The Baby-Friendly Hospital Initiative Increases Breastfeeding Rates in a US Neonatal Intensive Care Unit

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Abstract

This study evaluated the impact of a Baby-Friendly designation on breastfeeding rates in a US neonatal intensive care unit (NICU). The medical records of all surviving infants directly admitted to the Boston Medical Center's level III, 15-bed NICU in 1995 (before Baby-Friendly policies were implemented) and 1999 (when Baby-Friendly status was granted) were reviewed. Infants receiving any breast milk by any means during the first week of enteral feeds were considered to have initiated breastfeeding. Maternal and infant demographics for 1995 and 1999 were comparable. The NICU breastfeeding initiation rate increased from 34.6% (1995) to 74.4% (1999) ($P < .001$). Among 2-week-old infants, the proportion receiving any breast milk rose from 27.9% (1995) to 65.9% (1999) ($P < .001$), and the proportion receiving breast milk exclusively rose from 9.3% (1995) to 39% (1999) ($P = .002$). The implementation of Baby-Friendly policies leading to a Baby-Friendly designation was associated with increased breastfeeding initiation and duration rates. *J Hum Lact*. 19(2):166-171.

Keywords: minorities, human milk, premature infants

Human milk has been established as the "optimal form of nutrition"[1] for infants.[2-4] For premature or sick infants in a neonatal intensive care unit (NICU), the anti-infective properties of breast milk are considered even more critical than for term infants. Formula-fed premature infants have higher rates of necrotizing enterocolitis,[5,6] sepsis, and meningitis,[6,7] and more complications with gastrointestinal function, digestion, and the absorption of nutrients.[1] Human milk improves visual function[8,9] and enhances brainstem maturation[10] and neurocognitive development.[11,12] The successful breastfeeding of a premature infant is complex and requires a level of commitment from the institution as well as from the mother. Programs are needed to increase support for women who choose to provide breast milk for their high-risk infants.[13]

Breastfeeding rates among racial minorities and women of low socioeconomic status in the United States remain low. In 2001, only 52% of black women initiated breastfeeding, compared to 69% of all women.[14] This fact is pertinent when discussing the NICU population. Infant mortality and prematurity occur twice as often among black infants as white infants;[15] and black race alone, even when socioeconomic status, background, and birth characteristics are controlled for, is a predictor of not breastfeeding.[16] Recent research has suggested that "breastfeeding accounts for the race difference in infant mortality in the US at least as well as low birthweight does,"[16] and former US surgeon general Dr David Satcher stated, "Increasing the rates of breastfeeding is a compelling public health goal, particularly among the racial and ethnic groups who are less likely to initiate and sustain breastfeeding throughout the infant's first year."[17] The Baby-Friendly Hospital Initiative was designed by the United Nations Children's Fund (UNICEF) and the

Received for review, September 9, 2002; revised manuscript accepted for publication, January 31, 2003.

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J Hum Lact 19(2), 2003
DOI: 10.1177/0890334403252475
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World Health Organization as an intervention to increase breastfeeding rates. This intervention's impact on breastfeeding rates in NICUs in general (and among African American women with infants in NICUs in particular) is an important measure of its effectiveness, which has not been investigated elsewhere.

The Boston Medical Center (BMC), formerly Boston City Hospital, is an inner-city hospital serving a primarily impoverished population with a high number of racial minorities. Prior to 1997, few strategies were in place to support breastfeeding women with infants in the NICU or elsewhere in the hospital. However, a physician-led, hospital-wide effort resulted in the BMC becoming the 22nd US WHO/UNICEF Baby-Friendly hospital in December 1999.[18,19] With the gaining of Baby-Friendly status, the BMC's breastfeeding initiation rates among healthy, term infants rose substantially.[20]

Baby-Friendly status is awarded to hospitals or birthing sites that pass a rigorous inspection and meet the "Ten Steps to Successful Breastfeeding." Step 5 of the 10 steps states, "Show mothers how to breastfeed and how to maintain lactation, even if they should be separated from their infants." This step specifically involves NICUs because, especially in the case of a sick infant who is directly admitted to an NICU (as studied here), mother and infant are separated at birth. In addition, the Baby-Friendly site visit, at which compliance with Baby-Friendly status is evaluated, includes an inspection of the hospital's NICU. Although certain Baby-Friendly requirements differ for NICUs (eg, pacifiers can be used for NICU infants), NICUs must meet the same standards as other units. NICU physicians and nurses must be educated about breastfeeding, breastfeeding must be promoted, and NICUs must purchase formula (often an expensive undertaking because of the high cost of specialty formulas for premature or compromised infants).

