ORIGINAL ARTICLE

Improving expressed breast milk (EBM) provision in the neonatal unit: A rapid and effective quality improvement (QI) intervention

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Abstract
Breast milk is associated with a range of benefits in babies who are born preterm and/or sick. However, not all women may choose to initiate expression, and of those that do continued provision of breast milk may be challenging because of associated maternal anxiety and practical difficulties with expression. We aimed to improve both our initiation rates and the numbers still expressing at day 14 (D14) and discharge from the neonatal unit. A quality improvement (QI) program was designed and led by a single member of nursing staff. This identified potentially remediable factors and sought to improve them. Initiation rates increased from 76% to 90% and were maintained for the following 12 month period. D14 rates increased from ~45% to ~90% (of those initiating) and discharge rates from 30% to 54%. A QI program can result in dramatic improvements in provision of breast milk within a relatively short period and is likely to be associated with a range of improved baby, maternal and health care benefits.

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Introduction

Whilst it is widely agreed that human milk is the best form of nutrition for babies, the decision to breast-feed is a matter of individual maternal choice. National data on breast feeding rates in individual neonatal intensive care units (NICUs) is limited and not well validated, but background rates in the UK from the 2005 Infant Feeding Survey reported average initiation rates of 68% (Bolling, 2005). Demographic factors influencing the decision to breast feed are multitude and include attitudes of the wider family (partners,
siblings and grandparents) and peer groups (Heinig et al., 2006), collective knowledge, and practical issues such as an ill baby (Dyson et al., 2005; Fairbank et al., 2000, 2001; Renfrew et al., 2005a, Renfrew et al., 2005b; Sikorski et al., 2003). Whilst the prevalence of breast-feeding is linked to socio-economic status, mothers from less affluent backgrounds are more likely to deliver preterm or low birth weight babies who will be admitted to the NICU (Macfarlane and Mugford, 2000). The experience of having a sick baby admitted to a NICU means parents are thrust into an unfamiliar environment and reliant on healthcare professionals for support and guidance. Informed decision-making with regard to feeding will, in part, be dependent on the quality of information and support they receive prior to and after delivery.

Failure to provide sick and/or preterm infants with expressed breast milk (EBM) on the NICU carries greater risks than for those born at term. Preterm infants who receive breast milk have better short-term (e.g. lower rates of necrotising enterocolitis, NEC) and long-term (e.g. better cognition) outcomes (Lucas and Cole, 1990; Lucas et al., 1992). Aside from improved health outcomes, the additional healthcare costs associated with NEC and poor neuro-cognitive outcome are considerable. Any increase in the marginal costs associated with increasing EBM provision need to be considered, then, in the context of the additional costs to both the NHS and wider society of these, potentially preventable, adverse outcomes.

In addition to the health benefits of EBM, maternal satisfaction regarding own milk provision on the NICU is well documented (Bliss, 2008). Mothers commonly report that this unique contribution is one of the few things that they can actively do for their baby as part of their role and the emotional bond that accompanies it (Miracle et al., 2004). Maintaining a good milk supply requires commitment and motivation, however mothers have also reported lack of staff support as a contributory factor in their inability to maintain lactation and subsequently breastfeed their preterm or sick baby (Miracle et al., 2004; Bliss, 2008). Whilst evidence suggests that both health professional and peer support for mothers contributes to the success of breast-feeding in term babies (Renfrew et al., 2005a, 2005b), there has been little evaluation of its effect on mothers of preterm babies.

Whilst many units are able to use donor expressed breast milk (DEBM), it is not universally available. The existing data suggests DEBM might be associated with numerous health benefits, but there is a lack of adequately powered controlled trials, and although the risk of communicable disease transmission appears very small, concern persists. In addition, pasteurisation and freezing processes lessen many potential benefits of EBM. DEBM also contains lower levels of many constituents (including non-nutritive factors such as growth factors) and may not meet the macro- or micro-nutrient needs of extremely preterm infants. When faced with the need to add bovine based breast milk fortifier (BMF) to DEBM, many clinicians may opt to switch to a preterm formula.

