

The Effect of Breastfeeding Education in the Neonatal Intensive Care Unit on Post-Discharge Breastfeeding Duration

Natasha Shapiro^{1,2*}, Alyssa Rios¹, Hollis Bogdanffy¹, Martha Caprio¹

¹Neonatology, NYU Langone Medical Center, New York, NY, United States.

²NewYork-Presbyterian/Queens, Flushing, New York.
ns2020@gmail.com

***Corresponding Author:** Natasha Shapiro, MD, Neonatology, NYU Langone Medical Center, NewYork-Presbyterian Queens, Flushing, New York, United States.

Abstract

Objective: To demonstrate the importance of breastfeeding education in the Neonatal Intensive Care Unit (NICU).

Methods: This is a cohort study of women with infants in a Regional Perinatal Center NICU (RPC), who had received breastfeeding education between November 2013 and May 2014. Phone calls were made to assess their breastfeeding status at 1 and 3 months.

Results: At 1 month, 94% were still breastfeeding, with 73% breastfeeding exclusively. By 3 months, 75% reported to still be breastfeeding. Of these, 66.7% were breastfeeding exclusively. Currently, US National averages for breastfeeding show that 79.2% of women have ever breastfed. The 1 month breastfeeding rate in our sample is higher than that ($p = .012$), as well as that of the Surgeon General's Goal for Healthy People 2020, which would like to see 81.9% of women breastfeeding at hospital discharge ($p = .026$). Our results are also notable for an exclusive breastfeeding rate at 3 months that supersedes the national average (40.7%) and the Surgeon General's Goal for Healthy People 2020 (42.6%).

Conclusions: Women with infants admitted to a NICU that provides breastfeeding education and support are more likely to continue breastfeeding at 1 months and 3 months of age.

Keywords: Breastfeeding, NICU, breastfeeding education, lactation consultant, breast milk

INTRODUCTION

Breast milk is now widely accepted as the most complete form of nutrition for infants, with a range of benefits for infants' health, growth, immunity, and development.¹ Further studies have noted benefits to mothers as well, with mothers of breastfed infants noting multiple health and psychological benefits. For preterm infants, the benefits of breastfeeding are even more pronounced, with breastfed premature infants having a lower risk of developing necrotizing enterocolitis (NEC) and hospital-acquired infections, reduced hospital length of stay, decreased risk of retinopathy of prematurity, and faster brainstem development.^{2,3,4,5}

Other studies have supported the idea of a "dose-dependent" protective effect of breastmilk. In one study on extremely low birth weight (ELBW) infants by Sisk et al, it was determined that infants' whose

diet consisted of more than 50% breastmilk in the first 14 days had an 83% reduction in the development of NEC, compared to those infants that were fed with less than 50% breastmilk.⁶ In an even larger retrospective study by Meinezen-Derr et al, it was determined that the likelihood of NEC or death after 14 days was decreased by a factor of 0.83 for each 10% increase in the proportion of total breastmilk intake.⁷ Additional advantages of exclusive breastfeeding over partial breastfeeding include decreased risk of diarrhea, respiratory illness, otitis media, atopic dermatitis, and type 1 diabetes.⁸

Given this evident benefit of breastfeeding, the American Academy of Pediatrics (AAP) and the US Department of Health and Human Services (DHHS) recommend a national breastfeeding initiation rate of 75% in the early postpartum period or at hospital discharge.^{8,9} For mothers with infants admitted to the Neonatal Intensive Care Unit (NICU), these

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breastfeeding initiation rates are much lower. In fact, in the United States, the breastfeeding initiation rate among NICU infants is estimated to be about 35%.¹⁰

A mother's success with breastfeeding is dependent on accurate lactation information as well as support from family, the healthcare system, and even society. Mothers of infants in the NICU often report numerous difficulties with initiating breastfeeding, ranging anywhere from concern about the infant's condition to lack of education and resources within the NICU.¹¹ Despite these challenges, one study found that 73% of NICU mothers still wanted to breastfeed.¹²

