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Neonatal Family Care for 24 Hours per Day

Effects on Maternal Confidence and Breast-Feeding

Heidi Wataker, NP(P), MSN; Alf Meberg, MD, PhD; Eirik Nestaas, MD, PhD

ABSTRACT

In family care (FC) program for neonatal intensive care units (NICUs), parents are encouraged to reside together with their infant for 24 hours a day to actively be involved in the care. The aim of this study was to assess the impact of FC on maternal confidence and breast-feeding. Maternal confidence and rate of breast-feeding were assessed in 31 mothers offered FC that included special family rooms in the NICU, and in 30 mothers from a comparable NICU providing traditional care without such facilities. One week prior to hospital discharge, mothers in the FC group felt better informed regarding nursing issues and had more confidence in interpretation of the infants regarding feeding issues and in caregiving without staff attendance ($P < .05$). They also reported a higher level of empowerment ($P < .05$). Three months after discharge, the mothers in the FC group had a higher self-reported skill level for interpretation of the infant's signals and knowledge about breast-feeding ($P < .05$). Despite similar rate of breast-feeding at discharge, more infants in the FC group were breast-fed 3 months after discharge ($P < .05$). An FC program in the NICU promoted better maternal confidence during the hospital stay and 3 months after discharge compared with traditional care.

Key Words: breast-feeding, confidence, empowerment, family care, infants

Author Affiliation: Neonatal Intensive Care Unit, Department of Pediatrics, Vestfold Hospital Trust, Tønsberg, Norway.

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Correspondence: Heidi Wataker, NP(P), MSN, Neonatal Intensive Care Unit, Department of Pediatrics, Vestfold Hospital Trust, 3103 Tønsberg, Norway (heidi.wataker@siv.no).

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Although advances in neonatal medicine have reduced neonatal morbidity and mortality,[1–3] less attention has been paid to psychosocial needs of sick infants and their parents.[4] Environmental elements in the neonatal intensive care unit (NICU) are factors that may adversely affect parent-infant attachment and parental involvement.[5]

Mothers of premature infants experience more severe psychological distress than mothers of term infants.[6,7] Stressful aspects of the hospitalization reported by parents are separation, inability to protect the infant and challenges in caregiving, and parental role expectation.[8,9] Separation from the mother may cause stress for the infant as well as the mother.[10] Involving parents in the care of their infant and training them to understand behavior signals from the infant may facilitate bonding and increase parental confidence.[11,12] Parents with infants in the NICU report benefits from support programs, including facilitation of participation in infant care and communication with health professionals.[13]

The Baby Friendly Hospital Initiative[14] put forward criteria for maternity wards to give the mothers and their healthy newborns the opportunity to stay together, promoting attachment, interaction and breast-feeding. Such criteria are not implemented in most NICUs.

Family-centered care (FCC) has become a broadly accepted concept of neonatal care. This concept includes sharing of information, including the family in care and decision making and recognizing the family as experts in the care of their own infant.[15] Unrestricted parental presence in the NICU is one of several basic tenets of FCC.[16] In the traditional NICU design, however, mothers are not allowed to stay together with their infant for 24 hours a day. In European NICUs most parents are separated from their infants during the major part of the hospital stay.[17]

A family care (FC) program was implemented in the NICU at our hospital in 2006, offering the parents

special family rooms inside the unit and thereby giving them opportunity to stay 24 hours a day together with their infant, thus facilitating the principles from FCC. The FC is based on the assumption that mothers gain more experience and thus feel more confident during hospitalization as well as after discharge.

The aims of this study were to investigate the effects of an FC program in a NICU on maternal confidence and breast-feeding compared with mothers in a comparable NICU offering traditional care without such room facilities.

