

Research Article

Intense Lactation Specialist and Peer Support as Strategies to Improve Availability of Mother's Own Milk for Very Low Birth Weight (VLBW) Infants

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Abstract

Background: Despite being highly desirable, there is limited success discharging very low birth weight infants (VLBW) on mother's own milk.

Research aim: To explore interventions to improve lactation success based upon recommendations of lactating mothers of VLBW infants.

Methods: Prospective, two-phase project in an inner city, level IV NICU. Mothers of inborn VLBW who agreed to express breast milk and met eligibility criteria were followed from infants' birth to discharge. The first cohort receiving STANDARD breastfeeding support (n=50) was compared to a subsequent cohort receiving INTERVENTION (phone calls and peer group support sessions, n=50).

Results: Overall, lactation success at infant's discharge changed from 56% (STANDARD cohort, n=28) to 70% (INTERVENTION cohort n= 35); p=0.15. Lactation was significantly higher among mothers who were fully compliant to the intervention (INT COMPLIANT) as compared to the STANDARD cohort (n=20 of 24 vs. 28 of 50; p=0.003). In the STANDARD cohort, lactation success was significantly higher among mothers with higher than high school education as compared to mothers with lower or equal than high school education (n= 16 of 21, vs. n= 12 of 29; p=0.014). With intense intervention, rates of lactation among less educated mothers improved, attenuating the difference (n=20 of 24, vs. n=14 of 25; p=0.06).

Conclusion: For an ethnically diverse group of minority women, actually receiving intensified lactation specialists contact and peer support, the rates of lactation success at their VLBW infant's discharge improved. The positive effect impacted lactation among mothers with lower educational attainment.

ABBREVIATIONS

VLBW: Very Low Birth Weight

INTRODUCTION

Extensive research has documented the diverse and compelling advantages of human milk feeding for premature infants [1-8]. Despite it being highly desirable, there is relatively limited success in discharging very low birth weight (VLBW) infant's home on mother's own milk, with reported rates ranging from 30 to 62% [9-13]. While in term infants factors associated with initiation and maintenance of lactation have been extensively

studied, in VLBW infants, who predominantly receive expressed breast milk and are often critically ill, establishing lactation is more challenging and maternal factors that interfere with motivation for milk expression are not very well understood. It is known that low socioeconomic status minority women in the United States have not only the least success with lactation [14-16], but also the highest rates of prematurity [17]. The Holtz Children's Hospital's Neonatal Intensive Care Unit (NICU) serves a low socioeconomic and ethnically diverse population which benefits from a well-established lactation support program for mothers of VLBW infants. Despite initial success, with expressed breast milk initiation rates being as high as 90% of mothers, only

40% of the infants were discharged home on any breast milk prior to this study. Specific intervention strategies were needed to improve lactation success among minority women giving birth to VLBW premature infants, and who were breast-pump dependent for long periods of time in the NICU setting. Research suggested that increased support and targeted counseling could improve duration of lactation among mothers of infants admitted to the NICU [13,18-21]. The objective of this study was to explore the feasibility and effectiveness of interventions to improve lactation success in mothers of VLBW infants, developing simple, inexpensive interventions based upon the input of a cohort of lactating mothers of VLBW infants, and testing them in a subsequent cohort of similar mothers. Here we report how targeted support from lactation specialists and peer support from other mothers can improve rates of VLBW infants being discharged home on their own mother's milk.

MATERIALS AND METHODS

Design

Prospective observational feasibility pilot study, conducted between April 2005 and December 2008. The study was designed as a two-phase project. The first phase was observational participatory research with 50 mothers enrolled in the cohort. Subjects in this cohort were approached by a research assistant within 72 hours after delivery to answer a face-to-face questionnaire about their socio-economic, ethnic and cultural background as well as their personal beliefs in regards to breastfeeding and breast milk expression. The infants and mothers were followed throughout hospital stay with information on infant's health status being collected weekly. At a date close to infant's hospital discharge a second face-to-face questionnaire was obtained. On the discharge questionnaire the subjects were inquired about their overall experience with breast milk expression, indicated what had helped to motivate them, offered possible reasons for cessation of breast milk expression (if applicable) and suggestions for better retention on the program. They also, contributed with verbal and written insights towards the development of interventions to improve maternal motivation for breast milk expression while their infant's hospitalization in the NICU.