In an effort to increase breastfeeding rates among NICU patients, many hospitals have attempted to implement different breastfeeding support strategies. In a study by Friedman et al, it was found that prenatal consultation with a neonatologist, emphasizing the importance of breastmilk, significantly increased the length of breastmilk feeding in both the hospital and after discharge in premature infants.¹³ While these results are significant, further studies have shown that providing face-to-face interaction with care, rather than solely educating mothers, increases the prevalence of breastfeeding.¹⁴

The purpose of this study was to evaluate the effect of providing breastfeeding support in the form of a NICU-specific, certified lactation consultant to mothers of infants while in the NICU. Several risk factors associated with lower probability of breastfeeding in NICU infants (such as the medical condition of the infant, age of mother, and type of delivery) were also identified.

METHODS

Sample and Setting

Mothers and their infants who were delivered at New York University (NYU) Langone Medical Center (New York, NY) between November 2013 and May 2014 were studied during the infants' NICU stay and up to 3 months after birth. NYU Langone Medical Center, Tisch Hospital NICU is a Regional Perinatal Center (RPC) NICU and a Baby Friendly Hospital, designated in 2011. Mothers who were 18 years and older and able to speak and understand English were recruited.

Research Design

Mothers who expressed a desire to nurse their infants at delivery were interviewed at bedside in the NICU by a certified lactation consultant at the beginning of their

infant's NICU stay. They had follow up consultations throughout the duration of the infant's stay. Questions about individual goals for breastfeeding, including plans for while the infant was hospitalized and after discharge, were asked, and individual goals were identified. Each mother and infant pair was assessed for any physical or anatomical barriers to breastfeeding. Any issues (flat nipples, history of breast reduction/augmentation, ankyloglossia, small jaw, etc.) were identified and addressed as required. In the cohort of infants without counter-indications to intake by mouth, a feeding session was observed and mothers were educated as to the methods and techniques to use to assist their infant in achieving an effective latch. Strategies for building milk supply, such as effective pumping schedules, breast massage and compression were taught. This was especially emphasized for the mothers of premature infants and sicker infants who were not medically ready for direct feeds from the breast. Additionally, mothers were given individual suggestions for lactation management once discharged. Mothers were given advice and information about where to find support in the community and how to contact the hospital's lactation support services if more assistance was necessary.

After discharge, mother and infant demographics (including mother's age, marital status, smoking history, type of insurance, race and infant's gestational age at birth, birthweight, and mode of delivery), as well as infant medical data during their NICU stay, were collected through NYU Tisch's medical records software (EPIC). Throughout July-August 2014, mothers were contacted via phone or email and asked a series of standardized questions concerning whether their infants were still being breastfed. If the mother stated that the infant was still breastfeeding, further information about whether breastfeeding was exclusive and whether breastmilk was supplied through breast, pump, or both was also obtained. Infants who were being supplemented only with prescribed formula for the extra nutrition due to medical necessity were not included in the exclusively breastfeeding group. If the mother stated that the infant was no longer breastfeeding, age at discontinuation and reasons for stopping were obtained. All the information was compiled and answers were extrapolated to create two different time points in order to compare breastfeeding data at 1 and 3 months of age.

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Data was analyzed using Microsoft Excel and significance was calculated with t-tests. This study was submitted to the NYU IRB and was determined to be a quality improvement project for which IRB approval was not required.

RESULTS

Of all the mothers who had expressed desire to nurse their infants and were counseled by a lactation consultant, a total of 46 had provided their names and were included in the study. Demographic data on 45 mothers was found through medical records

retrospectively. Thirty-six of these mothers were contacted successfully via phone or email and were included in the results of this study (Figure 1).

