

The Breastfeeding Experience of Mothers of Preterm Infants

By

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ABSTRACT

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It is universally recognized by health care professionals that breast milk is the ideal food for newborns. Evidence is accumulating to support the benefits of breastfeeding and breast milk for premature infants. The literature identifies hospital-based support interventions that have been demonstrated by nursing research to assist mothers and their preterm infants to initiate lactation successfully. It also describes the multiple barriers that exist which make success difficult.

This descriptive study describes the experience of the mothers of premature infants hospitalized at the Doernbecher Neonatal Care Center of Oregon Health Sciences University Hospital where many support interventions are utilized by the nursing staff to promote breastfeeding of the premature infant. A questionnaire was developed to collect information from the mothers about their breastfeeding experience both during hospitalization and six to twelve weeks after the infants' discharge home. The questions asked for demographic information; detailed information about initiation of lactation, breastfeeding, and use of support services during the hospitalization period; feeding outcomes after discharge; and responses to three open-ended questions about the breastfeeding experience.

These questionnaires were sent to the homes of 24 mothers identified as eligible

six to nine weeks after their infants were discharged from the hospital. A total of nine (37.5%) mothers completed and returned the questionnaire.

At the time of follow up two of the nine were breastfeeding only, one was providing all breast milk but using both breast and bottle; the remaining six were bottle feeding-only (3 breast milk and formula, 3 formula only). Cross tabulations of maternal and infant characteristics with feeding method outcomes revealed that the two mothers breastfeeding-only had infants with the shortest hospital stays, the highest birth weights and the greatest mean gestational age of the sample. Comments made by the mothers in the open-ended portion of the questionnaire echoed what has been reported in the nursing literature regarding barriers to breastfeeding success and the importance of the nurse-mother relationship.

The implications of this study are limited by the small sample. Results do suggest that the difficulties associated with breastfeeding premature infants have not been surmounted by in-hospital support interventions, and that future studies might best begin with an assessment of the nursing staff regarding their perceptions of breastfeeding support and their specific practices in this regard.

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CHAPTER ONE

Introduction

Breast milk is universally recommended by health-care professionals as the ideal food for newborns (American Academy of Pediatrics, 1982; American College of Obstetricians and Gynecologists, 1988; American Dietetic Association, 1986; National Association of Pediatric Nurse Associates and Practitioners, 1988). Benefits to the infant are long term even when breast milk is received for a relatively short time. In a study of term infants it was shown that breastfeeding during the first thirteen weeks of life conferred protection against gastrointestinal illness that persisted beyond thirteen weeks through the twenty-four month period of observation (Howie, Forsyth, Ogston, Clark, & Florey, 1990).

Breast milk analysis is complex due to the dynamic nature of its composition not only over the course of the day but over the course of the lactation period as well. The components of preterm breast milk have not been as thoroughly studied as milk from mothers of term infants. However, there is evidence for the superiority of breast milk over formulas for preterm infants. Recent studies have shown that preterm milk from the infant's own mother contains cholesterol, phospholipids, medium-chain fatty acids, sodium, and chloride in concentrations especially suited to the premature infant's needs. Despite determined deficiencies in protein and calcium, the pattern of growth associated with its use more closely matches the pattern of normal fetal growth than does the growth seen with formula constituted for premature infants (Lawrence, 1994). In addition, human milk has been shown to have beneficial effects specifically on

neurological development. Premature infants tested at seven and one-half to eight years of age, who had received breast milk, had an 8.3-point I.Q. advantage over those who had not. This was true even after adjustment for differences in mother's education and social class and for those infants who received breast milk via tube rather than by feeding at the breast (Lucas, Morley, Cole, Lister, & Leeson-Payne, 1992).

Providing breastfeeding support for mothers has long been within the scope of nursing practice. The breastfeeding problems of premature infants are the focus of Interrupted Breastfeeding, a nursing diagnosis added to the North American Nursing Diagnosis Association's taxonomy in 1992. It specifically addresses the response that occurs when a breastfed baby cannot be put to breast for some or all of the feedings (Henrikson, Wall, McClurg & Lethbridge, 1993), an experience that is nearly universal for premature infant and mother pairs.

