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Healthy late preterm infants and supplementary artificial milk feeds: Effects on breast feeding and associated clinical parameters

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ABSTRACT

Objectives: to compare the influence of supplementary artificial milk feeds on breast feeding and certain clinical parameters among healthy late preterm infants given regular supplementary artificial milk feeds versus being exclusively breast fed from birth.

Design: a comparative study using quantitative methods. Data were collected via a parental diary and medical records.

Methods: parents of 77 late preterm infants (34 5/7–36 6/7 weeks), whose mothers intended to breast feed, completed a diary during the infants' hospital stay.

Findings: infants who received regular supplementary artificial milk feeds experienced a longer delay before initiation of breast feeding, were breast fed less frequently and had longer hospital stays than infants exclusively breast fed from birth. Exclusively breast-fed infants had a greater weight loss than infants with regular artificial milk supplementation. A majority of the mothers (65%) with an infant prescribed artificial milk never expressed their milk and among the mothers who used a breast-pump, milk expression commenced late (10–84 hours after birth). At discharge, all infants were breast fed to some extent, 43% were exclusively breast fed.

Key conclusions: clinical practice and routines influence the initiation of breast feeding among late preterm infants and may act as barriers to the mothers' establishment of exclusive breast feeding.

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Introduction

Infants born between 34 0/7 and 36 6/7 weeks of gestational age (GA) should preferably be referred to as 'late preterm,' rather than as 'near term,' to better convey their vulnerability and need for closer monitoring and follow up (Raju et al., 2006). Late preterm infants (LPIs) are at an increased risk for bradycardia, feeding difficulties, hypoglycaemia, jaundice, respiratory distress, sepsis, temperature instability, and hospital readmission (Engle et al., 2007; Celik et al., 2013). Despite the risks associated with prematurity, these infants are often managed in postnatal units instead of special units with qualified health-care professionals assigned to LPI care during the immediate postpartum recovery

period following birth (Engle et al., 2007; Phillips et al., 2013). A lower breast-feeding prevalence has been reported for LPIs in comparison with term infants (Demirci et al., 2013) and preterm infants born at less than 34 weeks of GA (Jang et al., 2012).

Preterm infants have problems in co-ordinating respiration with sucking and swallowing when they are bottle fed (Gewolb and Vice, 2006). This is the reason for assessing preterm infants' readiness for introduction of oral feeding (Fujinaga et al., 2013). In contrast, the capacity for nutritive sucking at the mother's breast has been observed in preterm and very preterm infants of 28 weeks gestation (Nyqvist et al., 1999). However, there are wide individual variations in nutritive sucking competence that are unrelated to GA at birth or birth weight (Nyqvist et al., 2001). The Academy of Breastfeeding Medicine recommends LPI be breast fed as much as possible and argues the World Health Organization (WHO) Baby Friendly Hospital Initiative with Ten Steps to Successful Breastfeeding (BFHI) also applies to these infants (Academy of Breastfeeding, 2011). An expert group from the Nordic countries

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and Quebec, Canada, has commenced the process of adapting the BFHI program to the special needs of preterm, low-birthweight, and sick infants and their mothers (Nyqvist et al., 2013).

Kangaroo mother care is an important factor to consider when planning the care of LPIs and their mothers. It has been concluded that skin-to-skin care between low-birthweight/preterm infants and their mothers maintains infant body temperature, enhances long-term cognitive development, and facilitates breast feeding and breast milk production (Britton et al., 2007; Nyqvist et al., 2010; Feldman et al., 2014). In addition, skin-to-skin care increases maternal attachment behaviour in the postpartum period and reduces maternal anxiety (Feldman et al., 2014).

The prerequisites for successful breast feeding are optimised when LPIs commence nursing within one hour after birth (Santos et al., 2008), have free access to the breast and, are breast fed at least 8–12 times per day (Britton et al., 2007). However, unless a feeding regimen adapted to the infants' current nutritive sucking capacity is applied (Nyqvist et al., 1999), their immature physiology may decrease feeding efficiency and increase the length of each feed (Santos et al., 2008); thus increasing the risk of malnutrition (Walker, 2008) and negatively affecting breast-feeding duration (Donath and Amir, 2008).

