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# Examining the relationship between family-centered care applied in the neonatal intensive care unit and anxiety levels of mothers

## Yenidoğan yoğun bakım ünitesinde uygulanan aile merkezli bakım ile annelerin kaygı düzeyleri arasındaki ilişkinin incelenmesi

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**ABSTRACTS**

**Introduction:** This study was conducted to examine the relationship between the family-centered care practice received by mothers whose infants were hospitalized in the neonatal intensive care unit and their anxiety levels.

**Method:** In the study, which was designed in descriptive and relational type, the data were obtained with the mother information form, the newborn information form, the State-Trait Anxiety Inventory and the Newborn Family Centered Care Scale. The study was conducted with 260 mothers. With the AMOS program, the relationship between the family-centered care practices received by mothers and their anxiety levels was examined. Some demographic factors were included in the model and their effects were examined.

**Results:** The mean total family center care score was $36.02 \pm 3.47$. The areas where the parents obtained the lowest score were the participation in care and collaboration with family subscales. It has been determined that the gestational week of the infant, the time of seeing the infant and the time of holding the infant are effective triggers on the family-centered care scores.The mean State Anxiety Inventory score of the mothers was $53.21 \pm 7.46$ and their mean Trait Anxiety Inventory score was $53.16 \pm 10.41$. The path coefficient between the FCC Scale and the State-Trait Anxiety Inventory was significant ($p<0.001$). As the mothers received FCC, their state and trait anxiety scores decreased at a statistically significant level. It has been determined that the gestational week of the infant, the age of the mother and the time of seeing the infants are the factors that affect the anxiety of the mothers.

**Conclusion:** It was determined that mothers whose infants were hospitalized in the neonatal intensive care unit received inadequate family-centered care. Insufficient family-centered care of mothers increased their anxiety.

**Keywords:** Anxiety; family-centered care; mother; newborn

**ÖZET**

**Giriş:** Bu araştırma bebeği yenidoğan yoğun bakım ünitesinde yatan annelerin aldıkları aile merkezli bakım uygulaması ile kaygı düzeyleri arasındaki ilişkinin incelenmesi amacıyla yapılmıştır.

**Yöntem:** Tanımlayıcı ve ilişkisel tipte tasarlanan araştırmada, veriler anne bilgi formu, yenidoğan bilgi formu, Durumluluk-Süreklilik Kaygı Envanteri ve Yenidoğan Aile Merkezli Bakım Ölçeği ile elde edilmiştir. 260 anneyle araştırma yürütülmüştür. Amos programıyla annelerin aldıkları aile merkezli bakım uygulamaları ile kaygı durumları arasındaki ilişki incelenmiştir. Bazı demografik etkenlerin model içerisine dahil edilerek etkilerine bakılmıştır.

**Bulgular:** Aile merkezli bakım toplam puan ortalamalarının $36,02 \pm 3,47$ olduğu tespit edilmiştir. Ebeveynlerin en düşük puan aldıkları alanların bakıma katılma ve aile ile işbirliği alt boyutları olduğu görülmüştür. Bebeğin gestasyon haftası, annenin bebeği görme zamanı ve kucağa alma zamanı aile merkezli bakım puanları üzerinde etkili tetikleyiciler olduğu tespit edilmiştir. Annelerin durumluluk kaygı ölçeği puan ortalamalarının $53,21 \pm 7,46$ ve süreklilik kaygı puan ortalamalarının benzer şekilde $53,16 \pm 10,41$ olduğu bulunmuştur. AMB ölçeği ile durumluluk kaygı ile süreklilik kaygı ölçeği arasındaki yol katsayıların anlamlı olduğu ortaya çıkmıştır ($p<0,001$). Anneler AMB aldıkça, durumluluk ve süreklilik kaygı puanlarında istatistiksel olarak anlamlı azalmalar olacağı görülmüştür. Bebeğin gestasyon haftası, annenin yaşı ve bebeği görme zamanı annelerin kaygı durumlarında etkili olan faktörler olduğu belirlenmiştir.