Statement of the Problem

In the Doernbecher Neonatal Care Center (DNCC) at the Oregon Health Sciences University Hospital, many nursing measures are employed to assist mothers to breastfeed their preterm infants. Counseling sessions with a professional breastfeeding consultant are available to mothers. Two of the registered nurse (RN) staff have taken a breastfeeding consultation course and are designated as resource personnel both to the mothers and to other nurses who are assisting mothers to breastfeed. Handouts inform mothers how to pump and store breast milk; videos are available to guide the process with premature infants. Electric breast pumps are readily available to mothers for use during the infant's hospitalization. When feasible, skin-to-skin (kangaroo) care is

encouraged and facilitated.

The RN staff at DNCC numbers more than 100 and there is no consistent approach employed by the nurses to provide assistance to these mothers and their infants. There are large variations among the nursing staff regarding what determines an infant's readiness for oral feedings. Criteria focusing on gestation and weight are giving way to a primary focus on individual infant behaviors such as sucking and a readiness signaled by active-alert and quiet-alert states as described by Siddell and Froman (1994). However, no specific profile of infant behaviors is known to predict success. In addition, there is no system in place for documenting the progress of these mothers and infants. There was a plan to begin using LATCH, a breastfeeding charting system and documentation tool (Jensen, Wallace, & Kelsay, 1994), but it has not yet been implemented.

During nine years as a neonatal RN, this investigator has assisted mothers during breastfeeding sessions relying on handouts, videos, personal breastfeeding experience, helpful hints from others, and consultation services. Often, when infants are approaching discharge, the majority of their feedings are taken from the bottle. The changeover to breastfeeding has begun, but rarely has progressed to full feedings at the breast. Thus, at discharge, the mother goes home planning to make the transition from bottle to breast. She is responsible for continued pumping, bottle-feeding, and breastfeeding during this transition. The unit's breastfeeding consultant, who is on faculty at the University's School of Nursing, has no accumulated data regarding the breastfeeding experience or continuation rates of breastfeeding of preterm infants after

discharge.

What is the experience of these mothers during hospitalization and after discharge? What is the feeding outcome? How well are the staff nurses doing in supporting breastfeeding so that it can be continued after discharge? In order to examine our current practice and to recommend changes, information is needed from the mothers whose infants have been hospitalized in our unit. Their reports, perceptions, and opinions would provide a starting point for the evaluation of our nursing practice in regard to breastfeeding support.

CHAPTER TWO

Review of the Literature

The art of breastfeeding does not come automatically to the mother-infant pair. Even for mothers of term infants, successful breastfeeding develops over time, a process described by mothers as a complex interactive process resulting in mutual satisfaction of maternal and infant needs. Maternal perceptions of successful breastfeeding were studied by Leff, Gagne, and Jefferis (1994). A qualitative research design using data from interviews of twenty-six mothers led to the identification of five categories important to their perception of breastfeeding success. These were infant health, infant satisfaction, maternal enjoyment, attainment of desired maternal role, and compatibility with lifestyle. McMahon (1990) reviewed and reported on data relevant to breastfeeding taken from a larger study of the experiences and expectations of first-time motherhood. Despite a strong motivation to breastfeed, forty-four percent ($n=50$) of the new mothers approached their first breastfeeding experience with negative expectations and thirty percent reported problems in the post-natal period.

When the infant is premature, breastfeeding is characterized by extraordinary challenges during every phase of the process. This review will discuss barriers to successful breastfeeding, research-based intervention strategies, and the existing knowledge about successful maintenance of breastfeeding of preterm infants after discharge from the hospital.

In general, the birth of a premature infant is highly stressful to parents both during and after infant hospitalization. Bennett and Slade (1990) report that adjustment

by mothers following the discharge of their preterm infants is characterized by persistent anxiety and depression. While breastfeeding frequently is desired and is perceived to be the one thing that the mother alone can provide, the rate of failure during the hospitalization period is high in this population, as high as 70% (Ehrenkranz, Ackerman, Mezger, & Bracken, 1985; Pereira, Schwartz, Gould, & Grim, 1984; Richards, Lang, McIntosh, Chan, Hartman, Clyman, & Ballard, 1986). Often preterm infants are not able to go to breast for days, weeks and even months. Mothers must initiate the pumping and storing of their milk long before they can breastfeed their infant.

