.0 |

\* $X^2 \pm SD$ =Mean $\pm$Standard Deviation

**Table2.Results related to the mean score for the Breastfeeding Observation Form (BOF)**

| Variable | $X^2 \pm SD$* | Median |
|---|---|---|
| **BOF** | $47.30 \pm 2.54$ | 48 |

\*$X \pm SD$ =Mean $\pm$Standard Deviation

**Table 3. Results on the Vital Signs of Premature Infants (n = 100)**

| Variables | Before Breastfeeding | During Breastfeeding | After Breastfeeding | Statistical Result | Post-Hoc Test |
|---|---|---|---|---|---|
| | **Median** | **Median** | **Median** | | |
| **SpO$_2$** | 96.00 | 96.50 | 97 | $x^2$= 2.129* $p = 0.345$ | |
| **Min.-Max.** | 88.00-99.00 | 90.00-99.00 | 90.00-99.00 | | |
| | **$X^2 \pm SD$** | **$X^2 \pm SD$** | **$X^2 \pm SD$** | | |
| **Heart Rate** | $145.71 \pm 19.22$ | $149.48 \pm 16.41$ | $138.59 \pm 16.10$ | F= 14.851* **p= 0.001*** | [a]p= 0.304 **[b]p= 0.002*** **[c]p= 0.001*** |

\*p<0.05, [a]Comparison of measurements before and during breastfeeding, [b]Comparison of measurements before and after breastfeeding, [c]Comparison of measurements during and after breastfeeding

**Table4. Comparison of Results Obtained from the Premature Infant Comfort Scale and Postpartum Comfort Scale**

| Variables | Before Breastfeeding (n=100) | During Breastfeeding (n=100) | After Breastfeeding (n=100) | Statistical Results | Post-Hoc Test |
|---|---|---|---|---|---|
| | **Median Min/Max** | **Median Min/Max** | **Median Min/Max** | | |
| **PICS** | 17.50 | 14.00 | 11.00 | x²= 181.813* **p = 0.001*** | **[a]p=0.001*** **[b]p= 0.001*** **[c]p= 0.001*** |

| | | | | | |
|---|---|---|---|---|---|
| **Min.-Max.** | 13.00-34.00 | 9.00-23.00 | 8.00-16.00 | | |
| | $X^2 \pm SD$ | $X^2 \pm SD$ | $X^2 \pm SD$ | | |
| **PCS** | 116.02±11.14 | 117.26±11.15 | 117.91±11.51 | F= 12.629* | [a]**p= 0.003*** |
| | | | | **p= 0.001*** | [b]**p= 0.001*** |
| | | | | | [c]p= 0.214 |

\* p <0.05, [a]Comparison of measurements before and during breastfeeding, [b]Comparison of measurements before and after breastfeeding, [c]Comparison of measurements during and after breastfeeding

**Table 5. Comparison of the Scores Obtained from the Breastfeeding Observation Form (BOF) with those obtained from the Postpartum Comfort Scale (PCS) and Premature Infant Comfort Scale (PICS)**

| Variables | PCS Before Breastfeeding (n=100) | PCS During Breastfeeding (n=100) | PCS After Breastfeeding (n=100) | PICS Before Breastfeeding (n=100) | PICS During Breastfeeding (n=100) | PICS After Breastfeeding (n=100) |
|---|---|---|---|---|---|---|
| BOF | r=-0.035 | r=-0.069 | r=-0.047 | **r=0.384*** | r=-0.055 | r=-0.040 |
| | p=0.726 | p=0.496 | p=0.645 | p=0.001 | p=0.588 | p=0.691 |
| | N=100 | N=100 | N=100 | N=100 | N=100 | N=100 |

*p<0.05

The relationship between the scores obtained from the Breastfeeding Observation Form score and the Postpartum Comfort Scale before, during and after breastfeeding was statistically insignificant (p> 0.05) and the correlation coefficients were very small. There was a positive correlation (r = 0.384) between the Breastfeeding Observation Form score and the pre-breastfeeding Premature Infant Comfort Scale score. This correlation was statistically significant (p <0.05). Accordingly, as the Breastfeeding Observation Form score increased, so did the pre-breastfeeding Premature Infant Comfort Scale score, but this relationship was weak (Table 5).