Data from maternal questionnaires was analyzed in quantitative and qualitative fashion. The second phase of the study aimed at testing the intervention (see details below) in a subsequent cohort of 50 mothers of VLBW infants. The first cohort of mothers received standard breastfeeding support provided by IBCLC certified lactation specialists (STANDARD). Standard support included the loan of hospital grade electric pumps, general breastfeeding educational material with video and one-to-one instructions on pump operation and milk storage. Extra counseling was provided by the lactation specialists upon parental demand. The second cohort of mothers received the standard breastfeeding support described above plus targeted, specific intervention aiming to improve maintenance of breast milk expression during NICU hospital stay of the infant (INTERVENTION). These interventions were designed in accordance to the demands from the first cohort of mothers for "increased support" as well as evidence based lactation support reviewed and discussed among the NICU lactation specialists

team. INTERVENTION consisted of regular phone calls and the opportunity to participate in breastfeeding peer group support sessions. The phone calls were intended to frequently assess breast milk expression status and the need for extra counseling at any point during the first month postpartum, a critical period for establishment of lactation. Calls were placed by a trained research assistant at enrollment (48h -72 hrs. after delivery), then weekly until 1 month after delivery, and then every other week until 2 months after delivery. Immediate referral to lactation specialists was done anytime questions were raised or problems with the pumping process/frequency were identified.

The breastfeeding peer group support sessions were held monthly, with the presence of a lactation specialist, a neonatologist and the research coordinator. The meetings were open to all mothers of infants receiving mother's own milk in the NICU, and included motivational speakers who were mothers of discharged VLBW infants who had been successful with pumping and breastfeeding. Spanish and Creole translation was available during these sessions, to facilitate participation of non-English speaking Hispanic and Haitian mothers. After each meeting, a written, anonymous evaluation form was completed by each participant. Additional information collected included the maternal medical history, and the infant's medical status and feeding progress at weekly intervals during the NICU stay.

Mothers who stopped pumping because of their infant's medical need for elemental nutrition were excluded from the analysis. In both cohorts, the mothers were interviewed and answered the same questionnaires.

Setting

In a level IV, 66 beds NICU at Holtz Children's Hospital, an inner-city teaching hospital affiliated with the University Of Miami Miller School Of Medicine that serves a low socio-economic and ethnically diverse population.

Sample

Eligible participants were mothers of inborn VLBW infants who had initially agreed to express breast milk for their own infants by enrolling in a NICU-based lactation support program sponsored by the Healthy Start Coalition of Miami-Dade County, and had infants who survived to discharge. The program provided a care coordinator for each mother, regular access to International Board Certified Lactation Consultant (IBCLC) certified lactation specialists and introduction to educational materials, including a breastfeeding video for mothers of preterm infants that each mother watched with her care coordinator and written breastfeeding education in 2 different languages (English and Spanish). Fifty electric hospital-grade breast pumps were available for loan without a rental fee while the infants were in the NICU and breast milk supplies (cooler, breast milk storage bags and containers) were also provided free of charge.

Women were ineligible for the study if they were ≤ 18 years of age, cognitively impaired, had a history of breast surgery, had contraindications to breastfeeding as listed in the 2012 American Academy of Pediatrics policy statement [22], or if their infant had any major congenital anomalies. The study received approval from the University of Miami Institutional Review Board.

Eligible women were approached by a research assistant about study participation within 72 hours of delivery and, if interested, provided consent. Consent was obtained in the mother's preferred language with appropriate consent forms.

Measurements

The primary outcome was lactation success, defined as an infant discharged from the NICU exclusively or partially receiving breast milk, with the mother actively lactating. Compliance with the intervention was defined as at least one successful phone contact with the mother in addition to the face to face interactions with the lactation specialists in the NICU, and maternal attendance at least one breastfeeding peer group support session. A subgroup of the cohorts with subjects who were compliant with the interventions (INT COMPLIANT) was analyzed separately.

