Human Milk Provision Experiences, Goals, and Outcomes for Teen Mothers with Low-Birth-Weight Infants in the Neonatal Intensive Care Unit

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Abstract

Introduction: Breastfeeding rates are virtually unknown for teen mothers whose low-birth-weight (LBW; <2500 gm) infants are hospitalized in the neonatal intensive care unit (NICU). The objective was to examine the infant feeding experiences, goals, and outcomes of teen mothers of LBW infants.

Methods: We conducted a multimethod study using a qualitative research design, survey, and infant medical records. The primary data source was individual interviews conducted with teen mothers of LBW infants hospitalized in a tertiary NICU. Content analysis and descriptive statistics were used for data analysis.

Results: All 15 teen mothers (12 black, 3 Hispanic) wanted what was best for their infants and initiated lactation by breast pump. However, maintaining lactation was challenging and the following barriers were identified: fear of being judged; body image issues; influence of the maternal grandmother; and disorganized thought processes about combining pumping with returning to school or work. Despite these barriers, 50% of the teen mothers met their goals for human milk provision at NICU discharge.

Conclusion: Most of the teen mothers' lactation barriers reflected their adolescent developmental stage. Potential interventions are identified and include focus groups with teen mothers and maternal grandmothers and lactation support by NICU-based teen breastfeeding peer counselors.

Keywords: teen mothers, breastfeeding, NICU, premature infant, outcomes, qualitative

Introduction

BREASTFEEDING RATES ARE disproportionately low among teen mothers (<20 years of age) in the United States, with 58.6% of teen mothers ever breastfeeding compared with 80.0% of the general population.¹ These rates are virtually unknown for teen mothers whose low-birth-weight (LBW; <2500 g; includes very low-birth-weight [VLBW; <1500 g] and extremely low-birth-weight [ELBW; <1000 g]) infants are hospitalized in the neonatal intensive care unit (NICU).

In 2014, teenagers gave birth to over one-fifth (20.5%) of all LBW infants in the United States,² the highest percentage of any age group. Black teenagers are 1.5 times more likely to give birth to an LBW infant when compared with white or Hispanic teenagers.² However, only 30% of *full-term infants* born to black teen mothers are ever breastfed³ and infants of black teen mothers are significantly less likely to receive *any* human milk (HM) than infants born to nonblack teen mothers.⁴

These racial and ethnic disparities persist regardless of access to or utilization of prenatal care.⁵

LBW infants, especially those who are VLBW and ELBW, are vulnerable to prematurity-associated morbidities, which increase the risk of lifelong health and neurodevelopmental problems, which also increase costs for families, healthcare, and educational systems, and for society at large.⁶ HM from the infant's own mother (excludes donor HM) represents a safe and effective approach to reducing the risk of morbidities during and after the NICU hospitalization.^{7–10} Given the low breastfeeding rates for teen mothers in general, little is known about the specific lactation needs and outcomes of the particularly vulnerable population with LBW infants hospitalized in the NICU.

The purpose of this research was to describe the HM provision experiences, goals, and outcomes for teen mothers of LBW infants hospitalized in the NICU. We were specifically interested in understanding the unique attitudes, concerns, and perceptions of barriers and facilitators to the provision of HM for this understudied population.

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TABLE 1. SAMPLE QUESTIONS FROM INTERVIEW GUIDE

<i>Topic</i>	<i>Question</i>
Birth experience	How is your baby doing? Tell me about your birth (Probes: How many weeks gestation, C/S or vaginal, did you hear your baby cry, what were your thoughts in the delivery room, who was with you)
Pregnancy	Tell me about when you found out you were pregnant. How did you tell your parents? How did they respond? Classmates, friends, school? First OB appointment?
Relationship with baby's father	What is your relationship like with the father of your baby?
Social support system	In general, who do you turn to for support? During pregnancy, who was most important? postpartum?
Infant feeding	How are you feeding your baby? When did you decide that? Who or what influenced you? Any pressure? What does your family say about your decision? Your friends? How is pumping going? What concerns do you have about pumping? What does it mean to you to provide milk? Who do you turn to for BF help and why? What kinds of caretaking things do you do for your baby?
Discharge and beyond	As you look ahead, what do you think about when you think about going home with your baby? What are your concerns? Where are you and baby going to live? School? Work? Infant care? Financial support?