36 mothers completed the follow-up questionnaire (Table 1). The mean age was 32.8 years (range of 21-44 years), the majority of women were white, married, had never smoked, and had private insurance. There was a slight predominance of vaginal deliveries to caesarian sections (55.6% vs 44.4%). While almost all mothers had planned to breastfeed prior to being enrolled in the study, only 28% had any previous breastfeeding experience.

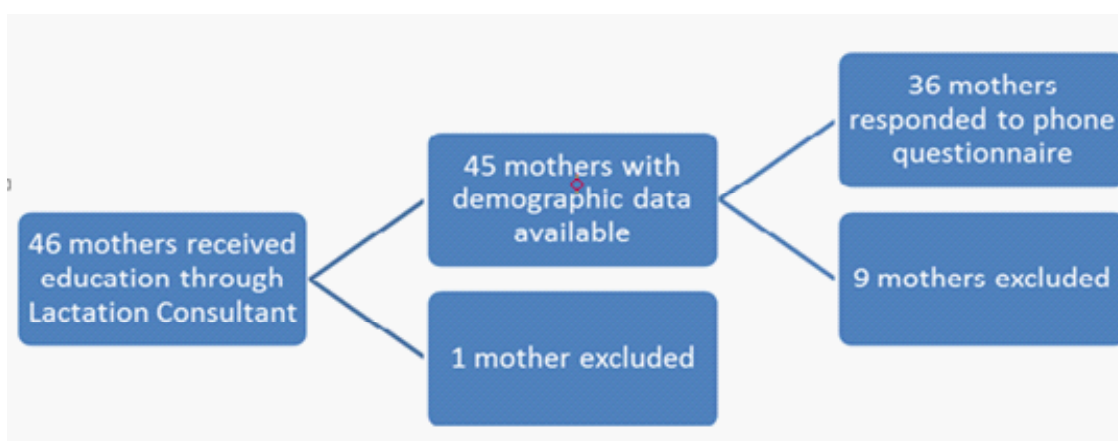


Table 1. *Mother and infant demographics*

Maternal Characteristics (N=36):			Infant Characteristics (N=43):		
Age:	32.8	(21-44)	Gender		Range or percentage
Married, %:	86.1%		male	27	62.8%
			female	16	37.2%
FACTOR	n	%	Multiple birth		
Smoking Status			Twins	14	32.6%
Non-Smoker	27	75.0%	Singletons	29	67.4%
Former Smoker	8	22.2%	Median GA at birth (weeks)	34 2/7	(24 3/7 – 41 5/7)
Current Smoker	1	2.8%	Median Birth Weight (g)	2160.0	(556-4009)
Insurance			1 min APGAR (median)	8.0	(1-9)
Private	35	97.2%	>=6	34	79.1%
Public	0	0.0%	<6	9	20.9%
None	1	2.8%	5 min APGAR (median)	9.0	(2-9)
Ethnicity			>=6	41	95.3%
Hispanic	3	8.3%	<6	2	4.7%
White	29	80.6%	Median Days in NICU	10.0	(2-124)
Black	0	0.0%	Median GA at discharge	38 2/7	(35 - 44 1/7)
Asian	2	5.6%	Median Age at interview	4mths, 1wk	(3mths1wk - 8mths3wks)
Other	2	5.6%			
Type of Delivery					
Vaginal	20	55.6%			
C/S	16	44.4%			
Plan to breastfeed	35	97.2%			
Previously breastfed	10	27.8%			

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There were 43 infants, with 7 pairs of twins, and a male predominance. The median gestational age at birth was 34 2/7 weeks, birth weight was 2160 grams, 1 and 5 minute APGARS were 8 and 9 respectively, and length of stay in the unit was 10 days (range of 2-124 days). The most common medical condition among the infants during their NICU admission was presumed sepsis, with 74.4% of infants within the study undergoing antibiotic treatment for 48 hours. Other common medical issues included hyperbilirubinemia (46.5%), feeding difficulties (39.5%), cardiac abnormalities (18.6%), respiratory distress (41.9%) and intrauterine growth restriction (16.3%).

