

Principles to promote the initiation and establishment of lactation in the mother of a preterm or sick infant

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Background

There is increasing recognition that the needs of the mother and baby in relation to breastfeeding when the birth occurs before term may differ from those when birth occurs at term. Whilst experience in this area is accumulating, a body of published evidence is slower to be established. In the light of this, the Designation Committee which oversees the Baby Friendly Initiative invited Liz Jones, acknowledged to be one of the key experts in this field, to share her insights in relation to both published and unpublished evidence about effective care for this group of mothers and babies. This document is the result. A further paper about the issue of non-nutritive sucking will follow.

At this present time (September 2008), the guidance within this document represents **recommendations** for practice rather than requirements to be met in order to achieve Baby Friendly accreditation, however should the body of evidence in support of these recommendations increase, then it is possible that these recommendations will become requirements for successful achievement of a Baby Friendly award. Should such a change be deemed necessary, all neonatal and maternity units would be given sufficient notice to enable them to implement the necessary changes in practice.

Introduction

As survival rates for extremely low birth weight infants improve, attention is being focused on the quality of survival through nutritional management, and mothers are increasingly being encouraged to provide breastmilk in order to reduce the incidence of necrotising enterocolitis, one of the most critical complications¹. However, it is widely acknowledged that mothers of preterm infants experience both physiological and emotional challenges that adversely affect breastfeeding rates for this population². It is the common experience of many units that mothers are unable to produce enough milk to meet the nutritional requirements of their premature infants. Milk production does not match milk demand. Therefore, the aim of this document is provide guidance to help health-care providers to facilitate and support the establishment of breastfeeding following preterm delivery, since the principles of lactation support that apply to the term infant may not necessarily apply to the mother of a preterm infant.

Health benefits of breastmilk for preterm infants

Short-term and long-term benefits associated with feeding breastmilk to preterm infants include:

- Reduced incidence of infections³
- Reduced incidence of necrotising enterocolitis¹
- Improved feeding tolerance⁴
- Enhanced neurodevelopment⁵
- Enhanced maternal self-esteem and maternal role attainment^{6,7}

Challenges

- A time commitment from the mother and health-care professionals is required.
- Breastmilk does not always provide enough calories, protein and minerals for optimal growth and nutrition of those preterm infants whose birth weight is under 1500g, therefore supplementation with Human Milk Fortifier may be considered for this sub-population of preterm infants⁸.
- Stress and anxiety may inhibit milk ejection, affecting both immediate milk yield and subsequent milk production⁹.
- Mammary growth may be incomplete in a substantially shortened pregnancy and poor placental function with low levels of human placental lactogen may further exacerbate this problem¹⁰.
- The mammary epithelium may not be sufficiently prepared by the hormones of pregnancy to respond with efficient milk synthesis¹⁰.

Incidence and prevalence of breastfeeding in the preterm population

Little data exists on breastfeeding rates for mothers of preterm infants. There is no outcome data available for the United Kingdom, but in the United States it is estimated that only 10 to 37 per cent of mothers breastfeed their preterm infants¹¹, with only 50 per cent of the women who initiate lactation with infants admitted to a Neonatal Intensive Care Unit being able to sustain lactation until their infant is discharged¹². This evidence strongly suggests that early cessation of breastfeeding in preterm infants is even greater than that for term infants.

Informing the family

Families need to be involved in decisions regarding feeding of their infant. It is extremely helpful if the discussion can take place prior to delivery, when the mother's attention is not compromised by the condition of her infant. The following information should be provided so parents can make informed choices regarding the development of a feeding plan:

- The benefits of breastmilk for preterm infants;
- The importance of establishing a frequent and effective milk expression regime in the immediate postpartum period in order to initiate and maintain a milk supply;
- Feeding options (from pumping only to establishing breastfeeding);
- Breastfeeding support services.

It is also extremely important that a cohesive lactation support system is in place to assist a mother to express her milk following delivery, and to transport it to the Neonatal Unit.

Professional knowledge and skills

All health-care professionals assisting in the care of a mother of a preterm infant require knowledge and skills in the following areas:

- The benefits of breastmilk for preterm infants;
- Issues related to breastfeeding the healthy term infant and breastfeeding the preterm infant;
- The principles and management of milk expression following preterm delivery;
- The collection, handling and storage of human milk;
- Developmentally supportive care;
- Relactation (where the need arises)*;
- Counselling skills to support parents' decisions.