In almost all cases, the mother of an NICU infant must initiate and maintain lactation without the stimulation of an infant nursing at the breast. In contemporary US NICUs, lactation is usually initiated by means of a high-quality, double-pumping electric breast pump. To produce an adequate milk supply, breast stimulation, in the form of double electric breast pumping at least 5 times in 24 hours, for a total pumping time of approximately 100 min/d,[21] is recommended.

For an NICU infant to receive breast milk, support for the mother is critical. When a hospital follows the Ten Steps, a supportive atmosphere is ensured. The purpose of this study was to determine the impact of Baby-Friendly policies on breastfeeding initiation and duration rates in the BMC NICU.

The Ten Steps to Successful Breastfeeding

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits of breastfeeding.
4. Help mothers initiate breastfeeding within one hour of birth.
5. Show mothers how to breastfeed and how to maintain lactation, even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk, unless medically indicated.*
7. Practice rooming-in—allow mothers and infants to remain together 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them, on discharge from the hospital or clinic.

*A hospital must pay fair market price for all formula and infant feeding supplies that it uses and cannot accept free or heavily discounted formula and supplies.

Methods

A research assistant extracted data from the medical records of all surviving infants directly admitted to the BMC's level III, 15-bed NICU in 1995 (before Baby-Friendly policies were implemented) and 1999 (when Baby-Friendly status was granted). Before retrieving any medical records, we excluded all babies who died after admission and all babies transferred in from other units. Infants who died were excluded because we judged that the feeding patterns (if any) of these critically sick infants would not be representative of the NICU population. Large numbers of infants are admitted to the NICU from BMC's own postpartum unit or from other institutions. Because many have already begun breastfeeding (or not) prior to admission, it is not possible to determine whether these infants breastfeed

successfully (or not) because of the influence of the BMC NICU or of the previous institutions. Thus, these infants were excluded. Information about race and ethnicity was obtained from the hospital admission sheets or from the infants' birth certificates. Hospital admissions staff members completed the admission sheets through interviews with either parent when the mothers were admitted to the maternity floor; information found in the birth certificates was obtained from the mothers by hospital-trained clerical staff members before the mothers' discharge from the hospital. Payer status was determined by the insurance coverage of the mothers as noted on the admission face sheets. Both documents were part of the permanent medical records.

The research assistant extracted infant feeding data from the 24-hour flow sheet completed for each NICU infant by the nursing staff member. The method of recording feeds did not change between the 2 years studied. Information on the flow sheet included documentation of the time of each feeding and the type and amount of feeding given (breast milk or the specific type of infant formula).

To establish whether an infant initiated breastfeeding, the research assistant examined the flow sheets to find the first week during which the infant received enteral feeds. An infant was considered to have "initiated breastfeeding" if any breast milk at all was received during the first week of enteral feeds, irrelevant of the feeding method (eg, at the breast or by tube). This is in accordance with national data, for which an infant who receives any breast milk is considered to have initiated breastfeeding.[14] An entire week was examined because on occasion, infants begin taking feeds before their mothers have been able to extract any milk with a pump, in which case formula is given. Any method of delivery was accepted because many premature infants receive breast milk feeds by nasogastric tube for weeks or even months before they are able to nurse directly at the breast.

To compare in-NICU breastfeeding duration rates between the years 1995 and 1999, the research assistant reviewed charts of "longer stay" infants who remained in the NICU at 2 and 6 weeks after their dates of birth. The total number of feeds for each day and for the previous day (a total of 48 hours of feeds) at the 2-week and 6-week time points was tallied, and the infants were assigned to 1 of 4 feeding categories for each time point: exclusive breast milk, mostly breast milk with some formula, mostly formula with some breast milk, and exclusive formula. For example, if an infant received 12 feeds in 48 hours, and 8 feeds were of breast milk and 4 feeds were of formula, the infant was placed in the "mostly breast milk" category. It was judged that measuring the breastfeeding rates of all hospitalized infants after 2-week and 6-week stays in the NICU effectively measured the success of maternal breastfeeding efforts within the controlled environment of the NICU and reflected on the hospital's ability to support women who chose to breastfeed.

The years 1995 and 1999 were chosen because during 1995, lactation support was minimal and none of the Ten Steps were in place. In 1999, all Ten Steps were implemented, and the BMC received a Baby-Friendly designation.

Data analysis was performed with SAS (version 6.12, SAS Institute Inc., Cary, NC). The variables of interest were overall breastfeeding initiation rates and initiation rates among US-born blacks and non-US-born blacks. The demographic data were analyzed using Fisher's exact test because of smaller sample sizes within ethnic subgroups. No significant demographic differences were found among the target populations of 1995 and 1999. A chi-square test was used to determine if there were significant differences between initiation rates among US-born blacks and non-US-born blacks in 1995 and 1999 and between the overall breastfeeding rates for those 2 years (initiation and at 2 and 6 weeks). In addition, data on the number of admissions to the NICU for each year were analyzed using Microsoft Excel (Microsoft, Redmond, Wash).