Materials and Methods

This study was undertaken to provide pilot and feasibility data for subsequent research to develop and test interventions supporting the provision of HM by teen mothers with LBW infants hospitalized in the NICU. This was a multimethod study that incorporated a qualitative, descriptive research design, a demographic survey instrument, and infant medical records.

Sample and setting

All eligible subjects were invited to participate. Maternal inclusion criteria were 14 to 19 years of age; ability to speak and read English; and maternal custody of a LBW infant hospitalized in the NICU whose survival was expected. Although all subjects initiated lactation, neither the decision to provide HM nor the initiation of lactation was an inclusion criterion. The study was conducted in a 72-bed single-patient room tertiary NICU in Chicago that prioritizes the feeding of HM and the employment of breastfeeding peer counselors (BPCs), all of whom are parents of former NICU infants. The institutional review board (IRB) of Rush University Medical Center approved the study and written informed consent was obtained from subjects.

Data collection

The primary source of data was in-depth, semistructured individual interviews conducted in the infant NICU room ~4 weeks (mean 3.5 weeks; range 10 days to 9 weeks) after infant admission to the NICU. This time period was chosen specifically to give mothers time to adapt to the NICU environment and to the routine of breast pump use for HM provision. An interview guide was developed by the research team specifically for this study based on previous research conducted by this team with mothers of VLBW infants hospitalized in the NICU^{11–13} and with input from mothers attending a weekly luncheon that provides a forum for evidence-based group lactation care, in which families also share their own concerns and experiences.^{8,12} The interview

guide was trialed on the first two participants and no significant changes were made. See Table 1 for representative questions from the interview guide.

The interview began with participants being invited to share their pregnancy and birth stories. This approach was a purposeful developmental strategy designed to empower the teen mothers by having them recount events in their own style.¹⁴ Questions then segued into attitudes and concerns about infant feeding experiences, support systems, lactation goals, and perceptions of facilitators and barriers to the provision of HM. Interviews lasted an average of 38 minutes (20–45 minutes) and were digitally recorded. Interviews were conducted by the Principal Investigator who did not provide clinical care to the participants or their infants and was thus blinded to any interactions that had taken place in the clinical area.

Following the qualitative component of the study, participants completed a written questionnaire that focused on infant and maternal characteristics, feeding goals, and social support. Infant medical records were used to determine infant feeding type (exclusive HM [EHM], formula, or a combination of HM and formula) and method (exclusive at-breast, EHM by bottle, HM through both breast and bottle, or exclusive formula by bottle), as recorded in the 72 hours before NICU discharge. The date of the last HM feeding received by infants whose mothers discontinued breast pump use before NICU discharge was also recorded. Data collection occurred between December 2014 and May 2016.

Analysis

Conventional content analysis,¹⁵ which reflects the perceptions and experiences of the participants studied rather than being hypothesis driven, was used to analyze the qualitative data. Our analysis was guided by aspects of several classic data analysis strategies^{16–18} and followed these basic steps: (1) interviews were transcribed verbatim and checked for accuracy; (2) coding began with the first three interviews to identify core consistencies and develop initial codes; (3)

these codes were compared and contrasted within and across the remaining interviews and new codes were added for data that did not fit into the initial coding system; and (4) codes were then combined and refined further into larger units of analysis or themes.¹⁹ All of the interviews were read and coded separately by two team members. Differences in coding were discussed with the team until agreement was reached.

Rigor was maintained by keeping an audit trail of field notes written after each interview and of the coding process. Descriptive statistics were used to describe sample characteristics and infant feeding outcomes.

Results

Characteristic of the sample

Fifteen teen mothers participated in this study. All subjects were low-income, minority (black = 80%; Hispanic = 20%) first-time mothers and 14/15 were unmarried. All participants initiated lactation and began providing HM using a breast pump. The majority (87%) indicated they were dependent upon their families for childcare and financial support. Six eligible subjects (5 black, 1 white) were unable to participate due to the following reasons: incarceration before the interview (1); losing custody of infant (1); mental illness requiring treatment (1); and inability to contact to arrange interview or failure to attend scheduled interview (3). Characteristics of the subjects are described in Table 2.