**Sonuç:** Bebeği yenidoğan yoğun bakım ünitesinde yatan annelerin yetersiz aile merkezli bakım aldıkları belirlenmiştir. Annelerin yetersiz aile merkezli bakım almaları kaygı durumlarını artırmıştır.

**Anahtar Kelimeler:** Kaygı; aile merkezli bakım; anne; yenidoğan

## Introduction

Family centered care (FCC) is a care approach which accepts the role of family in the care of newborns, infants and children and respects family, supports the choices of family members, is based on a collaboration between family and healthcare professionals and centers upon family (Arpaci & Altay, 2017; Azuine, Singh,

Ghandour & Kogan, 2015; Foster, Whitehead & Maybee, 2016). In this philosophy, family takes an active role in planning, implementing and evaluating care and has a voice in the child's care as much as a healthcare professional. The goal in FCC is to keep the bonds between the infant/child and family, enable the family to take an active role in the infant's/child's care and thus, minimize negative impacts of hospitalization (Arslan, Geckil, Aldem, & Celen, 2019; Feeg et al., 2016; Shields, 2015).

Family centered care is based on four main concepts: honoring differences and respect, information sharing, family involvement in the care, and family collaboration. Honoring differences and respect refers to the respect shown by health professionals for the preferences and opinions of families resulting from their values, beliefs and cultural backgrounds. Information sharing involves healthcare professionals sharing information and developments in the child's condition and the treatment approach with families regularly and without prejudice. The concept of family involvement in the care refers to families taking part in the patient care based on their own choices and wishes and requires families to have the courage to make decisions about the patient. The concept of family cooperation refers to the cooperation between health professionals and families for the development of care-related programs (Arslan et al., 2019; Kuo et al., 2012; Shields, 2015).

As premature infants have different care needs from a healthy infant and they get hospitalized in intensive care units due to specific health issues, the mother-infant interaction is interrupted and the mother infant bonding is affected negatively (Öztürk & Saruhan, 2013). In addition, the studies conducted reported that parents of infants hospitalized in Neonatal Intensive Care Units (NICU) experience intense stress and have difficulty parting from their child during this period (Chung, Kim, Park, Yeo, & Hwang, 2019; Ionio et al., 2016). The studies conducted in the literature have determined that families of newborns hospitalized in NICUs usually have difficulty participating in the care of their child, having a certainty about the child's condition, obtaining adequate information from the medical staff, seeing their child anytime in the intensive care unit, knowing the treatments and procedures performed on the child, adapting to the child's condition and acquiring parenting role (Çalışır, Şeker, Güler, Anaç, & Türkmen, 2008; Konukbay & Arslan, 2011; Turgut & Taş Arslan, 2013). A study conducted by Cağlar et al. (2019) found that nearly all mothers wanted to participate in the care applications of their child and more than half of them usually wanted to be with their child, except in specific painful and complicated treatment applications (such as feeding tube, peripheric and abdominal catheter placement, resuscitation and surgery) (Çağlar, 2019).

Family centered care has positive impacts on infants/children, parents and healthcare professionals. FCC is a useful care model for premature infants and it should be applied in NICUs (Lv et al., 2019). The study conducted have specified that preterm infants receiving FCC cry less, have a lower level of stress and need analgesics less often (Byers et al., 2006). A study conducted with premature infants with very low birth weights in Taiwan found an improvement in the short-term medical and neurobehavioral outcomes in the FCC group (Yu et al., 2017). FCC provided a greater weight gain among the preterm infants (O'Brien et al., 2018; Raiskila, Axelin, Rapeli, Vasko & Lehtonen, 2014; Zhang et al., 2018), reduced the duration of NICU hospitalization in terms of days and reduced rehospitalizations (Bastani, Abadi & Haghani, 2015; Zhang et al., 2018). A study conducted proved that FCC applications in NICUs improved breastfeeding rates when parents were included in care and were allowed to be primary caregivers (O'Brien et al., 2018). Another study performed a systematic training program on the NICU neonatal medical staff (19 unit administrators and 32 nurses). After the training, the medical staff indicated that the training program helped them identify and apply the elements of FCC such as supporting daily care skill of parents for their infants and making common decisions with parents (Toivonen, Lehtonen, Löyttyniemi, Ahlqvist-Björkroth & Axelin, 2020).