** Relactation refers to the re-stimulation of lactation in a mother who wishes to breastfeed again after her lactation has ceased.*

Immediate postpartum period – the importance of early, frequent and effective expression

The single most important determinant of the exclusivity and duration of breastfeeding is the volume of milk produced by 1-2 weeks, when volume typically plateaus¹³. **Early, frequent and effective** milk expression appears to be the most important factor in establishing lactation and has been consistently correlated with a greater milk production^{14,15,16}. Since it is unclear whether all mothers who deliver prematurely have the potential to produce a full milk supply, it should be noted that there may be a significant delay in the onset of lactogenesis II^{10,19}.

Early

Mothers should be encouraged to begin expressing as soon as possible after the birth of their infant, ideally within the first six hours¹⁷. Mothers should be given realistic expectations regarding the initial milk volume because the amount produced can be as little as a few drops of colostrum at each milk expression in the first 24–48 hours postpartum².

Frequent

Few empirical data are available to provide guidance for the frequency of milk expression in the immediate postpartum period. One study showed that mothers of very low birth weight (VLBW) infants who produce adequate milk volumes at five weeks postpartum, pump at least 45 times per week (more than six times a day)¹⁸. Extensive clinical experience, however, strongly suggests that mothers should be encouraged to express 8–10 times in 24 hours, allowing no more than a six-hour gap overnight. Longer periods between expressing sessions have been linked to the down regulation of milk

synthesis in some mothers as a result of build-up of the feedback inhibitor of lactation (FIL)²⁰. Adopting a frequent milk expression regime will also support the continued growth of secretory tissue in the maternal breast, which may facilitate compensatory mammary growth in a mother who has experienced a shortened pregnancy¹⁰. The goal is to mimic the optimal breastfeeding stimulation provided by a healthy term infant.

Effective

In addition to frequent expression the breasts should be drained as effectively as possible, since this is essential to increase the rate of milk synthesis^{20,21}. The goal is to establish a milk supply of **at least 750–900 millilitres per day (ml/d) by day 10**, since most preterm infants will require this amount on discharge from hospital. Milk production of less than 350 ml/d requires prompt attention^{22,23}. Once a mother's milk production is adequate, it may be possible to reduce the frequency of milk expression but still maintain her supply^{20,21}. Recent research indicates that the storage capacity of a mother's breast is a critical factor in determining the frequency of milk expression. Longer time periods between expressions are possible for women with a larger storage capacity before their breasts become full and production starts to decrease. Women with smaller storage capacities need to drain their breasts more frequently to maintain lactation. A calculation of the rate of milk production (ml/hour) for a range of intervals between breast expression sessions should form the basis of advice for individual mothers. This is an invaluable strategy for mothers dependent on milk expression for a long period of time²⁴.

Calculating milk synthesis over a 24-hour period provides a picture of the mother's overall synthesis rate. The 24-hour rate can be calculated by:

dividing **the volume obtained** by the **number of hours since the last milk expression**

For example, where a mother expresses 90ml three hours after she previously expressed:

90ml ÷ 3 = 30ml per hour 30ml x 24 = a total in 24 hours of **720mls**

Practical measures to maximise milk production

Early non-pharmacological measures to stimulate milk production include:

- Expressing milk in close proximity to the infant²²
- Skin-to-skin care^{25,26}
- Non-nutritive suckling at the breast²

In many units skin-to-skin care in the VLBW infant is practised when the infant is stable on the ventilator^{27,2}. Non-nutritive suckling can be accomplished while an infant is on nasal CPAP. These measures help to trigger the milk ejection reflex, which may be inhibited by anxiety and stress. When this reflex is inhibited, the average milk yield at that expression is less than 4 per cent of the available milk, and local feedback mechanisms (i.e. FIL) result in a subsequent inhibition in milk secretion^{28,29,30}. Fat-rich milk, available as the breast is drained of milk, contributes to the caloric and lipoprotein

composition of the feed and can not be obtained effectively without triggering the milk ejection reflex.

