Effects of the Close Collaboration with Parents intervention on the quality of family-centered care in NICUs

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ABSTRACT

Background Systematic training for the neonatal staff to support parents' active involvement is lacking. There is little information about the effectiveness of educational interventions.

Purpose To evaluate the effects of an educational intervention to neonatal staff on the quality of family-centered care (FCC) from the perspectives of parents and nurses.

Methods A quasi-experimental before and after study was carried out in five Finnish neonatal units in 2014-2018. Data were collected using the DigiFCC-tools with a 7-point Likert scale. Thirty-one

fathers and 53 mothers were recruited before the intervention and 21 fathers and 61 mothers after the intervention. They answered one question every evening until their infants' discharge. Each nurse answered one corresponding question after every shift, during the same period before and after the intervention. Before the intervention 3239 responses and after the intervention 3092 responses were received from nurses.

Results The fathers' total score and the score indicating "Shared decision-making" were higher after the intervention than before the intervention. The mothers' total score did not differ between the two time periods. The nurses' total score was higher after the intervention than before the intervention. Of the individual items, higher scores were found for "Active listening", "Parents' trust in the nurse", and "Emotional support".

Implications for practice Developing the staff's negotiating and active listening skills facilitates better support for parents during infants' intensive care.

Implications for research Family-centered care interventions such as Close Collaboration with Parents should be studied in RCTs, also including child outcomes

Keywords: Family-centered care; neonatal intensive care unit; parental support; shared decision-making, FCC intervention

INTRODUCTION

An average of 15 million infants are born preterm every year [1]. It is known that having an infant hospitalized in a neonatal intensive care unit (NICU) is emotionally challenging for parents. Stress and emotional burden are caused by the separation of parent and infant [2], the technical intensive care environment, and concerns about the survival of the infant [3]. In addition, it is known that the preterm birth of an infant interrupts normal psychological preparation for parenthood during pregnancy [4]. All of these factors may negatively affect parenthood and parent-infant bonding [5,6].

Large body of evidence has shown that integrating the parents in the care of their infant promotes the health outcomes of the infants [7,8], well-being of the parents [9,10], and supports parent-infant bonding [6].

This knowledge has led to the development of family-centered care (FCC) that is considered a guiding principle in neonatal care today [11,12]. FCC is defined as a comprehensive and holistic care approach, in which dignity and respect for the families, information sharing, equal family participation in care and decision-making, and collaboration between professionals and the family are the key elements [13]. The goal of FCC is staff-parent partnership which facilitates parents to become experts in caring for their infant. Identifying roles and responsibilities requires open communication and negotiation between parents and staff and the ability of parents to choose the extent to which they are involved in the care and decision-making.[12] It has been challenging to implement these elements in the practice.

BACKGROUND

Nurses working in neonatal intensive care unit (NICU) have a considerable role in creating collaborative relationships with parents, and they can either prevent or promote the development of partnerships with their actions. Nurses are expected to give emotional and practical support for parents and encourage them to participate in their infants' care from admission until discharge. Through active participation and open communication, a trusting relationship between parents and nurses can be established, and parents can gain confidence in their infant's care [14–16]. This increases parents' participation in decision-making and their sense of control [16] and promotes mutual partnerships [17]. However, nurses might unnecessarily control parental participation which parents experience negatively. Parents may feel inadequacy, frustration [15], disaffection [18], and feelings of 'hospital owning their baby'[14]. Nurses may ignore the opinion of the parents when they consider parents' action not to be the best interest of the infant.[18]

Skills to build up a mutual partnerships by respecting parents' views and choices [11,19,20] and negotiating about the infant care with them[11,12] are essential for nurses. On the other hand, parents must also respect nurses' professional skills [17]. Brødsgaard et al. [17] found that constant negotiation of role boundaries is essential for a successful process, leading to a mutual partnership between parents and nurses [17]. Changes in nurses' professional roles and attitudes are needed, so that parents are accepted as partners. This can be challenging because of the staff's task-oriented work identities and

the unclarity of role boundaries[12]. Staff are uncertain about FCC principles [21] and how to collaborate and communicate with parents [18]. Close Collaboration with Parents is a training program for multidisciplinary NICU staff, which was developed to support parenting and collaboration between parents and NICU staff [22]. The training program aims to develop staff's skills to understand individual needs of infants and families and integrate these into the everyday care planning. Furthermore, the program aims to increase staff's skills on active listening and negotiation, thus integrate parents into decision-making. The aim of this study was to evaluate the effects of the training program on the quality of FCC from the perspectives of mothers, fathers, and nurses. We hypothesized that parents and nurses evaluate the quality of FCC higher after the intervention compared with the time before the intervention.

METHODS

Study design

A quasi-experimental study design without a control group was used, comparing the quality of FCC before and after the intervention. This study progressed stepwise between October 2014 and August 2018 in five NICUs in Finland so that the first NICU participated in the study between 2014 and 2016, the next three NICUS between 2015 and 2017 and the fifth NICU between 2016 and 2018. The data were collected during a 3-month period both before and after the Close Collaboration with Parents training program, two years apart (Figure 1).