Teen mothers' HM provision experiences: attitudes, concerns, barriers, and facilitators

Data from the qualitative interviews provided insight into the mothers' initial decisions to provide HM, concerns about breast pump use, and perceptions of barriers and facilitators. These HM provision experiences are described within the primary themes: "Wanting to do the right thing" and "Everything's fine".

Wanting to do the right thing

Teen mothers wanted to do the right thing by prioritizing what was best for their infants and by being responsible mothers. All of the mothers initiated lactation and began providing HM as a demonstration of this responsible behavior, as one teen mother commented: "That's what a mother's supposed to do, put her kids first." Although all but one ($n = 14$) stated that the decision to provide HM was theirs alone, the mothers acknowledged the influence of others (Table 3). Most notably, teen mothers who had decided to breastfeed either before or early in pregnancy spoke of the influence of their mothers, particularly if they had been breastfed by their mothers ($n = 3$) or watched their mothers breastfeed a younger sibling ($n = 5$).

Five teen mothers changed their decision from formula to HM after giving birth and hearing about the importance of HM for their infants from the racially diverse NICU-based BPCs: "I gotta put my own needs aside and just do it to help him, to do the right thing." The mothers described the BPCs as helpful and knowledgeable and appreciated the thoroughness of the initial visits: "Two ladies came in before I even saw my baby and showed me how to pump and told me all the benefits for him and for me." "She was telling me

TABLE 2. DESCRIPTIVE STATISTICS FOR STUDY PARTICIPANTS ($N = 15$)

<i>Maternal characteristics</i>	<i>Sample characteristics n (%)</i>
Race	
African American	12 (80)
Hispanic	3 (20)
Economic status	
WIC eligible	14 (100)
Education	
In high school	4 (27)
High school graduate	11 (73)
In college	4
Employment	
Not employed	10 (67)
Employed full-time	2 (13)
Employed part-time	3 (20)
Marital status	
Married	1 (7)
Living with parents	12 (80)
Living with FOB	1 (7)
Living in college dorm	1 (7)
Gravida	
Primiparae	15 (100)
Type of birth	
Vaginal	9 (60)
Preterm labor	7
Preeclampsia	2
Cesarean section	6 (40)
Twins	2 sets
Preeclampsia	2
Fetal distress	1
Breech	1
Attendance at childbirth/breastfeeding classes	
Yes	3 (20)
No	12 (80)
Providing milk at data collection	
Yes	12 (80)
No	3 (20)
Low milk supply at data collection	
No	4 (27)
Yes	11 (73)
Infant receiving donor HM or formula	8 (53)
Infant receiving stored HM	3 (21)
Mean (range)	
Maternal age, years	18.1 (15–19)
Infant birth weight, gram	1285 (710–2140)
Gestational age at birth, week	28.2 (25–34)

FOB, father of the baby; HM, human milk.

a lot of information. I thought I knew more stuff that I already know."

Everything's fine

Ten of the mothers claimed it was difficult to maintain a regular HM removal schedule and expressed concerns about multiple lactation problems, including diet, breast and nipple pain, low HM volume, a belief in breastfeeding myths, and

TABLE 3. TEENAGER'S SUPPORTIVE NETWORK

Sources of support*	n
Teen's mother	10
Infant's father	7
Teen's grandmother/aunt	4
Breastfeeding influence* (prenatal)	
Teen's mother	11
Healthcare provider/lactation	10
Infant's paternal grandmother	3
Teen's grandmother/aunt	4
Infant's father	2
Postpartum breastfeeding support	
Teen's mother	11
Lactation team	4
Childcare responsibility*	
Teen's mother	12
Infant's father	4
Infant's paternal grandmother	3
Teen's aunt	3

*More than one answer given; $n > 15$.

% not provided.

body image issues. However, when members of the lactation team implemented a proactive approach to lactation problems, asking the mothers if they had questions or needed help, the majority of subjects responded with some variation of the statement: "Everything's fine."