**Discussion**

Although breastfeeding is a natural process, it can be learned, developed and supported by the mother at any time (Yurtsal, 2018). The findings of the present study suggest that the differences between the PCS scores obtained before, during and after breastfeeding in terms of such demographic characteristics of the mothers as educational status, social security, socioeconomic status, type of marriage, mode of delivery were insignificant and that these scores were moderate. In their study (2014), Capık et al. showed that the mode of delivery affected physical and sociocultural comfort, and the level of postpartum comfort was higher in those who gave birth vaginally, and that the comfort level decreased as the income level increased (Capık et al 2014). In a study by Cırlak and Erdemir (2013), the mothers' comfort level increased as their income level increased (Cırlak and Erdemir, 2013). In a study conducted by Sahin (2017), comfort scores of the mothers who had vaginal delivery were higher than were those of the mothers who delivered their babies by cesarean section (Sahin, 2017). According to the results of the present study, the differences between the PICS scores obtained before, during and after breastfeeding in terms of such demographic characteristics of the premature babies as sex and feeding type were insignificant. The relationship between the continuous variables (premature age, 1st and 5th minute APGAR scores, birth weight,

height and head circumference) of the premature infants and the PICS scores obtained before, during and after breastfeeding were statistically insignificant and the correlation coefficients were very small. The mean scores obtained from the Breastfeeding Observation Form in the present study were high, which is thought to stem from the fact that the trainings given to the mothers on breast milk and breastfeeding started as the babies were hospitalized and continued until the babies were discharged from the baby-friendly hospital, and that they were given kangaroo care. The comparison of the heart rate and SpO2 values measured before, during and after breastfeeding in the present study demonstrated that the differences between the measurements were not significant. There were significant differences between the SpO2 values measured at different times. The comparison of the measurements in pairs demonstrated that whereas the difference between the values obtained before and during breastfeeding was insignificant, the differences between the values obtained before and after breastfeeding, and between the values obtained during and after breastfeeding were significant. In the premature babies, oxygen saturation values measured before breastfeeding increased during and after breastfeeding.

In newborns, heart rate, respiration rate, blood pressure and tissue oxygenation values may vary with pain. Pain experience is evaluated by the increases or decreases in these parameters (Karabıyık Ogurlu, 2017). Because there is gap in the literature related to studies investigating heart rate and SpO2 values measured at different times regarding premature babies' feeding, the results of other studies on other variables affecting SpO2 and heart rate values were included in the present study. In some studies, the newborns' heart rates measured during the procedure were significantly higher than were those measured before the procedure (Mucignat et al., 2004; Gradin et al., 2004; Karaayvaz, 2009). In a study conducted by Karabivik Ogurlu (2017), the heart rate measured after the heel lancing procedure was similar to that measured before the heel lancing procedure; however, it increased during the heel lancing procedure (Karabıyık Ogurlu, 2017). In their study conducted with 340 healthy newborns (2006), Shepherd et al. compared two different types of automatic lancet and determined that post-procedure average heart rates were higher than were pre-procedure heart rates in both groups (Shepherd et al, 2006). In

Erzurumluoglu's study conducted in 2014 to investigate the effect of safe swaddling of newborns on pain perception, vital signs and duration of crying during heel lancing procedure, SpO2 values of the babies who were swaddled were significantly higher than were those of babies who were not swaddled (Erzurumluoglu, 2014). In the study conducted by Karabivik Ogurlu (2017), SpO2 values were found to be higher during and after the heel lancing procedure (Karabıyık Ogurlu, 2017). In Merter's study (2015) conducted to compare the effects of Manual Lancet and Automatic Lancet on the pain levels of full term infants, the mean oxygen saturation level of the babies in the experimental group was 96.9 ± 3.1 before the procedure and 96.4 ± 2.6 after the procedure (Merter, 2015). As the results of the aforementioned studies indicated, while the heart rates increased during the painful procedures, there were no statistically significant differences between the heart rates measured during and after non-pharmacological methods such as swaddling used to reduce pain. However, SpO2 values increased during and after breastfeeding when non-pharmacological methods were used during painful procedures.