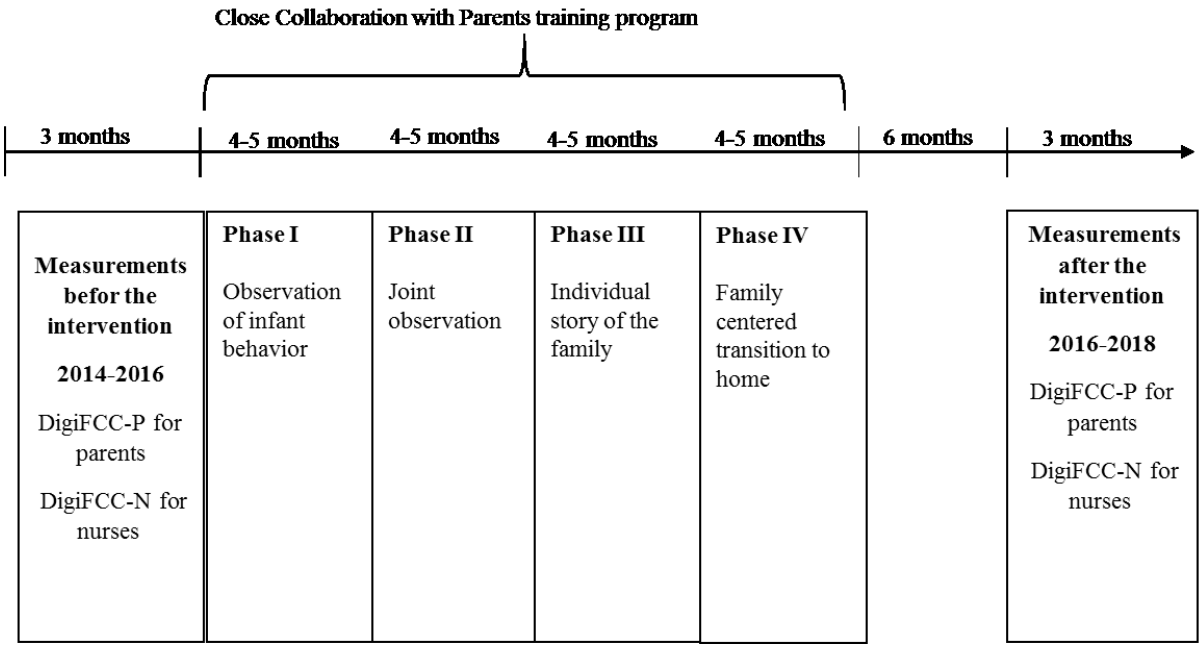

Figure 1. The timeline of the study

Intervention

The Close Collaboration with Parents training program is an educational intervention for multidisciplinary NICU staff. It aims to create a partnership between staff and parents during infant care. Close collaboration means that parents have a significant role and they are experts in their infants' care. The intervention was initially developed and implemented at Turku University Hospital between 2009 and 2012 to promote FCC. The original model of the intervention and its implementation are described in the article by Ahlqvist-Björkroth et al. [22] and a modified implementation process of the intervention is reported in the article by Toivonen et al. [23]. We have reported earlier that the unit culture and practices changed towards FCC in eight different hospitals [24]. However, one of the main questions is how the intervention affects the quality of FCC in these hospitals on an individual level from mothers, fathers, and staff perspectives.

The intervention's theoretical background is based on infant neurobehavioral organization theory, early parent–child relationship-based developmental theories (e.g., attachment theory), and reflective thinking theories. The strategies for implementing the change in attitude and clinical practices

included theoretical teaching, bedside practices with mentors to internalize the theoretical teaching, and reflections within supervision groups to spread recent innovations. The trainer team consisted of a psychologist, a neonatologist, and trainer mentors. The trainer mentors were nurses who had mentoring experience in their respective units before mentoring another unit.

The intervention consists of four phases building on each other and lasting 4 to 5 months each. First, the health-care staff learn to observe infant behavior. This phase aims at identifying the individual needs and features of each infant. After that, the staff observe infant behavior with the parents and learn to listen actively to parents' perceptions about their infant. During the third phase, staff learn to know the individual story of the parents becoming the parents for this baby, which supports empathetic understanding of the parents and developing parent-infant relationship. Finally, staff learn to integrate parents in decision-making and collaboratively plan the transition to home.

Setting and participants

Parents and nurses from five NICUs were recruited for the study. Characteristics of the participating units are presented in Table 1. Parents of infants no more than six months old were eligible for participation in this study (Figure 2). A research assistant or nurses working at the unit recruited parents on the infant's second day of life at the earliest, if the infant's estimated stay in the NICU was longer than three days, or during the second care day, if the infant was admitted from home. Parents were excluded if they did not understand Finnish, Swedish, or English; if their infants were triplets or higher order; if they did not have a mobile phone; or if their infant was in critical condition. The recruitment of parents continued for 3 months both before the intervention and 6 months after the completion of the intervention. The 'before' and 'after' samples were recruited two years apart and naturally included different samples of parents. The sample size was set at 30 families. This sample size was chosen so that data collection at each unit could be completed in a reasonable amount of time. Parents who participated in the study received a study file where they filled in infant and family characteristics, including the infant's gestational age, birthweight, birth head circumference, sex,

mode of delivery, singleton/multiple, number of siblings, and parents' ages, education, and socioeconomic status.

Nurses working in the units (n=139) were invited to participate in the study by the researchers. The nurses who did not work at the bedside or who had occasional work shifts in the unit were excluded. No background characteristics were collected from the nurses.