Time, space, and body issue concerns. Within the theme of "Everything's Fine", teen mothers independently decided to decrease the daily frequency of breast pump use for various reasons: "There are other things at home needing doing." "I just didn't like that I was wetting up all my shirts." "He don't like it (HM) no more." Teen mothers who were returning to school ($n=8$) or jobs ($n=5$) were naive about principles of supply and demand for lactation regulation despite its being a core teaching principle in the NICU where the study was conducted. "I just won't pump for eight hours. It'll be fine."

The mothers were also unclear about how they would find time and space to remove and store milk, stating honestly: "Didn't think about that yet." One black teen mother, whose self-reported goal was to provide HM for 6 months, noticed a significant reduction in her supply after she just decided to decrease the frequency of breast pump use because she thought she had too much milk. When asked about her HM volume versus her goals, she replied: "Everything's fine. I don't have any questions or concerns." She stopped providing HM 2 weeks after study participation.

Comfort with family versus NICU staff for continued breastfeeding support

While NICU staff and BPCs were instrumental in helping teen mothers confirm their decision to initiate lactation, most subjects stated they would turn to their own mothers for any further breastfeeding assistance (Table 3). However, the breastfeeding assistance their mothers provided was anecdotal rather than experiential or evidence based because

none of the grandmothers had provided HM for an LBW infant hospitalized in the NICU. Only three of the teen mothers were breastfed as babies (two black and one Hispanic). Four teen mothers stated that their mothers said they tried to breastfeed them, but they "didn't like it" or "wouldn't latch on."

Four black teen mothers, who claimed their mothers supported their decision to provide HM, shared comments made by their mothers. These included: "Why would you want to do that (provide HM)?" "I bet you're not gonna do it (provide HM)." and "Don't it hurt?" Another maternal grandmother refused to assist her daughter in acquiring a breast pump for use at home because the grandmother did not think it was necessary. Despite these disparaging statements and behaviors on the part of the maternal grandmother, the teen mothers stated it was easy to "just ask my mom or my auntie questions," implying an ease with their family's advice and support.

This level of comfort did not extend to the teen mothers' relationship with the lactation team. Five teen mothers commented that they were afraid to talk with the BPCs because they perceived they had failed for not keeping to a schedule with respect to breast pump use and were afraid of being judged. A second reason the BPCs were not consulted by the teen mothers was embarrassment at having the breasts exposed so the BPCs could provide assistance with breast pump use or feeding at the breast. They did not want the BPCs to stand there watching, nor did they want hands-on care.

This sentiment was especially strong with respect to feeding at the breast, which eight mothers referred to as nasty or disgusting. Three of these eight mothers had stated their prenatal intentions were to breastfeed. However, they disliked the feeling of pumping, became embarrassed at the thought of breastfeeding in front of anyone, and discontinued breast pumping before their infant's NICU discharge. One mother's remarks exemplified this subtheme: "You see people just whipping it out. Well, no thanks! No baby of mine is doing that anywhere!"

Human milk provision goals and outcomes

The teen mothers had varied goals for providing HM (Table 4). Three had discontinued breast pump use at the time of the interview due to low HM volume, and goals for the 12 remaining subjects (80%) included providing EHM for "as long as he's in here" and "until it dries up." Despite goals for continued HM provision, 10 of the 12 mothers still using the breast pump reported low HM volume at the time of data collection.

Despite low HM volume, 50% ($n=6$; 40% of the entire sample) of the 12 teen mothers met their goals of providing HM throughout the NICU hospitalization. (Table 4) Four of nine black teen mothers were providing EHM by bottle at the time of NICU discharge, and two of three Hispanic mothers were providing partial HM by bottle. Duration of the NICU hospitalization (19–165 days (mean = 59; median = 56) did not reveal a pattern with respect to continued HM provision through to NICU discharge. At NICU discharge, none of the five mothers (3 black, 2 Hispanic) achieved their self-stated goals to feed at breast, although two were still providing EHM by bottle.