MATERIALS AND METHODS

Facilities

Recruitment of patients to this prospective study took place from January to June 2009 in the NICUs at the Vestfold Hospital Trust (SiV) and the Østfold Hospital Trust (SØF) in Norway. Both are level II NICUs of comparable size (about 250-300 admittances a year) treating infants born at gestational age 28 weeks and higher and offering ventilator treatment. The mean hospital length of stay at SiV was 7.2 days and at SØF 11.3 days. Both NICUs have consultant neonatologists, a system of primary nursing, and services from social workers.

At SiV, an FC program was implemented in 2006, offering the mothers to stay in special family rooms inside the NICU as long as their infant was hospitalized. The family room has a bed for the parents, a television, a private bathroom, a bed for the infant as well as a bathinette, and equipment for monitoring heart rate and arterial oxygen saturation (pulse oximetry). Stable infants at 33 weeks postconceptual age or higher are allowed to stay with their parents in their room until discharge. At SØF (control unit), traditional neonatal care was provided, without family room facilities. The mothers were advised to stay with their infants as much as possible during daytime.

Subjects

Mother-infant dyads admitted to both hospitals were eligible candidates for the study. Mothers who did not speak Norwegian were not included. Additional maternal criteria at SiV included mother's documented presence with her infant during the hospital stay. Eligible mothers were informed about the study 1 week before planned discharge and invited to participate. The questionnaires were filled in 2 days before discharge. Written informed consent was obtained from all participants. The presence of the fathers in the NICUs was rather unpredictable, and data for their stay were thus not registered.

Data collection

Demographic variables were collected from the medical and nursing records. There was no validated questionnaire found suitable for assessing maternal confidence in the present setting. Therefore a novel self-reporting questionnaire was developed and used for assessing the level of confidence and breast-feeding prior to discharge.

An extensive literature search was performed to develop the questionnaire. The search was done in the PubMed, Cochrane Library, MEDLINE, EMBASE, and SveMed databases, using the following keywords: "Confidence, family care, infants, infants cues, maternal stress, empowerment, information and breast-feeding." The items represent key factors for interaction between mothers and their infants and were grouped in 4 subscales: information received; infants cues; experience in caretaking, and experience in breast-feeding. A scale of 1 to 9 was chosen on the basis of answers from a pilot study. Three months after discharge, the mothers were interviewed by telephone, using a modified version of the same questionnaire. In the modified questionnaire, the same items were assessed by use of a less comprehensive form more suitable for telephone interviews. The mothers in the telephone interview were asked about the information received in hospital before discharge, to what extent the mothers felt able to understand the infants cues 3 months after discharge, and maternal confidence in continuation of breast-feeding, as well as whether the infant was breast-fed.

Statistical analysis

Data were analyzed using PASW Statistics 18 (SPSS Inc, Chicago, Illinois). Descriptive statistics were conducted at baseline to summarize demographic and clinical variables. Double-sided tests and 95% confidence interval were used. Independent-sample t tests were used for testing normally distributed continuous data between groups, whereas nonparametric methods were used for continuous data with a nonnormal distribution. Differences in categorical data were analysis by the χ^2 test or Fisher exact test. Uncorrected P values were reported.

RESULTS

Sixty-six mothers were enrolled in the study, 36 in the FC group and 30 in the control group. Five mothers in the FC group were excluded because their self-administered questionnaires were not adequately filled inn. Five mothers in the FC group and none in the control group gave birth to twins. Maternal characteristics did not differ between the FC and the control group (see Table 1). Seventy-four percent of the mothers in the FC

Table 1. **Parity, civil status, and educational level of mothers in the FC intervention group and in the control group**

	FC Group ($n = 31$)		Control Group ($n = 30$)		
Characteristics	***n***	***%***	***n***	***%***	***P***
Primipara	23	74	24	80	.56
Civil status					
Married	13	45	7	27	.17
Cohabitee	13	45	17	65	.13
Single	3	10	2	8	>.99
Educational level					
≤12 y	23	79	16	64	.21
>12 and ≤15 y	3	10	6	24	.28
>15 y	3	10	3	12	>.99

Abbreviation: FC, family care.

group and 80% in the control group were giving birth for the first time. There were no significant differences in mother's socioeconomic background when referred to maternal education. The infants in the FC group had a lower gestational age and lower birth weight than the control group and more were treated with mechanical ventilation (see Table 2).