Table 1. Characteristics of the NICUs at the baseline

NICU	1	2	3	4	5
Level of care[a]	II	II	II	III	II
Admission per year	240	955[b]	1350[b]	500	250
Scheduled number of bedside nurses per day					
weekday	6	14	15	27	12
weekend	6	13	13	27	11
Number of nurses in the unit	11	28	30	47	23
Patient beds in the unit	5	15	16	15	10

[a]According to the American Academy of Pediatrics, Level II (special neonatal care) provides care for infants born ≥32 weeks of gestation and for infants who are moderately ill; Level III (higher subspecialty neonatal intensive care) provides care for infants born < 32 weeks of gestation and for infants born at all gestational ages with critical illness. [b]Included also pediatric admissions

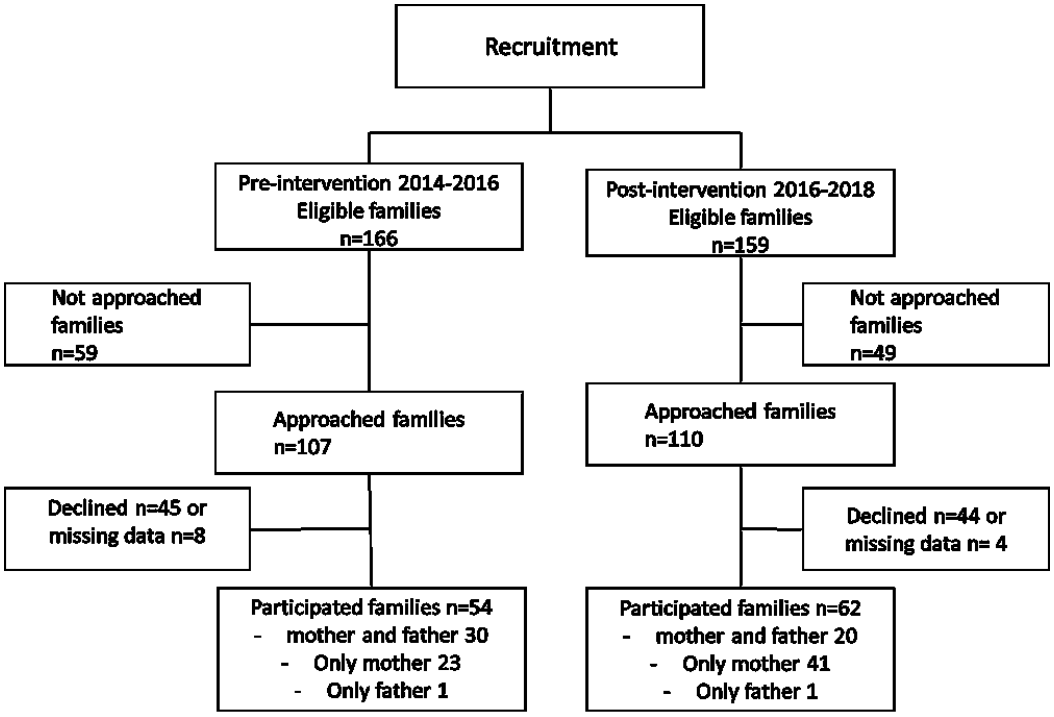

Figure 2. Flowchart of the study participation

Instruments

Parents evaluated the quality of FCC with the DigiFCC-P tool by answering text-message questions delivered by mobile phones. The tool was initially developed for the evaluation of the Close Collaboration with Parents training program and further developed based on feedback from parents, staff, and researchers to improve its content validity and feasibility. The questions were developed based on the earlier literature on FCC, and their content validity was verified with an interdisciplinary panel of experts (n = 18) in the field of neonatal intensive care, including neonatologists, nurses, psychologists, and health and social scientists [25]. The modified version of the tool was used in the 2013 multicentered survey conducted in Europe [26]. Parents received one randomized question from nine questions every evening during their infants' hospitalizations. They received all nine questions in a random order over nine days. Parents whose infant's hospitalization lasted less than nine days did not answer all the questions. The questions were one of the following. (1) To what extent did the staff listen to you today? (2) To what extent did you participate in your baby's care today? (3) To what

extent did the guidance provided by the staff meet your needs today? (4) To what extent was your opinion considered in decisions made about your baby today? (5) To what extent did you trust the staff in the care of your baby today? (6) To what extent did the staff trust you in the care of your baby today? (7) To what extent did you participate in the discussion during the medical round? (8) To what extent did the information provided by the staff meet your needs today? (9) To what extent did the staff offer you emotional support today? Parents rated their responses on a 7-point Likert scale (1–7, with 1 = not at all to 7 = very much) or 0, if they were not in the NICU that day.

Nurses evaluated the quality of FCC with the DigiFCC-N tool. Nurses answered corresponding questions with the parents' questions, with the exception of question number 7, which concerned parental participation in the medical round. Questions to nurses were in the following form: "To what extent did you listen to parents today?" Nurses gave answers through a web questionnaire using the computer designed for the research purpose. They replied to one randomized question after each work shift during a 3-month study period before and after the training program. Also nurses rated their responses on a 7-point Likert scale (1–7) or 0, if they did not work with parents on that day.

Statistical analysis

The background characteristics were compared between the pre- and post-intervention phases with a Mann-Whitney U-test, a two-sample t-test, a Fisher's exact test, or a Chi-Square test, depending on the distribution and the data measurement. We applied a linear mixed model to study the differences between pre- and post-intervention responses of parents and nurses. For parents, the unit of analysis was the number of parents and for nurses, the number of responses.

Pre and post differences were handled as between factor, while different parents answered the questions before and after the intervention. In the analyses, the unit was handled as a random effect. We controlled for gestational age (< 37 weeks or ≥ 37 weeks) in the models for parents. The Mann-Whitney test was used to compare the proportion of days the parents were present and the days the nurses were working with parents in the pre- and post-intervention period.