In order to achieve an increase in breast feeding success at infant's discharge from 40% to 70%, with 85% power, the sample size was calculated as 50 mothers in each cohort. For statistical analysis chi-square or the Fisher Exact test were used for comparison of categorical variables. The significance level was set at $p < 0.05$.

RESULTS

During the study period 296 mothers were screened, 231 mothers were eligible for the Healthy Start lactation program, and 212 agreed to express breast milk for their own infants (92% of all mothers of VLBW infants admitted were enrolled in the breastfeeding lactation program). Of those 212 mothers enrolled in the program, 181 were eligible for the study. In the STANDARD cohort, 61 out of 98 eligible mothers consented to participate in the study (62%), and in the INTERVENTION cohort, 60 out of 80 eligible mothers consented to participate (72%). Of the 61 enrolled mothers in the STANDARD cohort, 11 were excluded from analysis because of infant death ($n=6$), infant medical condition requiring the use of elemental formula in the opinion of the primary physician ($n=4$), and self-withdrawal ($n=1$). Of the 57 mothers enrolled in the INTERVENTION cohort, 7 were excluded from analysis because of infant death ($n=2$), infant medical condition requiring use of elemental formula ($n=2$), self-withdrawal ($n=2$), and maternal death ($n=1$). Each cohort had 50 mothers ultimately enrolled as per the original study design (Figure 1).

The two cohorts were similar in all measured characteristics - maternal educational status, family income, marital status, age, parity, multiple gestation, and route of delivery previous breastfeeding experience, infant and maternal morbidities, gestational age, birth weight and infant's length of hospital stay (Table 1).

Qualitative analysis from discharge questionnaire to the STANDARD cohort of mothers revealed "need for increased support/information" ($n=14$) as the most common theme to the inquiries related to how to improve the current lactation program. Some of the comments by lactating mothers suggested: "A parent-to-parent group about breastfeeding, mothers who have breastfed can encourage mothers, who just had an infant at NICU, to breastfeed", "Stress needs to be talked about and

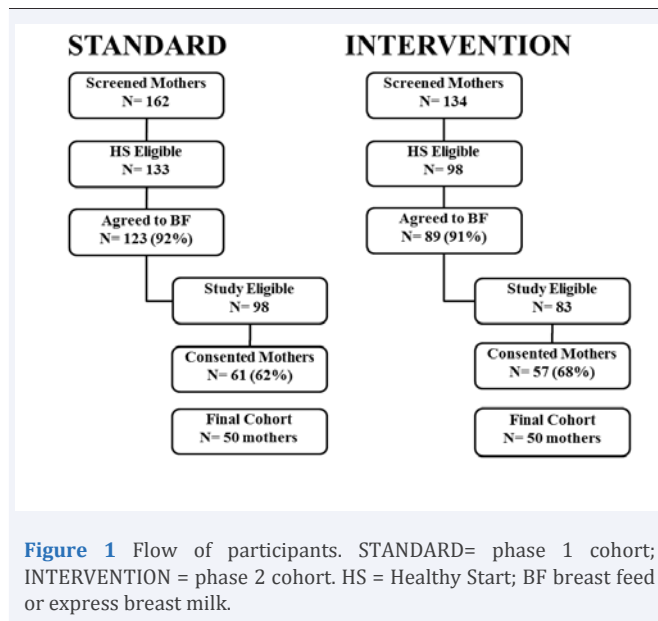


Table 1: Demographic data. * P= not significant; SD= Standard Deviation; GA= Gestational Age; BW= Birth Weight.

