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Trends in care practices reflecting parental involvement in neonatal care

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ABSTRACT

Background: Everyday care practices can facilitate or hinder parents' participation and involvement in neonatal care.
Aims: To evaluate trends in family-centered care practices in the Neonatal Intensive Care unit in Turku University Hospital.
Study design and subjects: In this retrospective study, the patient charts of very preterm infants were reviewed in 4 cohorts: 2001 to 2002 (n = 72), 2006 to 2007 (n = 69), 2009 to 2010 (n = 76), and 2011 to 2012 (n = 78).
Outcome measures: Care practices with parental involvement were evaluated: 1) thermoregulation; 2) nutrition and feeding; 3) the beginning and number of skin-to-skin care episodes. As safety measures, the length of stay and weight gain were recorded at discharge.
Results: The significant trends included: a decrease in gestational age at the end of incubator care (mean 33.4 [standard deviation (SD) 1.36] to 31.6 [SD 1.1], $p < 0.001$) and at the beginning of breast-feeding (35.3 [SD 1.34] to 33.1 [SD 1.89], $p < 0.001$), bottle feeding (from 34.1 [SD 1.04] to 33.3 [SD 1.51], $p = 0.003$) and skin-to-skin care (from 32.8 [SD 1.99] to 29.9 [SD 2.34], $p < 0.001$). The changes were most remarkable in the infants below 28 weeks. In addition, weight gain increased from 110 g to 159 g per week ($p < 0.001$).
Conclusions: The hospital care practices of very preterm infants developed during the study period support parental involvement. During the same time period, the weight gain of very preterm infants improved, significantly. These practices can serve as indicators of progressive trends in family centered care.

1. Introduction

During the last decades, neonatal care has become more family centered so that the focus has broadened from disease-centered care to embrace the infant in the context of his/her family and community [1]. Today, family-centered care (FCC) is regarded as the standard neonatal care. Intensive care exposes very low birth weight (VLBW) infants and their parents to stressful situations and environment. Intensive care usually separates the infant from their parents [2]. Thus, FCC practices are aimed to reduce the stress caused by the intensive care environment and the psychosocial needs of the infants and their families. The FCC involves parents in infant care and in care-related decision-making and supports collaborative care between parents and staff. Parents are central in providing optimal emotional, social, and physical environment for the child development during hospital care and later at home.

The FCC has several favorable effects on both infants and their parents [1,2]. The FCC decreases parents' anxiety and depression, increases parenting competency, and supports the development of early interaction [1,3]. Parent–infant closeness and parent support have positive effects on the neurobehavioral development of the infant [4–6]. The FCC may be a cost savings instrument to health care systems by shortening hospitalization in preterm infants [7,8].

Our objective was to follow the development of care practices supporting and enabling parent closeness and participation in infant care in a neonatal unit. Care practices were divided into: 1) thermoregulation management, including duration of incubator care and warmer bed care; 2) enteral and oral feeding practices and with a focus on breast-feeding; and 3) parent–infant skin-to-skin care practices.

2. Patients and methods

The study population consisted of very preterm infants who were born at less than 32 gestational weeks or birth weight less than 1500 g in Turku University Hospital. The study cohorts included infants born during the years: 2001–2002 (n = 72), 2006–2007 (n = 69), 2009–2010 (n = 76), and 2011–2012 (n = 78). Infants who died or were transferred to other hospitals were excluded. Patients with incomplete or unavailable documentation were excluded: 2001–2002 (n = 5), 2006–2007 (n = 1), 2009–2010 (n = 5), and 2011–2012 (n = 11). Altogether, 295 patient charts were reviewed.

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Table 1
Characteristics of the preterm infants in 2001–02, 2006–07, 2009–10, and 2011–12.

Background variables	Years 2001–2002 (n = 72)	Years 2006–2007 (n = 69)	Years 2009–2010 (n = 76)	Years 2011–2012 (n = 78)	p-Value
Birth weight (g), mean (SD)	1183 (333)	1349 (369)	1292 (383)	1176 (362)	0.01
Male (%)	31 (43%)	41 (59%)	53 (79%)	43 (55%)	0.012
GA (weeks), mean (SD)	29.4 (2.4)	29.7 (2.1)	29.8 (2.5)	29.0 (2.4)	0.175
<28 weeks (n)	18	14	18	26	
28–31 weeks (n)	46	52	48	46	
≥32 weeks (n)	8	3	10	6	

The study unit is a level III NICU [9] with 18 beds in seven rooms accommodating two to four patients per room. The hospital has an average of 4000 deliveries per year and the catchment area has 7000 deliveries. An average of 600 of them are admitted in the NICU and 50 to 60 of them were VLBW infants. The staff included 45 nurses and 4 neonatologists (situation in 2011). During the study years, parents were entitled to paid parental leaves consisting of maternity leave for 105 weekdays, paternity leave of 18 weekdays, and parental leave (mother or father) of 158 weekdays adding up to 47 weeks.

