CrossMark

Effects of single-family rooms on nurse-parent and nurse-infant interaction in neonatal intensive care unit

Mirka Toivonen [a,*], Liisa Lehtonen [b,c], Eliisa Löyttyniemi [d], Anna Axelin [a]

[a] University of Turku, Department of Nursing Science, Finland
[b] University of Turku, Faculty of Medicine, Finland
[c] Hospital District of Southwest Finland, Department of Pediatrics, Turku University Hospital, Finland
[d] University of Turku, Department of Biostatistics, Finland

ABSTRACT

Background: Single-family rooms in neonatal intensive care unit can provide longer interaction between family and staff. On the other hand, separation in private rooms has been shown detrimental to child development if parents are not present.
Aims: To examine the effects of single-family rooms on nurse–family, nurse–parent and nurse–infant interaction time in neonatal intensive care unit.
Study design: A quantitative, comparative, observational study was conducted before and after a move to a neonatal intensive care unit with single-family rooms. A total of 194 observation hours were conducted before the move and 194 h after the move. The differences were analyzed using a hierarchical linear mixed model.
Subjects: Nurses working in one neonatal intensive care unit were recruited to study.
Outcome measures: The duration and number of nurse-parent and nurse-infant interaction episodes were recorded.
Results: The nurse–family and the nurse–parent interaction were longer in the unit with single-family rooms compared with the unit before the move (mean 261 vs. 138 min per shift, p < 0.0001 and 117 vs. 35, p = 0.001, respectively). The duration of the nurse–infant interaction did not change after the move. The frequency of the nurse–parent or the nurse–infant interactions did not change between the time periods.
Conclusions: Neonatal intensive care unit with single-family rooms supported an increase in nurse–parent interaction time. Importantly, nurse–infant interaction time did not decrease.

© 2017 Elsevier B.V. All rights reserved.

1. Introduction

New unit architecture is emerging with single-family room neonatal intensive care units (NICUs) supporting parent–infant closeness in neonatal care [1]. Open-bay units with limited privacy and space have been seen as a challenge from the perspective of family centered care [2].

With increasing parental presence and participation in the hospital care of their infants, parents learn to know their infants and develop confidence in care, making transition to home smooth. It is essential for parents to get enough support from staff in the early phases of care to gain required competence in infant care [3,4].

Better medical and neurobehavioral child outcomes have been reported in single-family room units compared to open-bay units [5,6,7]. On the other hand, separation in private rooms has been shown detrimental to child development if parents are not present [8].

As traditional hospital architecture with limited privacy set challenges to nurse–parent interaction [2], there is little information addressing how new architecture may improve the situation. It may be that staff interacts with parents differently in single-family room architecture. It has been reported that nurses regard the quality of nurse–parent interaction as better in a single-family room unit compared to traditional open-bay NICU [9]. There is one study [10] reporting preliminary results that family interactions with staff might be longer in a single-family room unit compared to an open-bay unit. Information on how much staff spend time interacting with families in single-family rooms is sparsely available.

We performed an observational study to examine the effects of single-family room architecture on the duration and number of nurse–

* Corresponding author at: Department of Nursing Science, FI-20014, University of Turku, Finland.
  E-mail address: mijotoi@utu.fi (M. Toivonen).

parent and nurse–infant interaction in one neonatal intensive care unit before and after a move to a new unit with single-family rooms.

2. Methods

2.1. Setting

This study was conducted in one level III NICU in Southern Finland which moved from a traditional NICU architecture to a NICU with single-family rooms. Before the move, the unit did not have facilities for parents to stay overnight and the rooms had limited privacy. However, the unit did not have any limitations for parental presence. There were seven patient rooms (from 14 to 43 m^2) that had two to four beds each, and there was one room for overnight stay without a central patient monitoring system, which was used for pre-discharge overnight stay.

After the move, the single-family rooms had a permanent adult bed for a parent and another bed was provided if two parents stayed overnight. Half of the rooms had a private bathroom and a shower for parents and half of the rooms had an access to those on the corridor. In addition, there was a policy to keep the doors of the single-family rooms closed and the staff knocked upon the door when entering. There was no direct visual access in to the rooms because there was a curtain on the window of the door. All levels of intensive care were provided in the single-family rooms. The unit had altogether 10 single-family rooms with an average size of 20 m^2 with facilities for two patients in each room to allow twins to be in the same room. In case of a high patient load, the rooms were occasionally shared by two families providing the opportunity to stay overnight for one parent for each infant. In addition, the new unit included three traditional rooms with two infant beds in two of the rooms (31 m^2) and four infant beds in one room (63 m^2). The traditional rooms did not have permanent adult beds.