Characteristics*	STANDARD	INTERVENTION
Maternal age in years; Mean ± SD	31 ± 7	30 ± 6
Single, father uninvolved	50%	52%
Primiparous	66%	56%
Family income < US\$30,000/year	70%	80%
GA in weeks; Median (range)	29 (23-33)	28 (23-34)
BW in grams; Median (range)	1117 (575-1455)	1044 (560-1499)
Hospital stay in days; Median (range)	65 (29-168)	68 (21-156)
Multiple gestation	24%	24%
Previous breastfeeding experience	24%	22%
Cesarean section	70%	76%

listened..."; "Nurses need to talk to mothers...Talk to all parents all the time".

The distribution of the population according to ethnicity was diverse and largely composed of ethnic minorities. The single largest ethnic group in both cohorts was Hispanic (56% and 44% in the STANDARD and INTERVENTION cohorts, respectively) with mothers from Mexico, the Caribbean Islands, Central and South America. African Americans comprised the second most common ethnicity (24% and 34% in the STANDARD and INTERVENTION cohorts, respectively), followed by Caribbean Non-Hispanic Blacks (16 %) from Haiti, Bahamas, Jamaica, and other Caribbean Islands. White Non-Hispanics were only 2% (STANDARD) and 4 % (INTERVENTION) of the group. There was one African mother in the INTERVENTION cohort. The sample was representative of the actual population typically cared for at the Holtz Children's Hospital's NICU.

In the INTERVENTION cohort, 264 phone contacts were made.

On average there were 4.7 phone contacts per mother, and 82% of the mothers had at least 3 phone contacts. The breastfeeding peer group support sessions were attended by 48% of the mothers at least once. Mothers attending breastfeeding peer group support sessions were mostly of higher educational level (62% with more than high school education), from all the different ethnic groups. All mothers perceived the peer support groups positively according to their anonymous written evaluation forms after the meetings.

Lactation success at infant discharge is shown in Figure 2. Overall, with intense intervention beyond initial education and availability of lactation support staff, there was a change from 56% to 70% (n= 28 vs. n= 35; p=0.15) of mothers taking their infants home while still producing breast milk. The impact of the intervention was mostly due to an increase in exclusive mother's own milk at discharge, as the number of mothers who supplemented their infant's breast milk feeds with formula remained the same in the 2 cohorts (n=15). We further analyzed a subgroup of the INTERVENTION cohort, including only the mothers who were fully compliant to the intervention (INT COMPLIANT, n=24). Among the mothers who received more than one phone call and attended at least one breastfeeding support group meeting, the rate of lactation success was 83%, a significant increase when compared to the STANDARD cohort (p=0.003). The observed improvement resulted in an increased number of infants being discharged home exclusively on mother's own milk.

In the STANDARD cohort, lactation success was significantly higher among mothers with higher educational attainments (76% if more than high school education, n= 16/21, versus 41% if high school education or less, n= 12/29; p=0.014). Within the INTERVENTION cohort, however, rates of lactation among the less educated mothers improved, such that the difference in lactation success was no longer significant between greater and lesser educated women (83% if more than high school education, n=20/24, versus 57% if high school education or less, n=14/25 ; p=0.06) (Figure 3). When compliance with the intervention was evaluated, a majority of the mothers (62%) attending the breastfeeding peer support groups had greater than a high school education.

DISCUSSION

In summary, in this ethnically and culturally diverse population, higher lactation success rates were noted in the cohort receiving intensive support. Mothers in the INTERVENTION cohort who participated in breast-feeding peer group support sessions (INT COMPLIANT subgroup) had the highest rate of lactation success, while the earlier trend of lactation success favoring better-educated mothers was attenuated by the interventions in the later cohort.

These results represent one of the highest rates of lactation success at infant's hospital discharge among mothers of VLBW infants in the United States and draws attention to the effectiveness of intensification of support and counseling to increased rates of mother's own milk availability at NICU hospital discharge for these vulnerable patients. Previous efforts have focused on improving biological cues to enhance breastfeeding; in an observational study of mothers of VLBW infants, early

frequent milk expression (<6 hours after delivery and expression >= 5 times a day) and kangaroo care were independently associated with lactation beyond 40 weeks' conceptual age (19). Telephone follow-up has also been reported to be a positive strategy to sustain breastfeeding in mothers whose premature infants have been discharged home from a special care nursery [23]. In our study, the combined strategy of making frequent phone calls during the early postpartum period, to encourage the frequent pumping needed to establish breast milk production and the involvement in peer group support appears to have had a positive impact on outcome. The availability of lactation consultants was deemed to be very important by mothers in the STANDARD cohort, as they were able to address specific problems and concerns during the early critical period when pumping is extremely challenging, not only because of maternal factors but also because of the emotional difficulties associated with having an ill premature infant in the NICU in the acute phase of illness.