The studies conducted have found that FCC has positive impacts on infants/children, parents and healthcare professionals, healthcare professionals argue that FCC is significant and necessary, however, this care model remains inadequate in practice (Al-Motlaq, 2018; Gill et al., 2014; Raiskila et al., 2014). The studies have

determined that the mean total parental stress and anxiety scores were lower (ArshadiBostanabad, NamdarArshatnab, Balila, Asghari Jafarabadi, & Ravanbakhsh, 2017; Milan & Nasimi, 2018; Zhang et al., 2018), whereas the mean total satisfaction scores were higher in the group receiving FCC in the NICU than the control group (Bastani et al., 2015; Jannes et al., 2020; Zhang et al., 2018). Therefore, it is of paramount importance to arrange the care provided in institutions in line with the FCC principles. Nurses in particular play a key role in creating a change and awareness for hospital care to be family centered. Despite the increasing evidence that FCC applications in NICUs are useful, these applications are not used commonly in NICUs worldwide yet. In Turkey, mothers are still not allowed to stay in NICUs without limit and they are not included in care and treatment applications adequately. Especially during the pandemic period, family-centered care practices were interrupted due to visitor restrictions. Therefore, studies are needed to evaluate FCC in NICUs and to determine the relationship between FCC and mothers' anxiety level.

**Purpose of the study**

The purpose of this study was to evaluate the FCC applied in NICUs and to determine the relationship between FCC and anxiety levels of mothers.

**Study questions**

Is there a relationship between the FCC practice received by mothers whose infants were hospitalized in the neonatal intensive care unit and anxiety levels of mother?

**Methods**

**Study Design**

This study was conducted as descriptive and cross-sectional.

**Study Sample/Participants**

The study conducted the study in a province in the southeast of Turkey between April 2021 and June 2022. In the study, the researcher performed a power analysis to determine the sample size based on a study in the literature titled (Kim et al., 2020). The researcher determined the sample number to be taken with 95% confidence (1-α), 80% test power (1-β) and d=0.0888 (small) influence quantity as a total of 210 mothers, 105 for each group. The sample of the study comprised 280 mothers whose infants were hospitalized in the NICU. Inclusion criteria for the infant: being hospitalized for at least three days (Yıldız, 2019). Inclusion criteria for the mother: volunteering to take part in the study and being literate at least.

**Instruments**

The data of the study were collected using the Mother Information Form, the Neonatal Information Form, the State-Trait Anxiety Inventory (STAI) and the Neonatal Family Centered Care Scale (NFCCS).

**The mother information form**

The mother information form had a total of eleven open ended and multiple choice questions such as the mother's age, educational level, employment, marital status, family type, income status, number of children, the time when she saw and held her child for the first time after birth, state of staying with her child and frequency of visiting her child.

**The neonatal information form**

The neonatal information form had a total of nine open ended and multiple choice questions such as the infant's gender, age, birth weight, gestational week, being a singleton or multiple pregnancy, postnatal day, state of receiving breast milk, medical diagnosis and time of hospitalization.