The unit has staffing for 18 infants but 28 fully equipped places to locate patients both before and after the move. The average amount of patients in the unit was 17.

The nursing staff of the unit included 46 clinical nurses and one administrative head nurse before the move. After the move, the nursing staff included 51 clinical nurses and one head nurse. The number of admissions and care days were 53 and 562 per month, respectively, during the observation period before the move and 40 and 460, respectively, after the move.

The study protocol was approved by the Joint Commission on Ethics of the Hospital District and the university hospital as a part of a larger study (16/180/2011). 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. Informed written consent was obtained from each participant.

Even though the nurses were the participants in this study, the parents were also informed about the study and they were asked for oral permission for observations in the patient room. The observations on nurse–parent interaction were done outside the patient room, through the window, if there were any sensitive or difficult situations in infant care like deterioration in infant's condition.

2.2. Participants

Twenty nurses (registered nurses, midwives and a practical nurse) were recruited with purposive sampling. One nurse was unavailable to participate after the move and another nurse with a corresponding age and work experience was recruited as an additional participant. Participants had to belong to the nursing staff of the unit and they had received special training in the family centered care approach (the Close Collaboration with Parent) [11], that was provided for the staff from 2009 to 2012. In the training, staff was educated to observe infant behavior together with parents and to integrate parents and information from infant behavior in the decision making about infant's care. Thirty-one nurses finished the training before the move.

2.3. Data collection

The observation period before the move was carried out between December 2013 and March 2014 just before the move to the single-family room architecture (moving date April 1, 2014). After a six-month adjustment period in the single-family room architecture, the post-move observation was carried out from October 2014 through February 2015. The data were gathered using an electronic observation form, which was developed by authors (MT, AA). The observation form was filled in using laptop, which the observer carried with her. The time that a nurse spent with an infant and/or parents was recorded on the form minute by minute. Nurse–infant interaction was defined as nursing care, care procedures and talking to the infant. Nurse–parent interaction was defined as information giving, talking to the parents and supporting them in the infant care. Nurse–family interaction was defined as the time the nurse interacted in the room either with the infant or the parent. It was not a mere sum of the nurse–infant and the nurse–parent interaction times because the nurse could simultaneously interact with both the infant and the parents.

The observation form was piloted by observing one nurse during her work shift. The pilot observation gave no reasons to modify the observation form so the data were included in the study.

The number of infants in the unit and the number of nurses in the work shift were recorded in every observation shift. In addition, the age and the work experience of the nurses were recorded. The data regarding the infants the nurse took care of were gathered from the patient records. The data included birth weight, gestational age, postnatal age and respiratory support. Respiratory support was defined as a need of mechanical ventilation or continuous positive airway pressure (CPAP).

Each nurse was observed before and after the move by the first author (MT). Five of the observations before the move were performed by another trained researcher (OT). Each observation lasted for the entire work shift (from 7 to 10 h) both before and after the move. The aim was to do equal numbers of observations in morning, evening, and night shift before and after the move.

2.4. Statistical methods

The data is described as medians, lower, and upper quartile (Q1–Q3) and ranges. For all parameters (durations and numbers of the interactions) measured before and after the move, we used a hierarchical linear mixed model including one within-factors (time) and four between-factors (shift [morning/evening/night], the number of infant in the unit, respiratory support, the number of nurses in work shift). Statistical interaction between work shift and time was included to examine whether the mean changes in parameters were different between work shifts. To take into account the effects of work load and nurse resources on the duration and number of interactions the following statistical interactions were examined: statistical interaction between "the number of infant in the unit" and "time" as well as interaction between "respiratory support" and "time" and "the number of nurses in work shift" and "time". However, they were removed from the final model due to non-significant results for every parameter. Compound symmetry covariance structure was used. From the statistical model marginal means and 95% confidence intervals (CI) are reported.

The duration of a single interaction episode before and after the move were tested with Mann Whitney's U test. The data was analyzed statistically using SPSS 22.0 (Statistical Package for the Social Sciences) program, considering p-values < 0.05 (two-tailed) as statistically significant.

3. Results

Forty-six work shifts and 20 nurses were observed in the study. Three of the nurses were observed twice before the move and twice