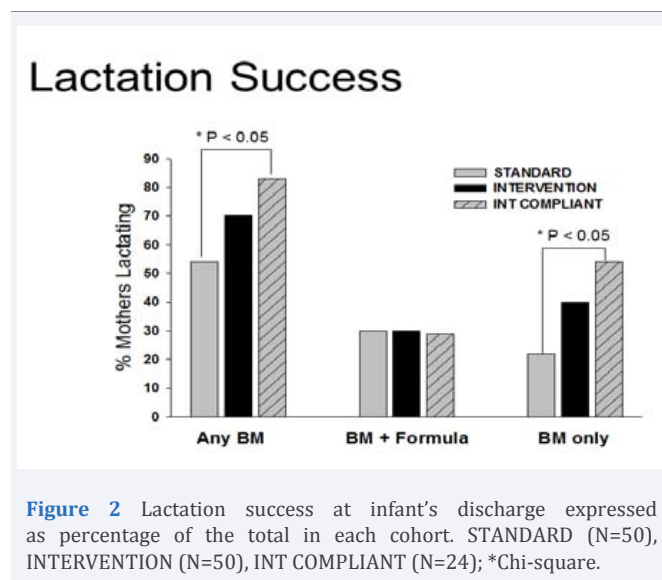


Figure 2 Lactation success at infant's discharge expressed as percentage of the total in each cohort. STANDARD (N=50), INTERVENTION (N=50), INT COMPLIANT (N=24); *Chi-square.

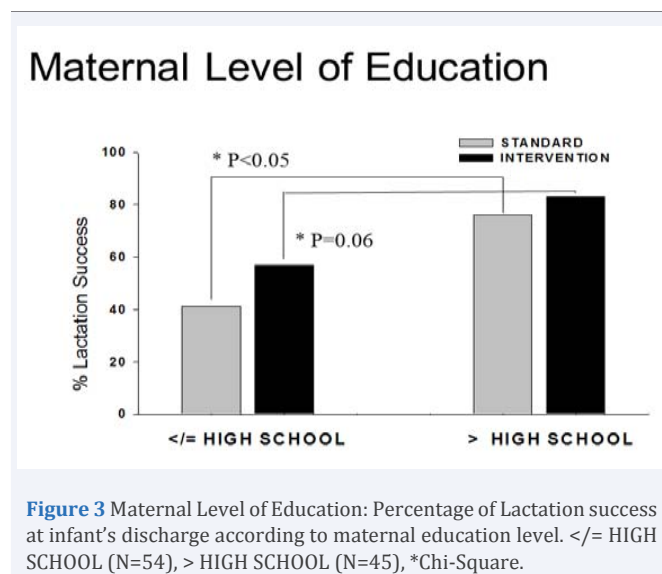


Figure 3 Maternal Level of Education: Percentage of Lactation success at infant's discharge according to maternal education level. <= HIGH SCHOOL (N=54), > HIGH SCHOOL (N=45), *Chi-Square.

Peer counseling programs using volunteer women from the community with previous breastfeeding experience has successfully raised breastfeeding rates among mothers of term infants [24,25]. A randomized controlled clinical trial among mothers of healthy premature infants, ranging from 32 to 37 weeks and admitted to the NICU, also showed positive results [18]. New mothers of VLBW infants have emphasized that one of the most important aspects of their relationship with the breastfeeding peer counselors was hearing the shared experience of how difficult it could be to provide milk while coping with the emotional stress of having an infant in the neonatal intensive care unit [26]. However, little is known about the impact of peer support approach on lactation success at infant discharge on mothers of critically ill premature infants, especially when extended periods of pumping are needed and motivation to sustain milk expression seems to be highly challenging. This study shows that breastfeeding support groups consisting of peer support has a positive impact on lactation success rates among mothers of VLBW infants. In our study peer support was provided by mothers living the NICU experience at the moment of their interaction as well as by mothers of infants who had been discharged. The peer support group meetings were well received by the mothers participating, an observation made based on only positive comments made on the anonymous written evaluations forms obtained from participating mothers after each meeting (data not shown).

