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Improving Human Milk and Breastfeeding Practices in the NICU

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ABSTRACT

Objective: To determine if systematic implementation of the Spatz Ten Steps for Promoting and Protecting Breastfeeding for Vulnerable Infants (Ten Steps) would result in an improvement in the percentage of infants receiving mother's own milk (MOM) at initiation of feedings and at hospital discharge.

Design: Continuous quality improvement (QI) process.

Setting: Urban, 82-bed, Level-III NICU.

Patients: Very- low-birth-weight (VLBW) infants weighing fewer than 1500 grams.

Intervention: The Ten Step method was implemented during a 3-year period.

Measurements: Process measurements included percentage of VLBW infants receiving MOM at initiation of feeds, number of mothers of VLBW infants with hospital-grade electric breast pump at hospital discharge, and number of mothers of VLBW infants initiating pumping within 6 hours of delivery. Outcome measurements included percentage of VLBW infants with any human milk at discharge to home and parent satisfaction with nurses' support of mother's efforts to breastfeed. Balancing measurements included percentage of VLBW infants at less than the third percentile for growth on the Fenton growth chart at discharge and receiving pasteurized donor milk (PDM).

Results: Significant improvements were achieved in the percentages of mothers expressing their milk within 6 hours of delivery, infants receiving MOM at initiation of feeds, and mothers with a hospital-grade pump at discharge. Improvements in these processes resulted in increased parent satisfaction with nurses' support of breastfeeding and a 3.1-fold greater odds of the VLBW infant receiving MOM at discharge in 2013 compared to 2010 (odds ratio [OR]= 3.01, 95% confidence interval [CI] [1.75, 5.17], $p < .001$). Despite an increase in the use of MOM, there was not a significant increase in VLBW infants discharged at less than the third percentile for growth, and initiation of PDM did not negatively affect the percentage of VLBW infants with any human milk at discharge.

Conclusions: Implementation of the Ten Steps method using QI methodology resulted in significantly improved rates of use of MOM at initiation of feeds and at hospital discharge.

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Human milk (HM) feeding should be viewed as an integral part of the care of preterm or critically ill infants. Human milk is nutritionally superior to infant formula and provides many well documented benefits including decrease in adverse neonatal outcomes such as necrotizing enterocolitis (NEC), sepsis, and retinopathy of prematurity (Menon & Williams, 2013). Very-low-birth-weight (VLBW) infants (fewer than 1500 grams) fed HM have improved visual acuity (Okamoto et al., 2007) and higher scores on tests of neurocognitive evaluations (Vohr et al., 2006; Vohr et al., 2007). In a recent policy statement, the National Association of Neonatal Nurses (NANN; 2011) indicated that "As the professional voice of neonatal nurses, the National Association of Neonatal Nurses (NANN) encourages all neonatal nurses to provide mothers of critically ill newborns the education, support, and encouragement needed to provide human milk for their infant.". The American Academy of Pediatrics (AAP; 2012) recommended that all preterm infants should receive HM, and if the mother's own milk (MOM) was unavailable, appropriately fortified pasteurized donor HM should be used.

Human milk feeding is associated with a decrease in the risk and severity of NEC. NEC is one of the most serious and devastating neonatal diseases and is a leading cause of morbidity and mortality that can affect 7% to 14% of VLBW infants (Parker, 2013). The outcome of infants with NEC is variable and can produce devastating sequelae, with

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mortality rates reaching 20% to 40% depending on disease severity and need for surgical intervention (Parker, 2013). Approximately 40% of infants diagnosed with NEC require surgical treatment that has been estimated to extend hospital stays by 43.1 days at a cost of $198,040. Medical treatment of infants with NEC may extend hospitalization by 11.7 days at a cost of $74,004 (Ganapathy, Hay, & Kim, 2012). Human milk feedings reduce the risk of NEC in infants during the hospital stay by 58% (Ip et al., 2007). Increasing the use of HM in the NICU is the only evidence-based practice to decrease the incidence of NEC in infants. Given the demonstrated benefits of HM feeding in the NICU, increasing the use of HM is critical. The U.S. federal government has increased awareness of the World Health Organization's Baby-Friendly Hospital Initiative (BFHI) through the Best Fed Beginnings grant program (National Institute for Children's Healthcare Quality, 2014). However, the BFHI Ten Steps to Successful Breastfeeding (Baby-Friendly USA [BFUSA], 2012) are designed for healthy term infants. In 2004, Spatz adapted the principles of the BFHI into the Ten Steps for Promoting and Protecting Breastfeeding for Vulnerable Infants (Ten Steps).

Intended Improvement

In 2010, our NICU HM feeding rates were suboptimal with only 80% of VLBW infants receiving MOM at initiation of feedings. The percentage of VLBW infants discharged home receiving HM was 35.8% compared to 53.6% in other Vermont Oxford Network (VON) centers (VON, 2014). The VON is a voluntary, not-for-profit collaboration of more than 1,000 NICUs worldwide (more than 500 in the United States) that submit data related the care and outcomes of infants in the NICU. The VON database holds information on more than 1.5 million infants and provides participating centers with comprehensive benchmarking reports to use for practice improvement (VON, 2015).

The project goal was to determine if the systematic implementation of comprehensive lactation and breastfeeding support using the Spatz Ten Steps method (Spatz, 2004) (Table 1) would result in an increase in the percentage of infants receiving MOM at initiation of feeds and at discharge.

Methods

This project involved the systematic implementation of evidence-based practices utilizing quality improvement (QI) strategies and thus did not require Institutional Review Board approval. The project was implemented at an urban, 82-bed, Level-III NICU that cares for approximately 120 VLBW infants annually. The NICU is located within a 1,021 bed, not-for-profit tertiary care center. The predominant payor is Medicaid (85%). During the period of this project, breastfeeding rates for the healthy term population were also being improved by participation in the National Institute for Children's Healthcare Quality (NICHQ) Best Fed Beginnings collaborative (NICHQ, 2015), which provided structure and processes for implementing the U.S. BFHI guidelines (BFUSA, 2012). The NICU indirectly benefited from the BFHI because of the increased awareness and focus on HM and breastfeeding.

Given the demonstrated benefits of human milk feeding in the NICU, increasing the use of human milk is critical.

The NICU Breastfeeding Committee (BFC) was the driving force behind the initiative. The BFC is a multidisciplinary team comprising key stakeholders, including bedside nurses who are primarily certified lactation counselors (CLC), hospital-based International Board Certified Lactation Consultants (IBCLCs), NICU dietitians, physicians, neonatal nurse practitioners, the unit-based educator, NICU parents, and the NICU quality specialist. The NICU quality specialist, a registered nurse with NICU experience and certification in health care quality, functioned as the team lead

Table 1: Spatz Ten Steps for Promoting and Protecting Breastfeeding for Vulnerable Infants

Step	Description
1	Informed decision
2	Establishment and maintenance of milk supply
3	Human milk management
4	Oral care and feeding of human milk
5	Skin-to-skin contact
6	Non-nutritive sucking
7	Transition to breast
8	Measurement of milk transfer
9	Preparation for discharge
10	Appropriate follow-up

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