Despite strong national support for breast-feeding from the Department of Health, professional bodies and health professionals, initiation rates in the North East of England remain amongst the lowest in the UK (Bolling, 2005). Our own local audit data suggested that whilst initiation rates are higher than background population rates, many mothers failed to initiate and/or maintain lactation. The aim of this quality improvement (QI) project was to conduct an audit and service review, identify challenges and remediable factors, and determine the effectiveness of a single, dedicated infant feeding support lead in improving provision of mothers’ own EBM to infants on a NICU.

Methods

We conducted the study on a busy level 3 Regional NICU in the north east of England (Royal Victoria Infirmary, Newcastle upon Tyne, UK). The NICU has over 600 admissions per year and admits approximately 160 infants born less than 32 weeks gestation per year. An initial audit was conducted over a 3 month period alongside a work package that examined current practice and aimed to identify potentially better practices (PBPs). A snap-shot survey of breast feeding initiation and numbers of mother’s still successfully expressing at 14 days (D14) was conducted over a 6 week period. Inclusion criteria were inborn delivery and admission to the NICU for at least 24 h in order to assess local practice. Nursing and medical staff knowledge and practices were assessed and qualitative methods were used to explore beliefs and attitudes of mothers in relation to their breast-feeding experience(s). PBPs were identified by networking with other NICUs and a literature review. Review of the evidence for strategies that improve breast-feeding for these babies was followed by a 12 month intervention period of a single, dedicated infant feeding support lead.
Initial audit results

Over a 6 week audit period, initiation rates were 76% but had dropped to 46% by D14. Semi-structured interviews were conducted with nursing (n = 15) and medical staff (Senior House Officers, n = 7), and mothers (n = 17). Interviews were conducted (HS) and involved a combination of open and closed questions, but were not tape recorded or formally transcribed. Whilst staff attitudes towards the benefits of EBM were positive, feedback and direct observation identified a common factor to be insufficient time and knowledge of bedside nurses to support mother’s providing EBM. Medical staff shared a common uncertainty regarding knowledge about the specific benefits of human milk for sick or preterm babies and in particular lacked confidence to discuss these benefits with parents. Many reported that they lacked knowledge or experience about lactation and breast-feeding to meet the demands of their role.

Mothers (and 3 fathers who took part alongside their partners) identified several common themes. Antenatal information was not as widespread as it could be, and opportunities to promote breastfeeding were missed. Several mothers had been admitted as antenatal in-patients prior to preterm delivery (duration of stay 3–22 days) and felt that vital information about feeding choices could have been given at that time. Preterm delivery also meant that other mothers had not accessed parent education classes, commonly offered during the third trimester of pregnancy. Mothers reported inconsistent information from neonatal and postnatal ward staff about practical issues associated with expressing and breast-feeding, and there appeared to be a lack of awareness and agreement over who should support the mother to initiate lactation. A significant delay (>24 h) in attempting to initiate lactation was common. It was also evident that many mothers had insufficient knowledge about expressing and breast pump use to enable them to optimise milk supply. Many reported a lack of ongoing support after initiation of expressing. Mothers perceived nursing staff as being “too busy” in the clinical area to discuss lactation issues and this appeared to contribute to dissatisfaction of their feeding experience.

We also examined current practice using focus groups for both staff and parents that revealed additional gaps in both knowledge and practice. Strategies to improve breast feeding initiation and support were identified to address the common themes that emerged from the initial audit.

Intervention period

A wide range of PBPs were made including:

1. Ante-natal ward visits to offer information to mothers who were likely to have a baby admitted to the NICU;
2. Visiting all mothers as soon as possible following delivery to discuss feeding choices;
3. Full supervision of first expressing session to assess technique and ensure correct information giving;
4. Continued maternal support for first 14 days and as required thereafter;
5. Using colostrum or EBM for mouth care/oral hygiene (whether or not enterally fed);
6. Altering unit guidelines so that the default position was to give all preterm babies EBM as soon as it was available (often within the first 12–24 h) unless the attending medical team specifically placed a baby ‘nil by mouth’;
7. Changing unit guidelines and procedures to improve the amount of time mothers could spend providing kangaroo care;
8. Improving NICU and postnatal staff training that coincided with hospital implementation of UNICEF Baby Friendly Initiative Stage 1;
9. Including UNICEF training on breast feeding and lactation for new medical staff at induction;
10. Securing additional funding for breast pumps, considering other unit factors (e.g. screens to support expression at the cot side, or supporting mothers to express at the cot side without screens if they wished), and improving facilities and information in the breast feeding rooms.