As demonstrated in Table 2 (divided by mother and by infant due to 7 twin pairs), at one month after giving birth, over 94% of mothers were still breastfeeding their infants, with over 73% of these mothers breastfeeding exclusively, which is an absolute exclusive breastfeeding rate of 69.4%. Of the mothers that breastfed exclusively, infants were more often put to the breast or given a combination of being put to the breast and expressed milk. Those that were not exclusive were primarily giving breastmilk to their child through expressed milk. Ten infants were still being given prescribed formula for supplemental nutrition.

Table 2. Results at 1 month of age.

One Month Questionnaire					
BY MOTHER			BY INFANT		
	n	%		n	%
Breastfeeding? yes	34	94.4%	Breastfeeding? Yes	41	95.3%
no	2	5.6%	no	2	4.7%
Exclusive? (yes)	25	73.5%	Exclusive? (yes)	28	68.3%
Breast	10	40.0%	Breast	11	39.3%
Expressed	5	20.0%	Expressed	5	17.9%
Both	10	40.0%	Both	12	42.9%
Exclusive? (no)	9	26.5%	Exclusive? (no)	13	31.7%
Breast	1	11.1%	Breast	1	7.7%
Expressed	7	77.8%	Expressed	11	84.6%
Both	1	11.1%	Both	1	7.7%
Prescribed formula?	7	21.9%	Prescribed formula?	10	27.0%

At three months after giving birth, approximately 75% of mothers reported to still be breastfeeding their infants. Of these mothers, two-thirds were breastfeeding their child exclusively (an absolute exclusive breastfeeding rate of 50% from the

original cohort), primarily by bringing the infant to the breast. Of those that were not exclusive, the primary form of feeding was through expressed milk. Nine infants were still being given prescribed formula (Table 3).

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Table 3. Results at 3 months of age.

Three Month Questionnaire					
BY MOTHER			BY INFANT		
Still breastfeeding?	n	%	Still breastfeeding?	n	%
yes	27	75.0%	yes	33	76.7%
no	9	25.0%	no	10	23.3%
Exclusive? (yes)	18	66.7%	Exclusive? (yes)	20	60.6%
Breast	9	50.0%	Breast	10	50.0%
Expressed	3	16.7%	Expressed	3	15.0%
Both	6	33.3%	Both	7	35.0%
Exclusive? (no)	9	33.3%	Exclusive? (no)	13	39.4%
Breast	1	11.1%	Breast	1	5.0%
Expressed	5	55.6%	Expressed	9	45.0%
Both	3	33.3%	Both	3	25.0%
Prescribed formula?	7	23.3%	Prescribed formula?	9	25.0%

Of the 9 mothers who were no longer breastfeeding their infants at 3 months, 33% reported difficulties with pumping, 55% reported difficulties due to infant latching/mouth abnormalities/feeding preferences, and 11% reported decreased breast milk supply over time, while the rest reported some combination of the three.

Finally, at the conclusion of the interviews, it was determined that over 91% of mothers found the breastfeeding education to be helpful. Possible suggestions for improvement included more instructions on breastfeeding/pumping techniques, information concerning what to expect in terms of breastmilk consistency over time, and more time with the lactation consultant.

DISCUSSION

The results of this study showed that for mothers who had received breastfeeding education and support

while their infant was in the NICU, breastfeeding rates were 94.4% and 75.0% at one and three months respectively. Of the mothers who were breastfeeding, 73.5% were doing so exclusively at 1 month and 66.7% were doing so exclusively at 3 months, which is an absolute exclusive breastfeeding rate of 69.4% and 50%, respectively. The fact that a large percentage of the mothers who did not exclusively breastfeed at 1 month and 3 months had been prescribed formula for their infants further suggests that exclusive breastfeeding rates might have been even higher had the infants not required supplemental formula.