The data was analyzed statistically using SPSS 24.0 (Statistical Package for the Social Sciences) and SAS for Windows version 9.4. The p-values ≤ .05 (two-tailed) were considered statistically significant.

Ethics

The study protocol was approved by the Ethics Committee, Hospital District of Southwest Finland (16/180/2011), as well as by each hospital. The hospital administration gave overall consent for the nurses' participation. We did not recruit nurses individually, but they were informed about the study, and they decided for themselves whether to reply to the web questions. Participation in the study was voluntary, and the participants were informed verbally and by a written information sheet about the aim of the study and its practical implementation. Each nurse's anonymous reply to the web question was considered as informed consent. Written informed consent was obtained from the parents.

RESULTS

Parent and infant characteristics

Fifty-four families, with 31 fathers and 53 mothers, participated in the study before, and 62 families, with 21 fathers and 61 mothers, after the intervention (Figure 2).

The median response rate of the study days for the fathers was 82% (Q1, Q3 58%, 100%) and 94% (Q1, Q3 71%, 100%) for the mothers before the intervention and 82% (Q1, Q3 50%, 100%) for the fathers and 89% (Q1, Q3 72%, 100%) for the mothers after the intervention. The characteristics of the participating parents and their infants did not differ between the study phases (Table 2).

The fathers and mothers' presences in the NICU remained at the same level during the two study phases. Fathers were present 81% of the study days before the intervention and 78% of the days after the intervention (p = .40), and mothers were present 98% and 95% of the days, respectively (p = .23).

Table 2. Characteristics of the participating parents and their infants

Variable	Before the intervention	After the intervention	p-value
Parent characteristics			
Father's age, years mean (SD)	32.5 (6.1)	35.2 (7.5)	.16
Mother's age, years mean (SD)	31.1 (5.1)	31.3 (5.5)	.87
Socio-economic status of the father, n			.17
Paid work	28	17	
Unemployed	0	1	
Student	0	2	
Other	3	1	
Socio-economic status of the mother, n			.10
Paid work	37	39	
Unemployed	3	5	
Student	2	6	
Homemaker	5	7	
Other	5	0	
Infant characteristics			
Gestational age, weeks median(range)	34.6(23.7-41.6)	35.8(24.3-42.0)	.76
Birth weight, g mean (SD)	2523 (1127)	2696 (1023)	.37
Length of stay in a NICU, days median (range)	11(2-56)	8 (2-88)	.66
Twins (n)	15	13	.67
Sex (n)			.85
male	37	42	
female	22	23	

Parents' perceptions of the quality of FCC

The fathers' total score for the quality of FCC, measured by nine questions, was higher after the intervention compared with the mean score before the intervention (6.07 vs 5.61, respectively), p = .02. Examined by the questions, fathers gave higher mean scores for almost all aspects of FCC after the intervention, although only one of them (Shared decision-making) was statistically significant (Figure 3). The fathers' mean score on "Shared decision-making" was 5.36 (SD 1.72) before the intervention and 6.85 (SD 0.32) after the intervention (p = .002).

The mothers' mean total score was at the same level before and after the intervention, mean 6.27 (SD 0.62) versus 6.22 (SD 0.67), p = .96. Examined by the individual items, mothers gave higher mean scores on six aspects of FCC after the intervention; however, the differences were not statistically significant (Figure 3).

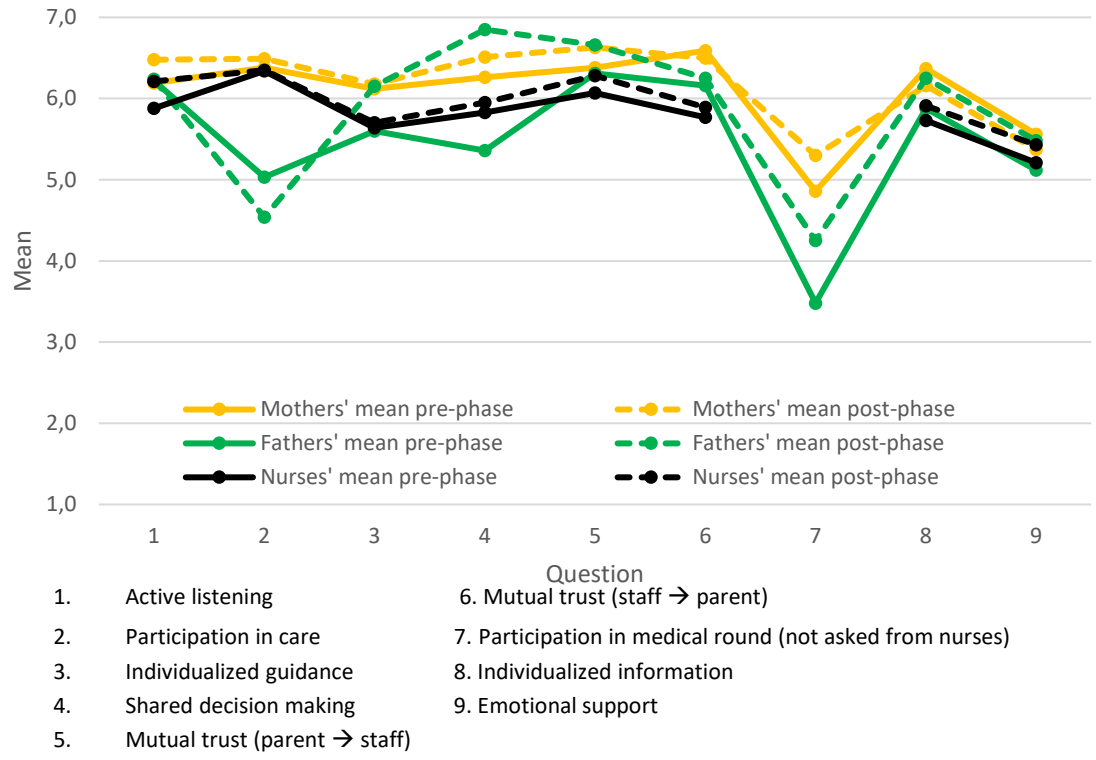

Figure 3. Fathers', mothers', and nurses' perception of the quality of FCC by the questions of DigiFCC-tools