The significantly higher lactation success observed in the subgroup of mothers fully compliant with the intervention (INT COMPLIANT) was attributed to their participation in peer group support sessions. In our study, it is possible that the higher level of maternal education, rather than the effect of peer support itself, resulted in higher motivation to express breast milk, to participate to breastfeeding peer support group meetings, and in longer duration of milk expression. However, the lactation success discrepancy between mothers with high school education or less compared to the mothers with more than high school education observed in the STANDARD cohort contrasts with the findings in the INTERVENTION cohort, where comparison of the lesser educated group to the better educated group showed no difference in duration of pumping, but rather appeared linked to acceptance of and participation in the interventions prescribed.

In a group of mothers of preterm infants who intend to breast feed, mere provision of a program where they are supplied with the necessary equipment and instruction to express breast milk is insufficient; efforts to provide additional support are crucial to improve motivation to maintain lactation until infants are ready for discharge. Peer group support, in addition to frequent assessment of maternal needs by the NICU lactation staff, is shown by this study to be a positive strategy to promote mother's own milk supply for VLBW infants until their hospital discharge.

LIMITATIONS

The major limitation to this study is that it was not a randomized controlled trial and comparison was made with a non-contemporaneous observational cohort. The study was designed to initially identify a maternal profile and do needs assessment, in order to create interventions specific for the target population. In addition, when the support groups started, we felt that excluding

mothers from participation in a randomized fashion would not be possible, as mothers communicate with each other in the unit, and exclusion could also create negative feelings towards the lactation staff and support group meetings themselves. Another limitation of the study was that not all mothers in the INTERVENTION cohort attended the support group meetings. This may have diluted the effect of the intervention. Strategies to encourage maternal attendance at peer group support meetings are crucial to the success of such programs. The impact of using incentives like transport tokens needs to be evaluated.

Because our outcome measure was lactation at discharge, the variable length of NICU stay between infants makes duration of breast milk intake comparisons challenging. In addition, our higher than expected lactation success at discharge of 56% for the STANDARD cohort, possibly influenced by maternal participation in the study, impacted the overall significance of our intervention ($p=0.15$). A larger sample size, calculated based on the higher baseline lactation success rates may have showed significance. Currently used quality indicators, including breast milk intake at discharge, may not be the best measure of dose and exposure duration to human milk in VLBW infants. A recent publication proposed evidence-based quality improvement measures which incorporate the percentage of human milk intake at 14 and 28 days of life for infants who received no human milk at discharge [27]. In the present study, the impact of the intervention on duration of breast milk intake in infants who did not go home receiving breast milk was not evaluated.

Targeted interventions to improve mother's own milk at VLBW infant's discharge have been evaluated in other countries and concluded that targeted health promotion policies in the NICU are necessary to increase lactation support to mothers and could improve rates in multiple cultural settings [28,29].

CONCLUSION

In conclusion, our pilot study shows that intensification of lactation support to a population of minority and ethnically diverse women is a feasible strategy that may improve availability of mother's own milk feeding at discharge for VLBW infants as long as mothers commit to receive the intensive support offered. Intervention based on frequent assessment/counseling of breast milk expression and a peer support component resulted in an impressive, although non-significant overall increase in lactation success at VLBW infant's discharge. Efforts to promote lactation success in the NICU setting, based upon intensive maternal support as desired by the women themselves, favors lactation success in mothers of VLBW with lower educational attainment. Further studies are needed to address strategies for better maternal engagement and participation into targeted population NICU lactation programs.

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