Among breast-fed infants, LPIs are more likely to require hospital-related care and readmission to hospital than term infants do. However, a comparison of readmission rates between LPIs and term infants who were not breast fed found no difference (Tomashek et al., 2006). This highlights the need for guidelines to promote, support, and sustain breast feeding with particular attention to late preterm infants' special vulnerabilities.

The objective of this study was to compare the influence of supplementary artificial milk feeds on breast feeding and certain clinical parameters among healthy LPIs given regular supplementary artificial milk feeds with LPIs exclusively breast fed from birth.

More specifically, were there any differences between the groups with regard to

- The mothers' patterns of breast feeding and milk expression, and use of nipple shield?
- The infants' age at the first breast feeding occasion?
- The infants' weight loss and age at commencement of weight gain after birth?
- Incidence of hypoglycaemia and neonatal jaundice requiring phototherapy?
- Duration of hospital stay?
- Exclusive breast feeding at discharge?
- Readmission to hospital after discharge?

Methods

Study design

The study was prospective, with a quantitative and comparative design.

Study setting

The study was performed at Uppsala University Hospital, Sweden, in which approximately 4200 infants are born each year. The hospital has two postnatal wards, where all mothers and fathers/partners are offered rooming in during their infants' entire hospital stay, and a neonatal intensive care unit (NICU). At the time of the study, healthy LPIs born at a GA of ≥ 35 0/7 weeks were routinely cared for at the postnatal wards. There was no separate transitional care area for LPIs at the wards. The mothers

stayed with their infants in hospital until their babies were discharged, and the majority of fathers/partners stayed together with the mother and the new-born baby in family rooms during the period of postnatal care. Siblings had free visiting hours but were not allowed to stay overnight. The midwifery care was provided by a midwife working with an assistant nurse and neonatologists directed the infants' medical care plan. Mothers intending to breast feed were offered individualised support to facilitate the establishment of lactation and exclusive breast feeding as soon as possible. To enable a first breast feed as soon as possible after birth all infants were placed skin-to-skin on their mother immediately after birth. In the wards, skin-to-skin contact between the infant and the mother/father was recommended.

Feeding policy

The postnatal feeding policy prescribed artificial milk supplementation for LPIs fully artificial milk fed according to the following schedule: postnatal day 0: a total daily volume of 70–80 ml/kg a day; day 1: 80–90 ml; day 2: 90–100 ml; and, day 3: 100–110 ml and so on up to 160–170 ml/kg a day. There was a milk bank at the study hospital, but donor breast milk was reserved for infants at the NICU and not available for infants at the postnatal wards because of a limited supply. The artificial milk supplementation of LPIs born at a GA < 36 0/7 weeks commenced within one to two hours after birth, whereas supplementation with artificial milk to infants born ≥ 36 0/7 was based on assessment of the infant's competence to suck and signs of hypoglycaemia. The artificial milk feeds were initially given every two/three hours and then gradually reduced until breast feeding was established. Blood glucose levels were monitored every two hours, from approximately three hours of age, during the first 24 hours after birth. The total daily volume of artificial milk supplementation was reduced individually, based on the infant's progress in milk intake, assessed by observations of active suckling behaviour, audible swallowing, and signs of fresh milk in the infant's mouth, ability to maintain blood glucose levels, and by daily assessment of the infant's weight.

The wards had no written guidelines regarding routinely prescribed artificial milk supplementation following weight loss. Test-weighing before and after breast feeding was used when mothers wanted. Infants were fed by cup, if breast feeding, to comply with the International Code of Marketing of Breast Milk Substitutes in order to reduce incorrect latching, superficial suckling at the breast (Geddes et al., 2013) and transition difficulties from bottle to breast (Naylor, 2001).

Sample

The study consists of a consecutive sample of LPIs cared for in family rooms. Inclusion criteria were mothers to LPIs who intended to breast feed, whereas twins and infants whose mother chose not to breast feed were excluded. An overview of the potential participants and study participants included is presented in Fig. 1.

During the data collection period, between 15 November 2010 and 30 November 2011, 77 (71%) mothers completed the study. Fifty infants were born at a GA between 36 0/7 and 36 6/7 weeks and 26 infants were born between 35 0/7 and 35 6/7 weeks. One infant was born at 34 5/7 weeks.

Data collection

Data were collected via a parental diary. The diary consisted of one chart for each day with a time-line (hours and minutes) and columns with fixed options regarding breast feeding, supplementary feeds,

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