**The state-trait anxiety inventory (STAI)**

Spielberger et al. created the STAI in 1964 to determine the state and trait anxiety level of individuals. The self-evaluation inventory had 40 items including short statements. The inventory comprised of two sections as 20-item *"state anxiety form"* created to determine what was felt at the moment and 20-item *"trait anxiety form"* created to determine what was felt within the last seven days (Spielberger, Gonzalez-Reigosa, Martinez-Urrutia, Natalicio & Natalicio, 1971). Öner and LeCompte in 1983 adapted the inventory into Turkish and conducted its validity and reliability studies. Weight values of the options ranged from 1 to 4. The inventories had direct (straight) and reversed statements. Negative emotions were expressed with direct statements, whereas positive emotions were expressed with reversed statements. When grading reversed statements, items at weight value 1 were transformed into 4 and items at weight value 4 were transformed into 1. Items 1, 2, 5, 8, 10, 11, 15, 16, 19 and 20 were reversed statements in the State Anxiety Inventory. Items 21, 26, 27, 30, 33, 36 and 39 were reversed statements in the Trait Anxiety Inventory. The total score obtained from two subscales ranged from 20 to 80. Higher score indicated a higher level of anxiety, whereas lower score indicated a lower level of anxiety (Öner & LeCompte, 1998). The reliability coefficients determined via Alpha correlations ranged from 0.83 to 0.87 for "The Trait Anxiety Inventory" and from 0.94 to 0.96 for "The State Anxiety Inventory" (Deniz, Dilmaç, & Arıcak, 2009). The present study used both the state and trait anxiety subscales to measure the anxiety level of the mothers.

**The neonatal family centered care scale (NFCCS)**

Yıldız created the NFCCS in 2019. This is a Turkish scale (Yıldız, 2019). They created the scale based on four main concepts (dignity and respect, information sharing, participation in care, collaboration with family) which were the main components of the Family Centered Care Scale in line with the literature and views (Gooding et al., 2011; Ömer, 2009; Öztürk & Saruhan, 2013). The 29-item NFCCS was a five point likert scale (1: strongly disagree, 2: disagree, 3: undecided, 4: agree, 5: strongly agree). The lowest and highest possible total scores obtainable from the scale were 29 and 145, respectively. Higher score obtained from the scale indicated that FCC had increased in a positive direction. The total Cronbach's Alpha value of the scale was 0.93 (Yıldız, 2019).

**Data collection**

The researcher was collected the data of the study in a room spared for mothers in the hospital which had an extensive neonatal intensive care unit via face-to-face interview method in approximately 15 minutes.

**Data analysis**

In the study, the researcher performed the descriptive (frequency, mean, ss, median, min and max values), reliability analysis and multiple linear linkage analysis using the SPSS 25 (Statistical Program in Social Sciences) program. In the second phase, the researcher performed the path analysis and used the Structural Equation Modeling to determine whether there was any effect between the "NFCCS", "The Trait Anxiety Inventory" and "The State Anxiety Inventory" and age of the mothers (S1) using the AMOS 23 package program via the variables observed. As a result of the analyses performed, the researcher set the significance level at 0.05. In order to test the correlation between the 29-item and four-subscale NFCCS, the 20-item Trait Anxiety Inventory and the 20-item State Anxiety Inventory, the researcher performed the path analysis based on total scores.

**Ethical considerations**

The researcher obtained ethics committee approval for the study (Ethics approval date: 01.03.2021-21/05/36) and institutional approval. We informed the mothers about the purpose of the study and received their oral consent based on voluntary participation.

## Results

Characteristics of the sample

Table 1 includes the socio-demographic characteristics of the participants included in the study.