Post intervention results

Many of the PBPs acted synergistically, and it was clear that the overall process led to a major change in profile and attitudes towards EBM over a relatively short period. The importance of strong leadership and a willingness to work with the whole team to overcome barriers and gently confront non-facilitating attitudes is difficult to accurately ascertain, but was undoubtedly a key component in the process. Within just 8 weeks, initiation rates had risen from 76% to 90%, and D14 rates of those who had initiated almost doubled from 18/40 (45%) to 54/61 (89%) (Chi² p = 0.04). Only a small minority of mothers (around 5% on average) declined to express after being given information about the benefits of breast milk for their sick baby (see Fig. 1). A small number of mothers were advised or did not initiate lactation.
because of reasons such as early infant death, maternal HIV, maternal chemotherapy and child protection issues. The improved rates were sustained during the intervention and associated with an increase in the numbers of babies discharged home breast-feeding from 12/40 (30%) to 144/263 (54%) (Chi² p = 0.07). (See Fig. 2). Freezer capacity for storing EBM had to be increased (Fig. 3.)

Discussion

We have shown that provision of mother’s own breast milk in a busy NICU can be increased dramatically within a relatively short period by providing additional staff resource. The QI intervention was based largely on published evidence, but implementation was designed to reflect local circumstance. At its inception we specifically planned that the package be allowed to evolve to best suit the specific issues on our NICU. Whilst the issues we identified, and the strategies we focused on may differ in emphasis from those in other large NICUs we believe our findings will have broad relevance for many other units in developed countries where breast-feeding rates are sub-optimal.

The study was planned as a composite of audit, review and QI and it is not possible to attribute or quantify which aspects of the process resulted in the greatest benefit, but from a QI perspective that is not of primary importance. Our specific outcome measure i.e. amount and duration of breast milk expression, was robust but does not reflect the multitude of other benefits that may include both infant health, and parental experience, as well as possible benefits to the healthcare system. Improving the morale of staff, and enabling units to better achieve aims to which they aspire to is likely to be associated with improvements in other aspects of care, again which cannot be accurately quantified.

Alternative study methodologies, such as a controlled trial, would not have been possible where the intervention has broad effects within the work...
environment. However, a QI approach will not enable precise quantification of cost effectiveness. It is possible that alternative strategies might be better or more cost-effective, and a range of other interventions have been subject to recent review (Dyson et al., 2005; Fairbank et al., 2000, 2001; Renfrew et al., 2005a, Renfrew et al., 2005b; Sikorski et al., 2003). It is possible that improvements in mother's own breast milk expression will reduce the need for donor EBM where it is used.

The rapidity of improvement suggests that whilst staff education is vital, there may be insufficient time for bedside nurses in busy tertiary care units to provide care at current staffing ratios (1 nurse per 2 ICU cots is typical in many NICUs) and also optimally support mothers wishing to provide EBM. Qualitative evaluation identified a number of remedial factors, and the importance of leadership and team ownership of the challenges and successes. This study used a single full time member of staff and this practice would therefore not provide cover for a unit 7 days a week. Whilst we observed that this was largely sufficient to promote the role of breast milk and support mothers, a more fully resourced team might have even greater success.

We do not present here a formal economic evaluation but we estimated that the associated staff cost per extra mother still expressing at D14 was equivalent to less than 6 h of intensive care provision according to current NHS tariffs. From a health provider perspective the overall economic benefits in terms of reduced risks of sepsis and NEC, and reduced use of formula milk or donor EBM, is likely to be substantial. Although there will be an increase in staff costs, this is likely to be fully offset by reductions in key morbidities such as NEC. We suggest that this type of intervention be adopted more widely within the NHS.

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References