Nurses' perceptions of the quality of FCC

The nurses gave 3,239 responses during the pre-intervention phase and 3,092 responses during the post-intervention phase. The mean response rate calculated from the work shifts for nurses working bedside was 52% (4–100%) before the intervention and 53% (4–100%) after the intervention. The proportion of the work shift in which the nurses worked with the parents increased from a median of 80% before the intervention to 86% ($p = .01$) after the intervention.

The nurses' mean score for the quality of FCC was higher after the intervention compared with the mean score before the intervention (5.96 vs 5.81, respectively), $p < .001$. Examined by the questions, the mean values of all questions were higher after versus before the intervention (Figure 3, Table 3), while the difference was statistically significant for three questions: "Active listening" 5.88 vs 6.21, respectively, $p < .001$; "Parents' trust in nurse regarding infant care" 6.07 vs 6.28, respectively, $p = .007$; "Emotional support" 5.21 vs 5.43, respectively, $p = .01$.

Table 3. Nurses' perception of the quality of FCC as a total score and by the questions of DigiFCC-N

Question n=pre/post	Pre-intervention Mean (SD)	Post-intervention Mean (SD)	p-value
Mean score on the 8 questions, n=2554/2472	5.81 (1.25)	5.96 (1.23)	<.001
1. To what extent did you listen to parents today? n=318/326	5.88 (1.26)	6.21 (1.14)	<.001
2. To what extent did you make it possible for parents to participate in the care of their baby today? n=321/302	6.34 (1.11)	6.35 (1.13)	.79
3. To what extent was the guidance you provided adapted to meet the individual needs of parents today? n=313/318	5.64 (1.30)	5.70 (1.18)	.95
4. To what extent did you consider parents' opinions in decisions concerning their baby today? n=313/300	5.83 (1.21)	5.95 (1.24)	.07
5. To what extent did parents trust you in the care of their baby today? n=324/308	6.07 (0.97)	6.28 (0.88)	.007

6. To what extent did you trust parents in the care of their baby today? n=319/320	5.77 (1.32)	5.89 (1.46)	.06
7. To what extent was the information you gave adapted to meet the individual needs of parents' today? n=316/294	5.73 (1.15)	5.79 (1.03)	.09
8. To what extent did you offer parents emotional support today? n=330/334	5.21 (1.35)	5.43 (1.43)	.01

DISCUSSION

This study showed that fathers and nurses rated the FCC of the NICU more positively after the Close Collaboration with Parents training, compared to the ratings before the intervention. The mothers' ratings were at a high level before and after the intervention without a difference between the time periods.

In this study, the fathers rated the quality of FCC significantly higher after the intervention compared to pre-intervention evaluations. Specifically, they were more satisfied with shared decision-making. These results suggest a change in the care culture supporting fathers' presence and participation. We have shown earlier that fathers were more present in the NICU after the intervention [27]. Furthermore, nurses have reported that they acknowledge fathers more after the intervention [24]. The integration of fathers in care has been identified as a problem in previous literature, as the fathers have felt they were outsiders [28] or secondary in comparison to the mothers [20,29]. Fathers have reported that they are afraid to touch the fragile infant [29,30]. Nurses have experienced that fathers need more encouragement to participate in their infant's care [18]. Consistently, fathers rated their participation in their infant's care as the second weakest aspect of FCC in this study as well. Possibly, fathers consider mothers as

the primary caregivers, while they consider their own role as a supporter of the mother [20]. The intervention effect of nurses acknowledging the fathers is very encouraging because of the obvious need to improve the integration of fathers in care.

Mothers rated the quality of FCC similarly before and after the intervention. Although there was a trend toward higher scores on six aspects of FCC after the intervention, two aspects were rated lower by the mothers, namely emotional support and individualized information. It might be that the mothers' needs for emotional support and individualized care are even higher after the interventions, as they spend longer times in the unit [27]. Therefore, even if the skills of the staff had increased, they only matched the increased needs. Previous interview study suggested that increases in the parents' presence may empower them and they may be more capable of expressing their views on the infant care[31].

Fathers and mothers rated "shared decision-making" high in relation to all questions, and fathers reported a significant intervention effect in this aspect. Also nurses rated this aspect higher after the intervention altough the difference was not statistically significant. This improvement can be linked to the second phase of the Close Collaboration with Parents training, during which the staff learn active listening skills, and the fourth phase, during which the staff learn negotiation skills. These skills provide a foundation for shared decision-making. Active listening gives more space for parents to express themselves. It is also important to let parents know that they are allowed—and expected—to participate in planning the care of their infants. Earlier studies have shown that parents do not necessarily know that they have the right to affect the care plan for their infants or it has been difficult for them to find a way to be involved in decision-making even if they wished to be [32,33].