**Table 1.** Socio-Demographical Characteristics of Mothers and Preterm Infants

| Characteristics | N | % |
|---|---|---|
| **Mother's educational status** | | |
| Not literate | 117 | 41.8 |
| Reader-Writer | 77 | 27.5 |
| Primary education | 53 | 18.9 |
| Secondary education | 33 | 11.8 |
| **Marital status** | | |
| Monogamous | 169 | 60.4 |
| Polygamous | 111 | 39.6 |
| **Mother's employment status** | | |
| Unemployed | 158 | 56.4 |
| Employed | 122 | 43.6 |
| **Family structure** | | |
| Nuclear family | 180 | 64.3 |
| Extended family | 100 | 35.7 |
| **Frequency of visiting the child** | | |
| Everyday | 33 | 11.79 |
| Every other day | 139 | 49.64 |
| Once a week | 108 | 38.57 |
| **Sex of child** | | |
| Boy | 96 | 34.3 |
| Girl | 184 | 65.7 |
| **Breastfeeding status** | | |
| No | 191 | 68.2 |
| Yes | 89 | 31.8 |
| **Diagnosis of the child** | | |
| Preterm | 147 | 52.5 |
| Small for gestational age | 76 | 27.1 |
| Hyperbilirubinemia | 57 | 20.4 |

It was found that 41.8% of the mothers participating in the study were illiterate, 60.4% had a monogamous marriage and 56.4% were unemployed. 64.3% of families of infants have nuclear family structure. It was determined that 11.8% of mothers see their infants every day and 31.8% breastfeed their infants. It was determined that 65.7% of the infants of the mothers were girls and 52.5% were hospitalized with the diagnosis of preterm infants (Table 1).

**Table 2.** Socio-demographical characteristics of mothers and preterm infants

| Characteristics | Mean±Sd | Median (Min-Max) |
|---|---|---|
| Mother's age | 27.81 ± 7.81 | 26 (17 - 46) |
| Income status (Turkish lira) | 6616.96 ± 2588.99 | 5000 (3000 - 12000) |
| Number of children | 4.35 ± 3.51 | 3 (1 - 14) |
| Time of seeing the postpartum infant (day) | 5.97 ± 1.92 | 6 (3 - 12) |
| Time of holding the infant after birth (day) | 8.85 ± 3.09 | 9 (3 - 15) |
| Gestational week | 35.08 ± 1.1 | 35 (31 - 38) |
| Infant's weight (gr) | 2006.21 ± 225.28 | 1960 (1500 - 2600) |
| Infant's postnatal day | 1.17 ± 0.37 | 1 (1 - 2) |

It was determined that the average age of the mothers participating in the study was 27.81 ± 7.81, their monthly average income was 6616.96 ± 2588.99 Turkish Liras, and they had an average of 4.35 ± 3.51 children. It was determined that the mothers saw it an average of 5.97 ± 1.92 times after the birth and held it on an average of 8.85 ± 3.09 times after the birth. It was determined that the gestational week of the infants was 35.08 ± 1.1 and the birth weight was 2006.21 ± 225.28 (Table 2).

Table 3 shows the mean scores of the mothers from the scales and sub-dimensions. The mother's newborn family centered scale sub-dimensions of reputation and respect mean score of 10.99 ± 3.01, Knowledge sharing mean score 10.18 ± 1.22, Participation in Care mean score 5.88 ± 1.29, and Collaborating with the Family score mean of 8.98 ± 1.15 was determined. It was revealed that the total mean score of the newborn family-centered care scale was 36.02 ± 3.47. It was determined that the mean state anxiety score of the mothers was 53.21 ± 7.46 and the mean Continuity score was 53.16 ± 10.41 (Table 3).

**Table 3.** Mean Scores of the scales

| Scale | Mean±Sd | Median (Min-Max) |
|---|---|---|
| NFCCS | | |
| Reputation and respect | 10.99 ± 3.01 | 11 (7 - 21) |
| Information sharing | 10.18 ± 1.22 | 10 (9 - 14) |
| Attending care | 5.88 ± 1.29 | 5 (5 - 11) |
| Collaboration with family | 8.98 ± 1.15 | 9 (8 - 14) |
| Family-centered care total score | 36.02 ± 3.47 | 36 (30 - 49) |
| STAI | | |
| State anxiety | 53.21 ± 7.46 | 52 (40 - 68) |
| Trait anxiety | 53.16 ± 10.41 | 58 (34 - 68) |