Breast and nipple massage is another extremely effective way to trigger milk ejection³¹. Breast massage also represents a form of positive pressure which adds to the pressure created within the ducts during milk ejection. A breast pump needs to remove milk quickly before the amount of milk in the ducts decreases and another ejection is required to re-establish the pressure gradient between breast and pump. A recent study³² suggests that combining breast expression and massage with electric pumping may increase milk output. Mothers pumped while applying manual pressure over areas of firmness in the breast. Without increasing frequency or duration of pumping, milk output increased over several weeks from an average of 591 ml/day to a post-instruction output of 862 ml/day.

Ensuring effective milk expression

Hand expression is an essential skill for all mothers and makes the collection of colostrum easier; it should therefore be taught in the first instance. However, for the majority of mothers, ongoing expressing with a hospital-grade electric pump will enable optimum milk removal once the volume of milk begins to increase. **Double pumping**, i.e. expressing simultaneously from both breasts, cuts milk expression time in half and increases prolactin levels and milk volume^{31,33,34}. Double pump kits should therefore be available to mothers during their hospital stay and at discharge.

Negative pressure – a function of the volume of air in the pump accessory kit – increases as the bottle fills with milk. When double pump sets are used, the potential for very low negative pressure exists when the containers are empty. A recent study has shown that milk yield and milk flow rate increase with the use of the mother's maximum comfortable vacuum³⁴. Therefore, the vacuum may need to be turned down as the bottle fills. It is also important not to force the rim of the breast shield onto the breast; light pressure is required to obtain a seal – firm pressure will inhibit milk flow as the ducts are easily compressed. The diameter of the aperture of the milk expression shield can also affect milk output, because shields that are too small compress the milk ducts, inhibiting milk flow. An undersized shield can also cause sore nipples during milk expression, so a variety of sizes should be available. The most appropriate size is usually determined by comfort. Shield size can change during the course of a lactation, since mothers often need a smaller size once lactation is well established.

Pharmacological measures to increase milk supply

When a mother has a failing milk supply despite frequent milk expression, the pharmacological enhancement of prolactin secretion may have some value. Domperidone may increase milk supply in the short term^{35,37}. However, until recently dose-effect data was not available and the safety of domperidone use in both the mother and infant has been questioned. A recent study³⁶ has been undertaken to investigate the possibility of a dose-response relationship for the use of domperidone in treating insufficient milk in the mothers of preterm infants and to quantify the exposure of the breastfed infant to domperidone. Six mothers of preterm babies received

domperidone (30 mg daily or 60 mg daily) in a double-blind, randomised, crossover trial. Milk production and serum prolactin were measured before and during the trial, and domperidone concentration in milk was measured during drug treatment. In one third of the mothers, domperidone did not increase milk production. In the remainder, milk production increased at both domperidone doses, and there was a trend for a dose-response relationship. The amount of domperidone that transfers into milk was extremely low, and infant exposure via breastfeeding was not considered to be significant.

Conclusion

Although there are occasional medical contraindications to the use of a mother's own breastmilk, the most likely reason that breastmilk is not given to VLBW infants is the lack of availability. Therefore, since a mother's successful commitment to supplying her milk is likely to have a significant medical benefit for her VLBW infant in both the short and long-term, mothers of premature infants should be directed and supported as much as possible to ensure that their milk is available for their baby.

Best practice recommendations

Establishing lactation:

- Express early – initiate milk expression as soon as possible in the immediate postpartum period.
- Establish a frequent milk expression schedule, 8-10 times in 24 hours, with no gaps greater than 6 hours, as a matter of urgency.
- Utilise non-pharmacological means to optimise early milk production: breast massage, hand expression, and skin-to-skin contact.
- A low milk supply at day 10 requires prompt attention.

Setting the stage for lactation support

- Obstetric and neonatologists should actively advocate breastmilk/breastfeeding when speaking to mothers prior to infant delivery.
- Labour ward and neonatal staff should allow as much maternal contact with the infant before transfer to the NICU as the infant's medical condition allows.
- Postpartum and NICU policies and practice should support breastfeeding in a cohesive and consistent manner.
- Every mother of an infant admitted to the NICU should be provided with access to an appropriate breast pump and the support to use it effectively.
- Specific lactation assistance should be available to mothers of NICU patients.
- All health-care professionals involved in a preterm infant's care should advocate breastfeeding.
- All health-care professionals involved in a preterm infant's care should have the knowledge, skills and attitudes necessary to successfully support the provision of breastmilk to the VLBW infant.

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