Effects of the FC program before discharge

The maternal level of confidence and rate of breast-feeding 1 week prior to discharge are given in Table 3. Mothers in the FC group felt significantly better informed regarding nursing issues and for information given by nurses on medical monitoring equipments. There were no differences between the groups on information given for the medical condition and treatment of the infants. Both groups reported similar support from the staff and similar availability of the staff in the nursery, and also reported that they were similarly prepared for discharge from the hospital. Mothers in the FC program reported a significantly higher level of empowerment, that is, influence on care and collaboration, and more confidence for taking care of the infant without staff attendance. Significantly more mothers in the FC group knew who their primary nurse was. They had a higher level for understanding the infant's cues regarding feeding issues and there was a trend for a higher level of confidence regarding need for quietness and sleep than the controls. There were no significant differences in issues related to dressing, caring for the infant, skills or knowledge regarding the parental role, or for breast-feeding.

Effects of the FC program 3 months after discharge

Three months after discharge, 23 (74%) of the FC mothers and 21 (70%) of the control mothers participated in a follow-up interview. Their scores for confidence and rate of breast-feeding are given in Table 4. The mothers in the FC group had less need for extra information regarding the infant's signals and for knowledge regarding breastfeeding. Although the breast-feeding rates were nearly similar in the 2 groups at discharge, significantly more infants in the FC-group were breast-fed ($P = .04$) 3 months later and there was a trend for more infants in the FC group being fully breast-fed ($P = .07$).

Table 2. **Clinical characteristics of infants in the FC group and in the control group**

Characteristics	**FC Group ($n = 36$)**	**Control Group ($n = 30$)**	***P***
Gestational age, wk; mean (95% CI)	32.7 (31.4-34.0)	34.7 (33.7-35.7)	.02
Birth weight, kg; mean (95% CI)	1.9 (1.6-2.1)	2.6 (2.3-2.9)	<.001
Antibiotics, n (%)	10 (28)	7 (23)	.68
CPAP, n (%)	11 (31)	12 (40)	.42
Mechanical ventilation, n (%)	7 (19)	0	.01

Abbreviations: CI, confidence interval; CPAP, continuous positive airway pressure; FC, family care.

Table 3. **Scores[a] for level of confidence and rate of breast-feeding in the FC group and the control group 1 week prior to discharge**

	FC Group ($n = 31$)	Control Group ($n = 30$)	*P*
Level of confidence related to the information from the staff on specific issues, mean (95% CI)			
Nursery issues	8.3 (7.8-8.7)	6.2 (5.2-7.2)	<.001
Medical condition	8.2 (7.5-8.8)	8.1 (7.5-8.6)	.82
Medical treatment	8.4 (8.1-8.7)	8.1 (7.6-8.6)	.21
Medical monitoring equipment	8.5 (8.2-8.8)	7.8 (7.2-8.4)	.04
Level of confidence related to the early attachment process, mean (95% CI)			
I have received proper support from the staff	8.4 (8.0-8.9)	8.8 (8.6-9.0)	.11
The staff have been available in the nursery	8.4 (7.9-8.9)	8.5 (8.3-8.8)	.58
I feel empowered	8.4 (8.1-8.8)	7.6 (6.9-8.2)	.02
I am prepared for discharge	8.3 (8.0-8.7)	7.9 (7.4-8.4)	.20
I know who my primary contact nurse is	8.5 (8.1-8.9)	5.0 (3.7-6.3)	<.001
I am confident when caring for my infant without staff attendance	8.9 (8.8-9.0)	8.3 (8.0-8.6)	<.001
I am prepared for caring my infant at home	8.4 (8.1-8.7)	8.4 (8.1-8.7)	.82
Level of confidence related to understanding the infant's signals, mean (95% CI)			
I know when my infant needs sleep and quietness	8.2 (7.4-8.9)	7.1 (6.2-8.9)	.06
I know when my infant is hungry	8.7 (8.4-9.0)	7.9 (7.1-8.7)	.03
I know how my infant should be dressed in different environmental conditions	7.6 (6.5-8.8)	7.2 (6.0-8.5)	.60
I know how to care my infant	8.6 (8.2-9.0)	8.4 (7.9-9.1)	.55
My skills and knowledge about my parental role has increased during the hospital stay	8.3 (7.4, 9.1)	8.3 (7.3-9.2)	.97
Breast-feeding rates at discharge, *n* (%)			
No breast-feeding	4 (13)	7 (23)	.34
Partly breast-feeding	6 (19)	5 (17)	.78
Fully breast-feeding	21 (68)	18 (60)	.53