Examining the fit values, CMIN= 16.197, DF= 2, CMIN/DF= 8.098, RMSEA= 0.16, CFI= 0.974 and GFI= 0.984. As RMSEA, CMIN/DF were not within the required bounds, the researcher examined their correction indices. In the model, the researcher omitted the path related to the time of seeing the child and the State Anxiety Inventory and the Family Centered Care Scale. He also omitted the path related to the time of holding the child for the first time and the Trait Anxiety Inventory and the State Anxiety Inventory. Examining the fit values of the new model, CMIN= 20.556, DF= 8, CMIN/DF= 2.57, RMSEA= 0.075, CFI= 0.977 and GFI= 0.98. As CMIN/DF was not within the required bounds, the researcher examined their correction indices. The researcher found the path coefficient related to the covariance between the gestational week, age of the mothers and the time of holding the child to be statistically insignificant. The model posed a problem in the fit criteria. The researcher created a new model. Examining the fit values of the model, CMIN= 4.601, DF= 7, CMIN/DF= 0.657, RMSEA= 0, CFI= 1 and GFI= 0.995. The researcher obtained all fit criteria within the required bounds.

One unit increase in the infant's gestational week provided 0.577 unit increase in FCC the mothers received. The path coefficient between the gestational week and the NFCCS was statistically significant (β= -0.577; p=0.001). The path between the time of holding the child and the Family Centered Care Scale was statistically significant. The mother caused one unit increase in holding the child and 0.145 unit increase in receiving FCC (β= 0.145; p=0.024). As age of the mothers increased, the possibility of receiving FCC increased. The path coefficient between age of the mothers and the NFCCS was statistically significant (β= 0.118; p<0.001) (Table 4).

The path coefficient related to age of the mothers and their state and trait anxiety scores was significant (β= -0.394; p= p<0.001, β= -0.969; p<0.001). As age of the mothers increased, their trait anxiety scores

decreased more. The women who had become a mother at a younger age received FCC less often and their trait and state anxiety scores were higher. The path coefficient between the time of seeing the child and their trait anxiety scores was statistically significant ($\beta$=-1.055; p= p<0.001). One unit increase in the time of seeing the child provided 1.055 unit decrease in their trait anxiety scores. The path coefficient between the gestational week of the infant and the state anxiety scores of the mothers was statistically significant ($\beta$=0.877; p=0.009). The path coefficient between the NFCCS and the State Anxiety and Trait Anxiety Inventory was significant ($\beta$=-0.498; p= p<0.001, $\beta$= -0.415; p<0.001). One unit increase in the NFCCS provided 0.498 unit decrease in the State Anxiety Inventory and 0.415 unit decrease in the Trait Anxiety Inventory. As the mothers received FCC, their state and trait anxiety scores decreased at a statistically significant level (Table 4).

**Table 4.** Structural equation modeling

|  |  |  | $B_0$ | $B_1$ | S.H | Test statistic | P |
|---|---|---|---|---|---|---|---|
| NFCCS | <--- | S13 | -0183 | -0.577 | 0.176 | -3.284 | 0.001 |
| NFCCS | <--- | S9 | 0.128 | 0.145 | 0.064 | 2.255 | 0.024 |
| NFCCS | <--- | S1 | 0.265 | 0.118 | 0.025 | 4.649 | <0.001 |
| State anxiety Inventory | <--- | NFCCS | -0.231 | -0.498 | 0.114 | -4.358 | <0.001 |
| Trait anxiety Inventory | <--- | NFCCS | -0.139 | -0.415 | 0.099 | -4.196 | <0.001 |
| State anxiety Inventory | <--- | S13 | 0.129 | 0.877 | 0.335 | 2.614 | 0,009 |
| State anxiety Inventory | <--- | S1 | -0.411 | -0.394 | 0.050 | -7.864 | <0.001 |
| Trait anxietyInventory | <--- | S1 | -0.725 | -0.969 | 0.045 | -21.387 | <0.001 |
| Trait anxietyInventory | <--- | S8 | -0.195 | -1.055 | 0.173 | -6.106 | <0.001 |

$B_0$: Standardized Coefficient; $B_1$: Nonstandardized Coefficient; SE: Standard Error; S1: Parent's Age; S8: Time of Seeing the Child; S9: Time of Holding the Child; S13: Gestational Week.