The analysis of the PICS and PCS scores obtained before, during and after breastfeeding in the present study indicated that there were significant differences between the PCS scores obtained at different times (p<0.05). When the measurements were compared in pairs, the differences between the scores obtained before and during breastfeeding, and before and after breastfeeding were significant (p<0.05); however, the difference between the scores obtained during and after breastfeeding was not significant (p> 0.05). The analysis of the PICS scores obtained at different times demonstrated that the differences between the scores obtained before and during breastfeeding, between the scores obtained before and after breastfeeding, and between the scores obtained during and after breastfeeding were significant. Among nursing and midwifery cares given to infants in neonatal intensive care units to increase their comfort levels are changing the position, hygiene interventions such as eye care, oral care and bathing, management of stress sources, and pain and sedation management. Assessment of pain in intensive care units by using appropriate scales and the use of pharmacological or non-pharmacological methods in the management of interventional pain play an important role in

increasing the comfort level of a patient (Kucuk Alemdar & Tufekci, 2015). Repetitive and painful interventions performed in neonatal intensive care units lead to psychological sequelae in infants. Newborns are exposed to many painful procedures from the very moment they are born. Therefore, because the first painful experience of the newborn will affect the next ones, the best pain prevention and relief methods should be chosen especially during the first interventions (Karabıyık Ogurlu, 2017). The environment where the newborn stays should be arranged and improved to reduce the stress level and increase the comfort level of the infant in order for the infant to feel as if the environment were its mother's womb or lap. To achieve this purpose, the use of humidified advanced incubators should be expanded. Increasing the comfort level of the patient is an integral component of professional nursing and midwifery care (Kucuk Alemdar & Tufekci, 2015).

In studies conducted on mothers' postpartum comfort, general anesthesia was found to adversely affect the mother's and newborn's postpartum comfort and compliance more than did local anesthesia applied in cesarean deliveries (Gokdag Balci, 2016). In a study conducted by Buyukkal (2019), the optimality level of mothers who gave spontaneous vaginal delivery decreased due to over-intervention, which consequently affected their postpartum comfort level negatively (Buyukkal, 2019). In Aksoy Derya's study (2012) conducted to investigate the effect of nursing and midwifery care given to puerperae who had cesarean delivery in line with the comfort theory, it was determined that such nursing and midwifery care increased these women's comfort level by meeting their comfort needs (Aksoy Derya, 2012). In Kurt Can's master's thesis (2018) on the postpartum comfort and satisfaction level of the puerperae according to the mode of birth, it was found that postpartum comfort levels of women who had spontaneous vaginal births were higher than were those of women who gave birth through cesarean section, and that the satisfaction levels were low in both groups (Kurt Can, 2018). In Sahin's study (2017), mothers who had breastfeeding experience and who breastfed comfortably obtained higher mean scores from the PCS (Sahin, 2017). There are studies showing that kangaroo care increases the baby's success in breastfeeding behaviors, positively affects the newborn's physiological

parameters and lowers the mother's anxiety level but does not affect the comfort level (Koc, 2015). In Karakaplan and Yıldız Eryılmaz's study conducted with mothers (2007), it was determined that the mothers' postpartum comfort was most affected by the environmental hygiene, and that other factors affecting their comfort were the attitude and approach of health personnel, heat, light, noise, smell of the environment, and the importance given to privacy (Karakaplan & Yıldız Eryılmaz, 2007). Several studies demonstrated that nursing and midwifery interventions that encourage mothers to breastfeed increased their comfort levels and as their comfort levels increased so did their breastfeeding scores (Pınar et al., 2009; Sahin, 2017). However, there are studies showing that mothers' comfort levels in the postpartum period were moderate (Capik et al., 2014; Akgun, 2016; Aksoy Derya & Pasinlioglu, 2017). In the present study, the mean scores for the PCS measured before, during and after breastfeeding were moderate.