Parents rated participation in the discussions during medical rounds as the weakest aspect of FCC in this study. An earlier study of 11 European NICUs showed that participation in the discussions during medical rounds was the most challenging part of FCC; the general level of FCC had to be high to achieve high scores in this aspect [34]. This result also highlights the importance of the doctors'

commitment to the Close Collaboration with Parents training, which was a challenge in some of the participating units[23]. After understanding the principles of the intervention, doctors can develop their receptive listening capacities and negotiation skills, thus supporting parents' participation in the discussions during medical rounds [35].

Importantly, the nurses rated the quality of FCC they provided higher after the educational intervention compared to before the intervention. Interestingly, the nurses rated almost all aspects of the FCC lower than the parents did when asked before the intervention. This might suggest that nurses were aware of the deficits in the FCC they were providing, and there was a need for improvement prior to the intervention [23]. After the intervention, the nurses reported better performance in their skills of listening and providing emotional support. In addition, they felt that they trusted parents and parents trusted them more. By actively listening and through successful communication, the staff gets to know the family. Getting to know each other promotes trust between parents and staff and, thus, emotional support when parents dare to talk about their needs and wishes [36]. Enhanced trust between parents and nurses creates the basis for their collaboration and partnership [12,17]. Lack of trust in parents can impair parental participation in their infant's care when staff decide what parents are permitted to do [9,17,21]. Therefore, a trend towards better performance in these aspects is highly valuable.

Providing emotional support has been especially challenging, according to earlier literature[37,38]. Emotional support is essential for parents, as it helps them to cope with stressful NICU experiences [14,39] and promotes parent–infant attachment and parental growth[37]. It has been shown that even if NICU staff consider it an important part of their role that they discuss the emotional experiences of parents, they do not identify themselves as key providers of emotional support. This may lead to a situation where this key aspect of FCC is neglected. [38] Therefore, the appropriate training, which promotes staff's ability to provide emotional support, is essential. In addition, the NICU staff have reported it emotionally stressful to work with anxious and distressed parents [38]. Providing the staff

tools to collaborate with parents may increase their work satisfaction [23] and ease their emotional stress.

Our FCC intervention seemed to be effective in improving the quality of FCC based on parent and staff evaluations. Similar findings were reported in previous FCC intervention studies. Family Integrated Care (FICare) aims to change existing care practices, so that the key role of parents as active participants is promoted. In the previous studies, parents reported their increased presence enhanced knowledge, confidence, and participation in their infant's care, and they felt a closer relationship with the staff. Nurses reported a closer relationship with parents and improved parent–staff communication and support for parents[9,10]. Even if the goals are the same, there are differences between the Close Collaboration with Parents intervention and FICare intervention. First, our intervention is educational program for staff when FICare is mainly focused providing education for parents. Second, the Close Collaboration with Parents also focuses on negotiating and shared decision-making, which creates a foundation for mutual staff-parent partnership and collaboration. Third, the Close Collaboration with Parents intervention challenges staff members to become aware of their own and unit's current FCC practices and thereby facilitates staff to innovate new FCC practices appropriate and needed in their own context.

Strengths and limitations

The mothers' ratings of FCC were extremely high before the intervention, and a ceiling effect was evident. A ceiling effect has been shown to be problematic in satisfaction surveys when patients choose the most positive answer option [40]. However, only 50% of the mothers who were approached participated in the study in the pre-phase and 55% in the post-phase. It can be that the mothers less satisfied declined to participate. The proportion of participated fathers was even lower, and representativeness of the sample is limitation of this study. Relatively small sample of parents and

nurses may increase the risk for the type II error and limit the generalization of the findings to other units.

The digital data collection tools enabled participants to assess the quality every day or work shift and acknowledge the variation between the study days. The quality of FCC was rated on almost all study days by the parents, which increased the validity of this study. The DigiFCC-P-tool has been used in earlier studies, and it has shown to be sensitive to finding differences between the ratings [26,34] when the baseline scores are at a lower level. However, the lack of psychometrical testing is limitation of the study. Another limitation is, that we did not have a control group. However, there were no major changes in the units between the data collection periods, except those that were triggered because of the intervention [24]. Earlier, we have reported the changes in the units' care culture that were evaluated with the Bliss Baby Charter Audit Tool [24]. Those results are in line with this study and validate the results. One limitation is that this study evaluated the changes only from the nurses' perspectives, even if the Close Collaboration with Parents intervention was implemented in the multidisciplinary NICU team.

Relevance to clinical practice and research This new evidence may increase an understanding of the way how staff could better provide family-centered care. Developing the staff's negotiating and active listening skills facilitated better support for parents during infants' intensive care. Nurses can support partnerships between parents and themselves by getting to know parents and actively providing possibilities for parents to participate in their infants' care. Parent–nurse collaboration particularly seems to promote the fathers' role, which had previously been minor in comparison with the mothers' role. Results suggested that parental involvement in medical rounds needs to be improved, which highlights the need for the involvement of physicians in the implementation of family-centered care interventions. In future, it will be important to study the sustainability of the training as well as the effects of the intervention on family-centered care quality assessed by the parents of extremely preterm infants. In addition, research about the effects of the Close Collaboration with Parents intervention on the short- and long-term outcomes of preterm infants is needed.

CONCLUSIONS

This study shows that our intervention, the Close Collaboration with Parents, developed the essential FCC elements in the NICUs. The intervention developed the staff's capacity for active listening and negotiating with parents. These skills promoted mutual trust between parents and nurses and shared decision-making. In addition, the nurses were better equipped to provide emotional support for parents. After the intervention, the staff acknowledge the fathers more, which have been difficult earlier. When the nurses' role changed from active caretaker to parents' facilitator, they were better able to support and encourage the fathers to participate in their infants' care from the beginning of the admission.