## Discussion

This study, it was tried to evaluate the FCC applied in NICUs and to determine the relationship between FCC and anxiety levels of mothers. Parents of infants hospitalized in NICUs experience mental illnesses, primarily such as anxiety and stress (Abdeyazdan, Shahkolahi, Mehrabi, & Hajiheidari, 2014). Due to the importance of family support for infants hospitalized in NICUs, FCC is the main element of the relationship between the medical staff and families (ArshadiBostanabad et al., 2017). FCC, focuses on family relationships including enhancing the participation of families in care and respecting families rather than the traditional task oriented or procedure oriented care strategy (Westrup, Sizun, & Lagercrantz, 2007). A study by Jannes et al. (2020) enabled parents to have limitless visiting hours and participate in care and proved that satisfaction of parents of infants with lower birth weights in NICUs had significantly improved (Jannes et al., 2020). Another quasi-experimental study enabled active participation of parents of premature infants with very low birth weights in care for at least four hours a day after training them on basic care knowledge and skills. As a result of the study, active participation of the parents in care improved discharge weights of the infants, nutritional outcomes, breastfeeding ratio and rehospitalization ratio. The study indicated that FCC was a useful care model for premature infants and since parents had a limited right to enter NICUs, FCC was to be applied in NICUs (Lv et al., 2019). Similar studies also indicated that it was possible to apply FCC in NICUs and families could assume the basic care of their children by participating in care and in trainings conducted by NICU medical staff (Cooper et al., 2007; Dunst, Trivette, & Hamby 2007; Kim et al., 2020; Maria et al., 2021; Zhang et al., 2018) and allowed families to have adequate information about the infant's medical condition (Cooper et al., 2007). A study conducted in eight NICUs in Finland enabled the staff to identify and apply FCC elements such as making common decisions and collaborating between parents and staff. In the study, the quality of FCC had significantly increased after the intervention (Toivonen et al., 2020). The present study found the mean total FCC score was low. The areas where the parents obtained the lowest score were the participation

in care and collaboration with family subscales. The reason is thought to be due to the collection of data during the pandemic period. In studies, it has been reported that family-centered care is compromised due to the restriction of visitor admission to NICUs during the pandemic period (Darcy Mahoney et al., 2020; Murray & Swanson, 2020; Vance et al., 2021; Vetcho, Cooke, Petsky, Saito, & Ullman, 2022). Moreover, this result demonstrated that FCC provided in NICUs was not adequate and NICUs were not standardized in terms of collaboration with families for infant care and participation of families in care yet. Therefore, nurses providing healthcare service are to offer more psychosocial support to families, accept the presence of mothers in NICUs and encourage mother infant bonding.