TABLE 4. OUTCOMES

<i>Participant/ Age</i>	<i>Prenatal goal</i>	<i>Postbirth feed type</i>	<i>Postbirth feeding goal</i>	<i>Length of NICU Stay, days</i>	<i>Last day of HM feeding</i>	<i>Feeding Type at NICU Discharge</i>
1 (B/18)	Formula	HM	**HM by bottle for 3 months	15	DOL 13	PTF
2 (B/18)	Formula	HM	Had discontinued pumping by data collection	103	DOL 48	PTF
3* (B/19)	BF	HM	**Exclusive HM through combined at-breast and bottle for 1 yr	37	DOL 37	Exclusive HM by bottle
4 (B/15)	BF	HM	Had discontinued pumping by data collection	24	DOL 10	PTF
5 (B/19)	BF	HM	**Exclusive HM through combined at-breast and bottle for 6 months	78	DOL 27	PTF
6* (B/19)	Formula	HM	**HM by bottle for 6 months	65	DOL 65	Exclusive HM by bottle
7* (B/19)	BF	HM	**HM by bottle for 1 year	165	DOL 165	Exclusive HM by bottle
8 (H/19)	BF	HM	**At-breast feeds for an indefinite time period	62	DOL 44	PTF
9 (B/18)	Formula	HM	**At-breast feeds for an indefinite time period	86	DOL 86 (Had discontinued pumping DOL 66)	Receiving frozen stored HM.
10 (B/18)	Formula	HM	**HM by bottle for 1 year	56	DOL 42	PTF
11 (B/18)	BF	HM	**HM by bottle for 1 year	53	DOL 21	PTF
12* (B/19)	BF	HM	**Exclusive HM through combined at-breast and bottle until NICU discharge	19	DOL 19	Exclusive HM by bottle
13* (H/19)	Combination BF and Formula	HM and PTF	**Combination of at-breast feeding and PTF for 1 year	20	DOL 20	Combination HM by bottle and PTF
14* (H/18)	BF	HM	**Combination of at-breast feeding and PTF for 1 year	22	DOL 22	Combination HM by bottle and PTF
15 (B/16)	Combination BF and Formula	HM	Had discontinued pumping by data collection	82	DOL 46	PTF

*Providing HM at NICU discharge.

**Postbirth goal for providing HM at NICU discharge and/or longer.

B, black; BF, breastfeed; DOL, day of life; H, Hispanic; HM, human milk from the infant's own mother (excludes donor HM); NICU, neonatal intensive care unit; PTF, preterm formula.

Discussion

This study reports the experiences, goals, and outcomes of HM provision for 15 teen mothers during the NICU hospitalization of their LBW infants. Our findings reveal that all 15 mothers wanted to do the right thing for their LBW infants and initiated breast pump use. The mothers experienced challenges once HM provision began, but they hid these difficulties, outwardly portraying themselves as being in control even as their HM volume declined.

Furthermore, the perceptions of being judged for their inconsistencies in breast pump use and embarrassment with breast exposure made the mothers less willing to seek assistance from the NICU BPCs. Instead, the teen mothers turned to their own mothers for lactation support even though their mothers lacked breastfeeding experience and knowledge and made disparaging comments about breast pump use and feeding at the breast. Despite these barriers, 50% of the subjects, including 44% of the black teen mothers, met their goals for partial or exclusive HM provision at NICU discharge.

Consistent with our previous studies that enrolled mostly minority mothers of VLBW infants hospitalized in the NICU, all of the teen mothers began HM provision even if their prenatal intent had been to feed formula.^{13,20,21} These findings indicate that the targeted messaging used in this NICU to promote HM feedings is effective for teen as well as nonteen mothers.^{7,22} Furthermore, 14 of 15 teen mothers took ownership of this decision claiming it was theirs alone, viewing it as a responsible decision that prioritized their infants' needs over their own and acknowledging that doing so was a positive statement of what mothers were supposed to do.^{11,22}

Teen mothers' experiences also paralleled nonteen mothers' experiences from the anxieties of coping with a very preterm infant in the NICU to disliking the frustration and lifestyle challenges of providing HM for an NICU infant.^{12,23,24} However, teen mothers differed from nonteen mothers with respect to their reluctance to engage the NICU BPCs to assist with common HM provision barriers. For example, the teen mothers described decreasing HM volume due to the dislike of breast pump use and did not seek help with organizing a pumping schedule when they returned to school or work.^{7,12} Whereas our previous studies indicate that nonteen mothers sought help from the BPCs to address lactation barriers such as this,^{11,13,22} the teen mothers feared being judged by the BPCs.