Because there are very few studies in the literature on the comfort of premature infants, studies on other factors affecting comfort and pain were included in our literature review. Among the pharmacological and non-pharmacological methods implemented to relieve pain in invasive procedures are using pacifiers, cradling, playing music, singing, talking, using an automatic lancet, giving sucrose or glucose solution, giving analgesics such as paracetamol, breast milk and placing the baby into the mother's lap (Derebent & Yigit, 2006). In Kizilok Kale's study (2018) investigating the effect of breastfeeding and fetal position on the pain level of newborns during heel lancing, it was found that breastfeeding and fetal position were effective methods in reducing the newborn's pain, and that breastfeeding was more effective (Kizilok Kale, 2018). In Kucuk Alemdar's (2013) doctoral thesis in which the PICS was administered, having premature infants listen to their mothers' heart sounds during suctioning procedure reduced their pain levels and increased their comfort levels (Kucuk Alemdar, 2013). In their study investigating premature infants' comfort levels during heel lancing (2007), Monique et al. found that post-procedure comfort scores were statistically significantly different from pre-procedure comfort scores (Monique et al., 2007).

In Dolu's study (2013) conducted on the effect of mechanical vibration on pain control in newborns during heel lancing, the difference between the Neonatal Infant Pain Scale (NIPS) scores of the newborns in the experimental group obtained during and after the heel lancing procedure was statistically significant (Dolu, 2013). In Gurlu's study (2017), using a pacifier during painful procedures reduced the newborns' NIPS score, corrected changes in physiological parameters, reduced the duration of crying, and placing the baby into the mother's lap, although not as much as using a pacifier, had the similar effects (Gurlu, 2017). In Akcan's study (2014), using the smell of lavender and amniotic fluids, and breast milk during and after heel lancing reduced the newborn's pain (Akcan, 2014). In the present study, the comparison of the mean scores obtained from the PICS before, during and after breastfeeding demonstrated that there were significant differences between the scores obtained at different times.

In the present study, the mean pre-breastfeeding PICS score for the premature infants which was 17.50 was above the scale's cut-off value of ≥17; however, during and particularly after breastfeeding, the scores decreased statistically significantly, and the babies' comfort level increased statistically significantly. In the present study, there was a positive correlation (r = 0.384) between the Breastfeeding Observation Form score and the PICS score obtained before breastfeeding. This correlation is statistically significant. Accordingly, as the breastfeeding observation score increased, so did the pre-breastfeeding PICS score, but the relationship was weak. In the present study, there were no significant differences between the mean PCS scores obtained before, during and after breastfeeding in terms of the babies' feeding style. However, when the measurements of the Postpartum Comfort Scale performed before, during and after breastfeeding were compared in pairs, the differences between the scores obtained before and during breastfeeding and between the scores obtained before and after breastfeeding were significant, but the difference between the scores obtained during and after breastfeeding was not significant; It can be said that the difference between the PCS scores obtained before and after breastfeeding was significant was a noteworthy result, and that breastfeeding positively affected the comfort level of the mother who had a premature baby.

**Conclusion:** The results of the present study indicated that breastfeeding affected the premature babies' comfort level positively. While there was no significant change in the babies' heart rates measured during and after breastfeeding, their SpO2 levels increased, which suggests that the oxygenation level changed for the better. The scores obtained from the PCS by the mothers who participated in the present study were generally moderate, while the scores they obtained before breastfeeding were low, those obtained during and after breastfeeding increased, they felt more comfortable during and after breastfeeding, and the differences were statistically significant. Breastfeeding had a positive effect on the comfort levels of the mothers who had a premature baby.

It is recommended that midwives and nurses working in the neonatal intensive care units should participate in the birthing process, should ensure the skin-to-skin contact between the mother and the baby within the first half hour of the delivery, should support the mother and the baby to ensure the initiation of breastfeeding, and should provide counselling to mothers by devoting sufficient time to encourage and help them to breastfeed their babies based on the principals of patience, dedication and voluntariness, and that the number of fully equipped postpartum rooms with a private bathroom to provide mother-baby attachment should be increased and measures to improve environmental conditions should be taken.

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