Results

Exclusions

Initially, we established from the handwritten daily record kept in the NICU the number of infants admitted to the NICU in 1995 and 1999. The total number of infants admitted in 1995 was 257, of whom 147 were eventually excluded for analysis in this study. Of these, 7 infants died, and 68 were transferred into the NICU, not directly admitted. Further exclusions in 1995 were made for the following reasons: medical records missing (21), infant feeding data or maternal breastfeeding eligibility data missing from the medical record (19), mother ineligible to breastfeed—HIV positive (1), mother ineligible to breastfeed—substance abuse (23), and other reasons such as maternal incarceration or maternal methadone use (8). In 1999, a total of 264 infants were admitted to the NICU, of whom 147 were

Table 1. Demographic Data

	1995	*1999*	*P*
Number of cases	110	117	
Infant			
Female (%)	42	50	.23
Gestational age, weeks (%)			
< 30	4.5	6	
30-37	51.8	61.5	
≥ 37	43.6	32.5	.22
Birth weight, grams ($\bar{x} \pm$ SD)	2619 ± 987	2506 ± 939	.19
Number of infants in NICU* at 2 weeks of age	43	41	
Number of infants in NICU at 6 weeks of age	8	9	
Maternal			
Vaginal birth (%)	58	44	.05
Age (%)			
< 20	14	11	
20-30	54	50	
> 30	33	39	.56
Ethnicity (%)			
Black	68	66	
Hispanic	19	15	
White	9	11	
Other	3	3	
Unknown	1	4	.55
Payer status (%)			
Medicaid	57	51	
Uninsured	29	28	
Other	13	20	.55

*NICU = neonatal intensive care unit.

eventually excluded. Of these, 6 infants died, and 79 were transferred into the NICU, not directly admitted. Further exclusions were made for medical records missing (9), infant feeding data or maternal breastfeeding eligibility data missing from the medical record (22), mother ineligible to breastfeed—HIV positive (1), mother ineligible to breastfeed—substance abuse (20), infant the subject of adoption or custody issue (4), and infant excluded for other reasons (6). As a result, 110 eligible infants in 1995 and 117 eligible infants in 1999 were included in the final analysis. All infants were receiving enteral feeds by 2 weeks of age.

Participant Characteristics

Infant and maternal demographics were similar for both years studied. There was no statistically significant difference between 1995 and 1999 for infant sex, gestational age, mean birth weight, maternal age, maternal ethnicity, or insurance/payer status. There was marginal statistical significance ($P = .05$) between the percentage of vaginal births in 1995 (58%) and the percentage of vaginal births in 1999 (44%) (Table 1).

Table 2. Breastfeeding Rates

	1995		*1999*	
	n	%	*n*	%
Breastfeeding initiation*				
All babies**	38	34.6	87	74.4
US-born black†	10	34.5	16	64.0
Non-US-born black‡	7	27.0	29	81.0
Breastfeeding at 2 weeks	43		41	
Exclusive breast milk	4	9.3	16	39.0
Mostly breast milk	3	7.0	3	7.3
Mostly formula	5	11.6	8	19.5
Exclusive formula	31	72.1	14	34.1
Any breast milk**	12	27.9	27	65.9

*Any breast milk feeds during first week of enteral intake.
**$P < .001$.
†P = .03.
‡P = .001.

Breastfeeding Rates

Breastfeeding initiation rates, defined as an infant receiving any breast milk during the first week of feeds in the NICU, increased significantly from 34.6% (1995) to 74.4% (1999) ($P < .001$). Breastfeeding initiation rates among US-born blacks, the racial group with the nation's lowest breastfeeding rates, rose from 34.5% in 1995 to 64% in 1999 ($P = .03$) and for non-US-born blacks from 27% (1995) to 81% (1999) ($P = .001$) (Table 2).

In 1995, 43 infants remained in the NICU after 2 weeks, and in 1999, 41 infants remained in the NICU after 2 weeks. In 1995, 8 infants remained in the NICU after 6 weeks, and in 1999, 9 infants remained in the NICU after 6 weeks. The percentage of 2-week-old infants receiving any amount of breast milk rose from 27.9% in 1995 to 65.9% in 1999 ($P < .001$). The percentage of 2-week-old infants receiving only breast milk rose from 9.3% in 1995 to 39% in 1999 (Table 2). Breastfeeding rates among infants who remained for the first 6 weeks of life in the NICU were also reviewed. Although conclusions cannot be drawn because of the small number of infants involved, a positive trend was observed. In 1995, only 1 of 8 infants remaining in the NICU at 6 weeks of age was breastfeeding, whereas in 1999, 6 of the 9 infants remaining in the NICU at 6 weeks of age were breastfeeding.