In a poll conducted by the CDC in 2014, determining breastfeeding rates in the United States, 79.2% of women reported having ever breastfed.¹⁵ Given the known health benefits associated with breastfeeding, the surgeon general created a goal (Surgeon General's Goal for Healthy People 2020) stating that by the

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year 2020, with increased breastfeeding support and education, 81.9% of women in the US should be breastfeeding by the time their infants are discharged from the hospital.¹⁶ The results of this study showed that for those mothers who had received breastfeeding support from a NICU-specific, board certified lactation consultant while their infant was in the NICU, breastfeeding rates at one month were 94.4%, significantly higher than both the national rate of women that have ever breastfed ($p = 0.012$) and the Surgeon General's Goal for 2020 ($p = 0.026$). Furthermore, while not statistically significant, our results showed an exclusive breastfeeding rate at 3 months which supersedes that of the national average (40.7%) and of the Surgeon General's Goal for Healthy People 2020 of 42.6%.

We also internally compared our study's rates of exclusively breastfeeding at 1 months and 3 months to the exclusive breastfeeding rates at the time of discharge from our "Baby Friendly" newborn nursery. Between November 2013 and May 2014, 54% of women were exclusively breastfeeding their infants at the time of discharge from the well-baby nursery. From our study cohort during the same time period, we had a total of 69.4% of women exclusively providing breast milk to their infants at 1 month of age, and 50% of women doing so at 3 months of age. Our results at 1 month for exclusive breastfeeding of NICU infants are therefore significantly higher than the rate of exclusive breastfeeding at discharge from the same hospital ($p = 0.044$).

While the results of this study are very exciting, there are several limitations present. One of the major limitations is the lack of a control group within the same institution. While our results showed that mothers who received breastfeeding education from a lactation consultant within the NICU had significantly higher rates of breastfeeding at 1 and 3 months compared to the US National Averages, little is known concerning the breastfeeding rates of infants at NYU's NICU prior to the hospital's initiation of its baby-friendly policy. As such, further research is currently being performed to contact mothers with infants in the NYU NICU prior to its initiation as a baby-friendly hospital to determine breastfeeding rates during this time. It would also be helpful to conduct a new study where breastfeeding education would be offered to all mothers after delivery to see if this practice

would increase the rate of breastfeeding more than the national rate. In the meantime, since our study sampling included a specific population, it is difficult to make it comparable to the general US rates of breastfeeding. Our success should therefore be viewed as a study on best practices within our institution.

Another limitation of this study is the possible selection bias that occurred given the process by which mothers were recruited. As described in the methods section of this paper, mothers in this study were women that had already expressed an interest in breastfeeding prior to being counseled by the lactation consultant, therefore possibly skewing the results towards higher rates of breastfeeding compared to the general population. A solution to this unintentional bias could be to provide lactation consultation to all mothers regardless of feeding preference, but this might be more detrimental than beneficial, as mothers who have no desire to breastfeed might feel as if they are being pressured to do so.

A final limitation of this study is possible recall bias affecting the method in which breastfeeding data was obtained. During the follow-up interviews with mothers (at which time breastfeeding data was obtained), infants ranged between 3-8 months of age. As such, mothers might have had problems recalling specifics of feeding patterns when their infants were 1 and 3 months old. Possible improvements in future studies could include contacting mothers when infants are 1 and 3 months old in order to get the most accurate data possible. In addition, some of our more premature babies had not yet been discharged home at the age of 1 month and even 3 months. For those infants, we still used the data provided by the mothers on whether or not they were receiving breast milk for their feeds during their hospital stay by that age. Unfortunately, those data points may have been skewed by the ongoing provision of breastfeeding education by the inpatient lactation consultant.

CONCLUSION

While there are a number of factors which may hinder breastfeeding success, these results suggest that women with infants admitted to a NICU that provides breastfeeding education and support catered specifically toward NICU moms are more likely to continue breastfeeding at 1 month and 3 months of age as compared to national average breastfeeding rates in the United States.

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