Abbreviations: CI, confidence interval; FC, family care.
[a]Answers from the self-administered questionnaire 1 week prior to discharge (scale 1-9; 1 = not at all, 9 = very much so).

Table 4. **Level of information and rate of breast-feeding in the FC group and the control group 3 months after discharge**

	FC Group ($n = 23$)		Control Group ($n = 21$)		
	n	%	*n*	%	*P*
Mothers reporting a need for more information regarding					
Medical condition	6	26	5	24	.86
Understanding of the infant's behavior	3	13	11	52	.005
Issues related to maintaining breast-feeding	2	9	9	43	.009
Breast-feeding rates 3 months after discharge					
No breast-feeding	6	26	12	57	.04
Partly breast-feeding	1	4	0	0	>.99
Full breast-feeding	16	70	9	43	.07

Abbreviation: FC, family care.

DISCUSSION

Before discharge

The main finding in this study was that mothers offered FC including family room facilities in the NICU felt significantly more confident in their ability to parent their infant both at discharge and 3 months later than the mothers offered traditional care in a NICU without access to family rooms. At discharge, the FC group felt better informed by the nurses, had more skills in

interpreting their infant's signals, were more empowered, and were more confident in caring for their infant without staff attendance. Significantly more mothers in FC group continued breast-feeding 3 months after discharge

Accurate information, inclusion in care, parent-infant contact, individualized care, and a positive relationship with staff have been shown as crucial needs for parents in the NICU.[10,15] The FC program supports the parental needs, with focus on daily information, opportunities for parent-infant contact, and the primary nurse contact to improve individualized care and promote confidence. Neonatal environments with adequate facilities conductive to the needs of infants and parents are unique opportunities to assist mothers in initiating and developing parental roles and to promote confidence with assistance in individualized care.[18]

Optimal parenting effects are obtained with more active maternal involvement and even short-term intervention may provide benefits in mother's knowledge of infant's behavior.[19] Although our study was not designed to examine the attachment process and a direct comparison thus not justified, our study showed that FC mothers were more confident in caretaking and had better understanding of the infants' cues for feeding. Supporting the attachment process is a precursor for promoting parenting skills regarding the infant's behavior.[20] Mothers in the FC group could interact with their infant through day and nighttime with support from nurses. These mothers thus had a greater opportunity to learn about the infant's cues and need for care than the mothers who were allowed to stay only part time in the NICU. These findings indicate that mothers benefit from provision of information through active participation. Effective interaction requires that parent and infant provide a range of clear cues, respond to each other, and experience environmental support for interaction.[21]