The FCC care is valued in the unit. In 1986, the SSC care in preterm infants was started. From year 2008, there has been one room for predischarge overnight stays available for families. The unit developed its FCC by a structured training program for the staff (the Close Collaboration with Parents Training Program [10]) from 2009 to 2012 aiming to improve parents' presence and participation in the infant care. Medical treatments developed in the unit according to the accumulating evidence regarding all aspects of neonatal care.

Patient data were retrospectively reviewed from infants' hospital charts. Background data included gestational age (GA) at birth, birth weight, and gender. The parameters were categorized into: 1) thermoregulation i.e. the GA at the end of incubator and warmer bed care; 2) nutrition and feeding, including the proportion of infants getting enteral and parenteral nutrition on the first day of life, the GA at full enteral nutrition (i.e., the last day of intravenous fluids), and the GA at the beginning of bottle and breast-feeding and at full oral feedings (i.e., the last day of nasogastric tube); and 3) parent–infant closeness including the postnatal and gestational age at the beginning of SSC, and the number of SSC episodes during the first four weeks of life. In the unit the criteria allowing SSC included sufficient medical stability and the willingness of the parents to initiate SSC. The safety measures included weight gain from birth to discharge, GA at discharge, and length of hospital stay.

The quality of the hand-written documentation varied. All documents were carefully reviewed as similar information could have been written or entered in different places in the documentation sheets or electronic charting system. Because of filing system, a part of patient charts were microfilmed or scanned which further complicated the data collection. The lowest quality was during the years 2001 to 2002. To assess the proportion of data entry errors and interpretation errors the data for five randomly selected subjects was re-entered by another person. The overall accuracy between the two entries was 71%.

Univariate comparisons between the birth cohorts were made with one way analysis of variance (ANOVA) for continuous variables, and chi-square tests for categorical variables. The associations between the outcome variables and the two birth cohorts were further studied using analysis of covariance controlling for gender and birth weight. In addition, gestational age, subgroup analyses were performed when the difference between the cohorts was significant. Statistical analyses were done using SPSS v. 20.0 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.). p-Values below 0.05 were considered as statistically significant.

The study protocol was approved by the Ethical Committee of the Hospital District of Southwest Finland (16/180/2011).

3. Results

3.1. Patient characteristics

The four study cohorts of preterm infants differed from each other in gender and birth weight but not in GA. Gender and birth weight were adjusted in the analyses. We found no time trends in the background factors (Table 1).

3.2. Thermoregulation

The GA at the end of incubator care decreased during the study period (mean 33.4 (SD 1.36)) in the first cohort vs. 31.6 (SD 1.60) in the last cohort, $p < 0.05$. The GA at the end of warmer bed care decreased from 35.5 (SD 2.30) to 34.0 (SD 1.93), respectively, $p < 0.001$. (Table 2).

3.3. Nutrition

Both parenteral and enteral feeding became significantly more intensive during the first 24 h of life. The infants reached full enteral feeding earlier in the later cohorts compared to the first cohort, but the age at when full oral feedings were reached did not change. Breastfeeding began approximately three weeks earlier while bottle-feeding less than a week earlier in the last cohort compared to the first cohort (Table 3).

The proportion of infants beginning oral feeding on breast increased significantly during the study period. Eleven percent of infants began oral feeding on breast in the first cohort compared to 23% in the last

Table 2
Thermoregulation indicated by the gestational age in weeks at the end of incubator and warmer bed care presented as mean (SD).

	n	Years 2001–2002 (n = 72)	Years 2006–2007 (n = 69)	Years 2009–2010 (n = 76)	Years 2011–2012 (n = 78)	p-Value
Age at the end of incubator care		33.4 (1.36)*	32.3 (1.16)	32.1 (1.60)*	31.6 (1.10)	<0.001
<28 weeks	76	33.3 (1.69)*	31.9 (1.49)	31.5 (1.40)	31.1 (0.99)	<0.001
28–31 weeks	184	33.2 (1.04)*	32.5 (1.01)	32.0 (1.28)	31.8 (1.06)	<0.001
≥32 weeks	20	35.1 (1.08)	34.3 (0.21)	34.7 (1.59)	32.4 (0.10)	0.206
Age at the end of warmer bed care		35.5 (2.30)	34.2 (1.64)	34.3 (2.20)	34.0 (1.93)	<0.001
<28 weeks	76	36.4 (3.12)	34.6 (1.78)	34.7 (2.77)	34.3 (2.83)	0.106
28–31 weeks	165	34.9 (1.65)	34.0 (1.50)	33.7 (1.80)	33.5 (1.16)	0.001
≥32 weeks	23	36.3 (1.20)	36.6 (1.06)	36.1 (1.50)	34.4 (0.60)	0.062

* Indicates a significant difference ($p < 0.05$) between this and the following cohort.