A randomized controlled trial enabled parents to participate in care as primary caregivers for at least four hours a day until discharge after a parental training program. After the intervention, the FCC group parents had lower mean total parental stress and anxiety scores and higher mean total satisfaction scores than the control group and they had better outcomes related to special neonatal care skills after the training (Zhang et al., 2018). Similar studies found that the group receiving FCC in NICU had lower mean total parental stress and anxiety scores (ArshadiBostanabad et al., 2017; Cano Giménez & Sánchez-Luna, 2015; Milan & Nasimi, 2018) and higher mean total satisfaction scores than the control group (Bastani et al., 2015; Jannes et al., 2020). An experimental study measured the anxiety of mothers in both groups prior to the intervention. The control group fathers only received routine care of the unit, whereas the intervention group fathers received training and maternal support for neonatal care for three times. In addition, the parents were allowed to be with their children to exchange opinions outside visiting hours for three days. A test performed one day after the intervention demonstrated that there was a significant decrease in the mean total anxiety score of the intervention group mothers (ArshadiBostanabad et al., 2017). There are limited number of studies in this field in the literature (ArshadiBostanabad et al., 2017; Bastani et al., 2015; Cano Giménez & Sánchez-Luna, 2015; Jannes et al., 2020; Milan & Nasimi, 2018; Zhang et al., 2018). The present study demonstrated similar results with the literature and as the mothers received FCC, their state and trait anxiety scores significantly decreased. Moreover, according to the findings acquired from the Structural Equation Modeling analysis, the increase in the time of seeing the child caused a decrease in their trait anxiety scores. When the effect of NICU family-centered care on mothers is examined; it is thought that mothers who are informed about their child's disease and treatment, allowed to participate in care practices and included in the decision-making process experience less anxiety. It is also predicted that the earlier mothers are allowed to see infant in the NICU, the less anxiety they will experience. According to the findings acquired from the Structural Equation Modeling analysis, there was a statistically significant difference between age of the mothers, gestational week, time of holding the child and the FCC scale. As gestational week of the infant and the time of holding the child increased, the state of receiving FCC increased. In addition, as age of the mothers increased, the state of receiving FCC increased and the trait anxiety scores decreased further. The women who had become a mother at a younger age received FCC less often and they had higher trait and state anxiety scores. These findings make it necessary to conduct further studies to understand the mechanism between FCC and anxiety.

**Implications for Nursing Practice**

Nurses are well-positioned as leaders and facilitators of FCC implementation within the NICU. Family centered care has positive impacts on infants/children, parents and healthcare professionals. Therefore, it is of paramount importance to arrange the care provided in institutions in line with the FCC principles. Nurses in particular play a key role in creating a change and awareness for hospital care to be family centered. Despite the increasing evidence that FCC applications in NICUs are useful, these applications are not used commonly in NICUs worldwide yet. Therefore, Organizational, managerial and operational changes are required for FCC implementation in NICU. In order to develop FCC in NICUs, institutional, managerial and functional changes

such as introducing the hospital environment to the family, informing the family about visiting hours and hospital rules, establishing family support groups, determining the needs of the family by creating forms, ensuring communication of the infant's with all family members, informing the family about community supports are required.

## Conclusion

The present study proved that as FCC applications increased, state and trait anxiety of the mothers decreased. Therefore, nurses and medical staff are to apply the FCC philosophy/strategy better as of the onset of an infant's hospitalization and be encouraged to provide support and care to mothers and infants.

## Recommendations

It is predicted that if parents whose infant is in the neonatal intensive care unit are placed in the mother's lap and the sooner they are seen, their anxiety levels will decrease and the level of family-centered care will increase. It is suggested that if family-centered care is provided in the neonatal intensive care unit, there may be reductions in trait and state anxiety levels. It is predicted that the earlier the mother is allowed to see the infant in the neonatal intensive care unit, the lower the levels of continuity and stasis anxiety. It has been observed that the sooner the mother holds the infant in her arms, the faster her anxiety levels will decrease. It is recommended that mothers be shown infants early and ensure early contact. Therefore, nurses are to take FCC into consideration and prioritize it.

## Limitations

The researcher specified the inclusion criteria as being literate at least. However, as the rate of nonliterate mothers was higher, the researcher collected the data of the nonliterate mothers, which posed a limitation to the study. During the pandemic period, mother-infants interaction was largely disrupted by visitor restrictions in NICUs. For this reason, family-centered care practices were affected during the pandemic process, and this constituted the limitation of the study.

## Credit authorship contribution statement

All authors have agreed on the final version and meet at least one of the following criteria:

(1) the conception and design of the study, or acquisition of data, or analysis and interpretation of data,

(2) drafting the article or revising it critically for important intellectual content,

(3) final approval of the version to be submitted.

## Declaration of competing interest

The authors declare no conflict of interest in this study.

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