An educational-behavioral intervention strategy with repeated information may reduce maternal stress, promote parent-infant interaction, and give the parents stronger beliefs about their parental role.[22,23] This is consistent with the findings in our study. The mothers felt significantly more informed regarding nursing issues and medical equipment, possibly because the FC group could receive bedside information more or less continuously. The FC group and the control group felt similarly informed regarding the medical condition and treatment of their infant. Such information was given by the neonatologists on a regular once-a-day basis. A timely and appropriate communication process can alleviate stress, increase understanding of care and progress, and enable participation in decision making.[10,22] Similar findings occurred in our study. Mothers in the FC group could receive appropriate information because they were together with their infant and the nurse on a more regular basis. The maternal involvements in the FC group together with ongoing communication through 24 hours a day strengthens confidence in caring for the infant without staff attendance and empower the mother in their role. Continuous communication about the infant's condition and treatment plan is necessary for mothers to feel as partners in caregiving and decision making.[24] Mothers should be encouraged and supported to participate in these issues at the level they themselves choose.[25] It may have been an important factor that mothers in the FC group were not given responsibility for the infant in their family room until the infant was judged stable and the mother felt ready to provide care. Hence, nurses may act as role models for learning and gradually give the parents the responsibility for interaction with their infant.[15] When the caring tasks are gradually taken over by the parents, care must be taken so that the mothers do not experience too much responsibility in parenting their infant in the unfamiliar settings in the NICU, governed by medical and technological practices.

In both hospitals, the nurses practice the philosophy of primary nursing. A minimum number of nurses should have primary contact with the family to promote a close and mutual parent-nurse relationship.[26] Studies have shown that "mothers struggled to mother" because nursing interaction pushed them to the sideline and left them feeling unimportant in the life of their child.[27] Significantly more of the mothers in the FC group felt that they knew their contact, possibly because the mothers and their primary nurses could spend more time together and to promote a mutual relationship.

We are aware of only 1 other study that has assessed the effects of parents staying in the NICU from admission to discharge. Ortenstrand and colleagues[28] found a significantly reduced length of stay in infants admitted to NICUs offering FC with "family room 24 hours a day" compared with traditional care, and also found a decreased rate of bronchopulmonary dysplasia. Neither the length of stay in hospital nor bronchopulmonary dysplasia were primary outcomes in our study.

Three months after discharge

Although the mothers in both groups at discharge felt confident and ready to leave the hospital to take care of the infant at home, 3 months after discharge, the mothers in the FC group were less in need for information regarding the infant's cues and information regarding breastfeeding. Despite that the rates of breastfeeding were similar at discharge and that the infants in the FC group had a lower gestational age and birth

weight, 3 months after discharge, more infants in the FC group were breastfeed. These findings were probably related to effects of the FC program, as promotion of confidence through pre- and postdischarge inventions strategies have shown to be effective and important factors for maintaining breast-feeding.[29] The importance of mothers being near their infant when the infant needs to be breastfed, also during nighttime, may have been an important factor both for developing confidence and for maintaining breast-feeding.

Limitations and strengths

A limitation of the study is the relatively small sample size giving low power to document differences between the FC and the control group. Randomization was not performed, as it could be disputable from an ethical point of view as (nearly) all mothers would prefer to have a family room near their infant if available. The control group was therefore recruited from a comparable NICU without an FC program. The higher morbidity of the infants in the FC group compared with the controls (lower gestational age and birth weight, and more infants treated with mechanical ventilation; see Table 2), may strengthen the findings in our study. However, one could also argue that more severe illness could promote a closer relationship between the mothers and the nurses. The fathers' participation in and perception of FC should be assessed in further studies, to give a more complete evaluation of the program. Maternal age was not assessed, and the impact of maternal age on their confidence should be explored in further studies. The results in our study would have been strengthened if the questionnaire had been psychometrically tested. However, the questionnaire was created from other validated questionnaires. The use of uncorrected *P* values and multiple tests being performed carry a risk for type 1 errors; however, correcting the *P* values would give a high risk for type 2 errors in this study.

CONCLUSIONS

This study showed a higher level of confidence in mothers regarding information, interpretation of the infant's behavior, taking care of the infant without staff attendance, and enhancing empowerment of mothers offered FC than traditional care. Better maintenance of breastfeeding after discharge was also observed. An FC program may facilitate mother-infant attachment and interaction and improve the quality of neonatal care. When planning future neonatal intensive care unit, these aspects should be taken into account and family rooms made available.

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