These concerns, in combination with embarrassment about having the BPCs see and/or handle their breasts, emerged as barriers to the acceptability and effectiveness of the BPC lactation care model with teen mothers. This behavior highlights the teen mothers' social and emotional immaturity and suggests that teen mothers may respond better to a teen BPC, whom they perceive as a true peer. A former BPC in the study NICU was a teen mother whose experience made her especially effective with other teen mothers.²⁵

In our previous studies, the nonteen mothers of VLBW infants relied upon the NICU BPCs for lactation care and emotional support because their family and friends did not understand their NICU-specific needs.^{11,22} In contrast, the teen mothers reported that they sought support and assistance from their own mothers despite the fact that the maternal

grandmothers frequently disparaged the mothers' HM provision efforts.

Other studies have revealed that teen mothers perceive their own mothers as supportive notwithstanding the grandmothers' negative impact on lactation outcomes.^{26–28} This apparent contradiction in support may be more nuanced than simply assuming the maternal grandmothers discouraged the mothers' long-term lactation goals. Instead, we propose an alternate hypothesis; the perception of support may reflect the grandmother's supporting the *mother's own ambivalence* about continued HM provision, thereby validating the teen mother's need or desire to scale back or discontinue pumping as the NICU hospitalization progressed.

It is also likely that the grandmothers may have prioritized school or work versus the uncertain or tangential benefits of HM for the LBW infant. Previous research has shown that breastfeeding support may not be met for teen mothers residing in three-generation households (grandmother, teen mother, and infant) as maternal grandmothers preferentially support their daughters' transition from adolescent dependency to adult autonomy.^{27,29,30} Thus, the teen mothers may have perceived support from maternal grandmothers even though this support was more focused on the mothers themselves than their LBW infants.

GOALS: setting and changing goals

At NICU discharge, four and two teen mothers were still providing exclusive and partial HM by bottle, respectively, and an additional mother had sufficient frozen HM so that her infant was receiving exclusive HM even though she had stopped pumping. These HM feeding rates are similar to those reported for mothers with VLBW infants at NICU discharge.^{20,31,32} Several studies of mothers with VLBW infants suggest that the duration of the NICU hospitalization negatively impacts the achievement of goals for HM provision.^{20,33} Although the findings from this study do not reveal a comparable trend, the small sample size of LBW (versus only VLBW or ELBW) infants and having only one measured HM feeding goal preclude any speculation about the effect of the duration of NICU hospitalization on achievement of HM feeding goals for the teen mothers.

Potential interventions for subsequent research

A primary purpose of this pilot study was to identify potentially modifiable barriers to HM provision in this population that could be developed and tested in subsequent research. Most barriers were related to the developmental stage of the teen mothers, including disorganized thought processes and lack of planning with respect to combining HM provision with other obligations; fear of being judged and criticized; embarrassment about having lactation experts view their breasts; and dependence upon the maternal grandmother for support.

Several studies have targeted nonlactation interventions for NICU teen mothers based on developmental stage.^{34–36} These previous studies suggest that focus groups of teen mothers and maternal grandmothers may be effective in the design and implementation of effective HM provision programs in this population.³⁷ Also worthy of consideration is

the employment of NICU-based teen BPCs and the incorporation of social media alternatives to traditional lactation care.^{38,39}

Limitations

The primary limitations in this study include the small sample size and the fact that data were collected in a single NICU that prioritizes HM feeding and standardized messaging for physicians, nurses, dietitians, and BPCs. Similarly, our sample consisted primarily of black, low-income urban mothers, but data indicate that these demographic characteristics are most associated with teen birth.²

Conclusion

Teen mothers of LBW infants hospitalized in the NICU wanted to do what was best for their infants and began HM provision, prioritizing the infant's needs over their own. All teen mothers encountered barriers to HM provision, most of which reflected their adolescent developmental stage. Despite multiple barriers, nearly 50% of the teen mothers achieved their self-stated goal to provide HM through to NICU discharge. Potential modifiable barriers and interventions for subsequent research are outlined.

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Disclosure Statement

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