References

1. WHO. Preterm birth. https://www.who.int/news-room/fact-sheets/detail/preterm-birth. Published 2018.
2. Flacking R, Lehtonen L, Thomson G, et al. Closeness and separation in neonatal intensive care. *Acta Paediatr*. 2012;101(10):1032-1037. doi:10.1111/j.1651-2227.2012.02787.x
3. Hearn G, Clarkson G, Day M. The Role of the NICU in Father Involvement, Beliefs, and Confidence: A Follow-up Qualitative Study. *Adv Neonatal Care*. 2020;20(1):80-89. doi:10.1097/ANC.0000000000000665
4. Korja R, Ahlqvist-Björkroth S, Savonlahti E, et al. Relations between maternal attachment representations and the quality of mother-infant interaction in preterm and full-term infants. *Infant Behav Dev*. 2010;33(3):330-336. doi:10.1016/j.infbeh.2010.03.010
5. Gibbs D, Boshoff K, Stanley M. Becoming the parent of a preterm infant: A meta-ethnographic synthesis. *Br J Occup Ther*. 2015;78(8):475-487. doi:10.1177/0308022615586799
6. Fernández Medina IM, Granero-Molina J, Fernández-Sola C, Hernández-Padilla JM, Camacho Ávila M, López Rodríguez M del M. Bonding in neonatal intensive care units: Experiences of extremely preterm infants' mothers. *Women and Birth*. 2018;31(4):325-330. doi:10.1016/j.wombi.2017.11.008
7. Raiskila S, Axelin A, Rapeli S, Vasko I, Lehtonen L. Trends in care practices reflecting parental involvement in neonatal care. *Early Hum Dev*. 2014;90(12):863-867. doi:10.1016/j.earlhumdev.2014.08.010
8. Lester BM, Salisbury AL, Hawes K, et al. 18-Month Follow-Up of Infants Cared for in a

Single-Family Room Neonatal Intensive Care Unit. *J Pediatr*. 2016;177:84-89. doi:10.1016/j.jpeds.2016.06.069

9. O'Brien K, Robson K, Bracht M, et al. Effectiveness of Family Integrated Care in neonatal intensive care units on infant and parent outcomes: a multicentre, multinational, cluster-randomised controlled trial. *Lancet Child Adolesc Heal*. 2018;2(4):245-254. doi:10.1016/S2352-4642(18)30039-7

10. O'Brien K, Bracht M, Robson K, et al. Evaluation of the Family Integrated Care model of neonatal intensive care: A cluster randomized controlled trial in Canada and Australia. *BMC Pediatr*. 2015;15(1). doi:10.1186/s12887-015-0527-0

11. Gooding JS, Cooper LG, Blaine AI, Franck LS, Howse JL, Berns SD. Family Support and Family-Centered Care in the Neonatal Intensive Care Unit: Origins, Advances, Impact. *Semin Perinatol*. 2011;35(1):20-28. doi:10.1053/j.semperi.2010.10.004

12. Mikkelsen G, Frederiksen K. Family-centred care of children in hospital - a concept analysis. *J Adv Nurs*. 2011;67(5):1152-1162. doi:10.1111/j.1365-2648.2010.05574.x

13. Ramezani T, Hadian Shirazi Z, Sabet Sarvestani R, Moattari M. Family-centered care in neonatal intensive care unit: a concept analysis. *Int J community based Nurs midwifery*. 2014;2(4):268-278. http://www.ncbi.nlm.nih.gov/pubmed/25349870. Accessed May 14, 2020.

14. Russell G, Sawyer A, Rabe H, et al. Parents' views on care of their very premature babies in neonatal intensive care units: a qualitative study. *BMC Pediatr*. 2014;14(1):230. doi:10.1186/1471-2431-14-230

15. Skene C, Gerrish K, Price F, Pilling E, Bayliss P, Gillespie S. Developing family-centred care in a neonatal intensive care unit: An action research study. *Intensive Crit Care Nurs*. 2019;50:54-62. doi:10.1016/j.iccn.2018.05.006

16. Fegran L, Fagermoen MS, Helseth S. Development of parent-nurse relationships in neonatal intensive care units - from closeness to detachment. *J Adv Nurs*. 2008;64(4):363-371. doi:10.1111/j.1365-2648.2008.04777.x

17. Brødsgaard A, Pedersen JT, Larsen P, Weis J. Parents' and nurses' experiences of partnership in neonatal intensive care units: A qualitative review and meta-synthesis. *J Clin Nurs*. 2019;28(17-18):3117-3139. doi:10.1111/jocn.14920

18. Jones L, Taylor T, Watson B, Fenwick J, Dordic T. Negotiating Care in the Special Care Nursery: Parents' and Nurses' Perceptions of Nurse-Parent Communication. *J Pediatr Nurs*. 2015;30(6):e71-80. doi:10.1016/j.pedn.2015.03.006

19. Amorim M, Alves E, Kelly-Irving M, Silva S. Needs of parents of very preterm infants in Neonatal Intensive Care Units: A mixed methods study. *Intensive Crit Care Nurs*. 2019;54:88-95. doi:10.1016/j.iccn.2019.05.003

20. Serlachius A, Hames J, Juth V, Garton D, Rowley S, Petrie KJ. Parental experiences of family-centred care from admission to discharge in the neonatal intensive care unit. *J Paediatr Child Health*. June 2018. doi:10.1111/jpc.14063