Discussion

We have established elsewhere that breastfeeding initiation rates increased significantly in our hospital with the gaining of Baby-Friendly status.[20] Our aim in this study was to determine whether breastfeeding rates in the NICU also increased significantly with the gaining of Baby-Friendly status. We established that both breastfeeding initiation rates and breastfeeding rates at 2 weeks increased after the BMC became Baby-Friendly. Specific Baby-Friendly factors that we consider to have had an effect are the requirements for a breastfeeding-supportive breastfeeding policy (step 1), staff and parent education at all levels (step 2), promotion of breastfeeding prenatally (step 3), extra assistance for women separated from their infants (step 5), the creation of a breastfeeding-friendly environment and the removal of formula advertising from the hospital and the NICU (step 6), and the creation of a support system after the mother's discharge (step 10).

Although since the gaining of Baby-Friendly status, the Breastfeeding Center at the BMC has created additional programs for the NICU, such as the peer counseling program implemented in 1999,[22] only 2 initiatives had targeted the NICU beyond the actual Baby-Friendly guidelines. First, we produced a patient education[23] video on kangaroo care, and second, we proactively increased access to electric breast pumps, which may have affected duration. In both 1995 and 1999, hospital-quality, double-pumping electric breast pumps were available to mothers of NICU infants in the postpartum unit. During the process of becoming Baby-Friendly, however, it was discovered that in many cases, a mother's ability to maintain lactation (as specified by step 5) while separated from her infant was compromised because of the lack of an electric breast pump at home. This was due primarily to inadequate or nonexistent health insurance and to the inaccessibility of breast pumps theoretically covered by insurance (the process of obtaining a pump proved too complicated for the family). In addition, the large percentage of impoverished women at the BMC meant that many mothers could not afford to rent breast pumps privately. In an attempt to remedy this situation and follow step 5, staff members were trained in assisting mothers to obtain pumps via insurance, and a grant-funded program was initiated in 1998 to ensure that pumps were available at home to all women who needed them, regardless of their financial situations. We established by an informal survey that approximately 40% of mothers of NICU infants either had no insurance or had some kind of insurance that would not pay for breast pump rental. This correlates with our finding elsewhere that approximately 35% of women giving birth at the BMC are uninsured.[20] The grant pump program has been described in detail elsewhere.[24]

The results of this study add weight to results already published regarding the effect of Baby-Friendly policies on breastfeeding rates in the US hospital setting[20] and to the importance of the Baby-Friendly Hospital Initiative internationally.[25] In both healthy term and NICU infants, the full implementation of Baby-Friendly policies at the BMC was associated with a significant rise in breastfeeding rates. These increases occurred despite the high percentage of women from underprivileged backgrounds and racial minorities, the groups traditionally most difficult to influence in terms of breastfeeding initiation and duration.

As practicing clinicians, we believe that many correlates associated with low breastfeeding rates in these populations (such as poverty, a lack of access to health care, and suboptimal educational status) are compounded by the NICU setting. A lack of education on the benefits of breast milk for premature infants, a lack of medical insurance for breast pumps, and the overwhelming practical issues of maintaining contact with hospitalized infants present extra barriers to breastfeeding NICU infants for impoverished families and put them in double jeopardy. Thus, the importance of a hospital system that is designed (by following the Ten Steps) to support breastfeeding and ease the complicated NICU situation is critical in vulnerable, low-income women who may lack the resources and the ability to advocate for themselves and for their infants.

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Resumen

La Iniciativa Hospital Amigo del Niño aumenta los índices de lactancia materna en una unidad de cuidados intensivos neonatal en Estados Unidos

El objetivo de este estudio fue evaluar el impacto de la nominación de Hospital Amigo en los índices de lactancia materna en una unidad de cuidados intensivos neonatal (UCIN). Se revisaron todas las historias clínicas de niños ingresados al Boston Medical Center, UCIN nivel III con 15 camas en 1995 (antes de la implementación de la norma de Hospital Amigo) y en 1999 (cuando se nominó Hospital Amigo). Se consideró un iniciador cuando el niño recibía algo de leche materna con cualquier método en la primera semana de alimentación. La demografía materna y de los niños fue comparable en 1995 y 1999. El índice de iniciación de lactancia materna en la UCIN aumento de 34.6% (1995) a 74.4% (1999) ($P < .001$). El índice de lactancia materna a las 2 semanas aumento de 27.9% (1995) a 65.9% (1999) ($P < .001$). El porcentaje de niños que eran amamantados exclusivamente a las dos semanas de edad aumento de 9.3% (1995) a 39% (1999) ($P = .002$). La implementción de las normas del Hospital Amigo que conlleva a la nominación de Hospital Amigo estuvo asociada al aumento de los índices de iniciación y duración de la lactancia materna en una UCIN en Estados Unidos.