21. Benzies KM, Shah V, Aziz K, Lodha A, Misfeldt R. The health care system is making 'too much noise' to provide family-centred care in neonatal intensive care units: Perspectives of health care providers and hospital administrators. *Intensive Crit care Nurs*. 2019;50:44-53. doi:10.1016/j.iccn.2018.05.001

22. Ahlqvist-Björkroth S, Boukydis Z, Axelin AM, Lehtonen L. Close Collaboration with Parents™ intervention to improve parents' psychological well-being and child development:

Description of the intervention and study protocol. *Behav Brain Res*. 2017;325(Pt B):303-310. doi:10.1016/j.bbr.2016.10.020

23. Toivonen M, Lehtonen L, Ahlqvist-Björkroth S, Axelin A. Key factors supporting implementation of a training program for neonatal family- centered care - A qualitative study. *BMC Health Serv Res*. 2019;19(1). doi:10.1186/s12913-019-4256-1

24. Toivonen M, Lehtonen L, Löyttyniemi E, Ahlqvist-Björkroth S, Axelin A. Close Collaboration with Parents intervention improves family-centered care in different neonatal unit contexts: a pre–post study. *Pediatr Res*. May 2020. doi:10.1038/s41390-020-0934-2

25. Axelin A, Raiskila S, Lehtonen L. The Development of Data Collection Tools to Measure Parent–Infant Closeness and Family-Centered Care in NICUs. *Worldviews Evidence-Based Nurs*. 2020;17(6):448-456. doi:10.1111/wvn.12475

26. Raiskila S, Lehtonen L, Silnes Tandberg B, et al. "Parent and nurse perceptions on the quality of family-centered care in 11 European NICUs" [Aust. Crit. Care 29 (4) (2016) 201–209]. *Aust Crit Care*. 2016;30(1):53-54. doi:10.1016/j.aucc.2016.12.002

27. He FB, Axelin A, Ahlqvist-Björkroth S, Raiskila S, Löyttyniemi E, Lehtonen L. Effectiveness of the Close Collaboration with Parents intervention on parent-infant closeness in NICU. *BMC Pediatr*. 2021;21(1). doi:10.1186/s12887-020-02474-2

28. Sisson H, Jones C, Williams R, Lachanudis L. Metaethnographic Synthesis of Fathers' Experiences of the Neonatal Intensive Care Unit Environment During Hospitalization of Their Premature Infants. *JOGNN - J Obstet Gynecol Neonatal Nurs*. 2015;44(4):471-480. doi:10.1111/1552-6909.12662

29. Guillaume S, Michelin N, Amrani E, et al. Parents' expectations of staff in the early bonding process with their premature babies in the intensive care setting: a qualitative multicenter study with 60 parents. *BMC Pediatr*. 2013;13:18. doi:10.1186/1471-2431-13-18

30. Provenzi L, Santoro E. The lived experience of fathers of preterm infants in the Neonatal Intensive Care Unit: a systematic review of qualitative studies. *J Clin Nurs*. 2015;24(13-14):1784-1794. doi:10.1111/jocn.12828

31. Axelin A, Ahlqvist-Björkroth S, Kauppila W, Boukydis Z, Lehtonen L. Nurses' Perspectives on the Close Collaboration with Parents Training Program in the NICU. *MCN, Am J Matern Nurs*. 2014;39(4):260-268. doi:10.1097/NMC.0000000000000061

32. Berman L, Raval M V., Ottosen M, Mackow AK, Cho M, Goldin AB. Parent Perspectives on Readiness for Discharge Home after Neonatal Intensive Care Unit Admission. *J Pediatr*. 2019;205:98-104.e4. doi:10.1016/j.jpeds.2018.08.086

33. Finlayson K, Dixon A, Smith C, Dykes F, Flacking R. Mothers' perceptions of family centred care in neonatal intensive care units. *Sex Reprod Healthc*. 2014;5(3):119-124. doi:10.1016/j.srhc.2014.06.003

34. Aija A, Toome L, Axelin A, Raiskila S, Lehtonen L. Parents' presence and participation in medical rounds in 11 European neonatal units. *Early Hum Dev*. 2019;130:10-16. doi:10.1016/j.earlhumdev.2019.01.003

35. Axelin A, Outinen J, Lainema K, Lehtonen L, Franck LS. Neonatologists can impede or support parents' participation in decision-making during medical rounds in neonatal intensive care units. *Acta Paediatr*. 2018;107(12):2100-2108. doi:10.1111/apa.14386

36. Wigert H, Dellenmark Blom M, Bry K. Parents' experiences of communication with neonatal intensive-care unit staff: an interview study. *BMC Pediatr*. 2014;14(1):304.

doi:10.1186/s12887-014-0304-5

37. Franck LS, Axelin A. Differences in parents', nurses' and physicians' views of NICU parent support. *Acta Paediatr*. 2013;102(6):590-596. doi:10.1111/apa.12227

38. Twohig A, Reulbach U, Figuerdo R, Mccarthy A, Mcnicholas F, Molloy EJ. Supporting preterm infant attachment and socioemotional development in the neonatal intensive care unit: Staff perceptions. *Infant Ment Health J*. 2016;37(2):160-171. doi:10.1002/imhj.21556

39. Fegran L, Helseth S. The parent-nurse relationship in the neonatal intensive care unit context - closeness and emotional involvement. *Scand J Caring Sci*. 2009;23(4):667-673. doi:10.1111/j.1471-6712.2008.00659.x

40. Masino C, Lam TCM. Choice of rating scale labels: Implication for minimizing patient satisfaction response ceiling effect in telemedicine surveys. *Telemed e-Health*. 2014;20(12):1150-1155. doi:10.1089/tmj.2013.0350