Historically, health care professionals have viewed the physiologic demands of breastfeeding to be too great for premature infants. Thus, first "nipple" feedings are often from the bottle, further delaying the implementation of breastfeeding. The assumption of excessive physiologic cost has been challenged by nursing research. Meier and Anderson (1987) compared feeding ability, transcutaneous oxygen pressure, skin temperature, and duration of feeding between bottle and breastfeeding of five preterm infants. They found better coordination of sucking, swallowing, and breathing; less decline in transcutaneous PO₂; greater increase in infant body temperature; and greater duration of feeding time with breastfeeding. Meier (1988) reports further on qualitative and quantitative differences in transcutaneous oxygen pressure between the two feeding methods examined in the previous study, concluding that preterm infants seem better able to integrate feeding and breathing during breastfeeding and have less ventilatory alteration. Snell (1991) studied pulse oximetry measurements of ten preterm

the responsibilities and perceptions of both the mothers and the nurses. They describe a process of transfer of care from nurse to mother emerging in four stages. This process begins with the nurse providing all care, nurse and mother sharing normal infant care, nurse and mother sharing normal and technical care, and finally the mother's assumption of care just prior to discharge. The development of the relationship between the primary nurse and the mother was a process specific to the personalities and styles of the two. Establishing a positive working alliance was not always successful. Nurses and mothers had differing expectations often misreading each others' cues. Resulting conflicts sometimes led to competition for control. The nurses interviewed in this study often were not aware of their contribution to the relationship that had developed.

There are research reports which provide concepts, models and specific guidelines for assisting the mothers of preterm infants to breastfeed during the hospitalization period. For example, in a study of 132 mothers of infants (premature and term) in a neonatal intensive care unit, a model utilizing research-based interventions was developed and found to promote successful breastfeeding (71.2% at discharge) for those mothers who wished to breastfeed (Meier, Engstrom, Mangurten, Estrada, Zimmerman, & Kopparthi, 1993). From this study emerged a five-category model of specific breastfeeding support interventions: expression and collection of mothers' milk, gavage feeding of expressed mothers' milk, in-hospital breastfeeding sessions, post discharge breastfeeding management (approximately one half of the sample received telephone follow up, a home visit, or referrals to lactation specialists), and additional consultations by the investigators with the family or nursing personnel.

In New Zealand, a teaching plan called mothercraft was instrumental in establishing breastfeeding during hospitalization. Mothercraft included encouraging mothers to express milk six to eight times each day, utilizing expressed milk for infant feedings, and giving mothers the responsibility to manage infant feeding independently by weighing before and after breastfeeding sessions and then giving the complement volume needed to complete a feeding. Mothers in this study came to the neonatal unit by day to care for their infants. When it was determined that an infant could nipple the amount required for a full feeding, mothers fully breastfed for four consecutive feedings without test weighing. When an infant was gaining weight with this regimen, mothers were given a bed in another part of the hospital for a few days to establish full lactation. There, infants were fed on demand (minimum of eight feedings in twenty-four hours) without test weights and were discharged when gaining weight. Thirty-six (84 %) of the mothers of preterm infants admitted over a 10-week period who wished to breastfeed participated in this study; thirty-three (92 %) of them left the hospital breastfeeding (Gunn, 1992). After discharge, midwives visited the home a few days after discharge and then monthly until the baby was weaned.

Kangaroo care, the practice of holding a diaper-clad infant underneath a mother's clothing, skin-to-skin and lying upright between her breasts or on one breast, has demonstrated many benefits for the premature infant-mother pair. Known research data and reports with regard to kangaroo care have yielded consistent findings that support the safety and value of kangaroo care. During kangaroo care mothers' body temperatures increased or decreased as needed to maintain their infants within an

appropriate thermal range. In addition these mothers had more productive lactation and lactation of greater duration (Anderson, 1991).

It is noted by Gotsch (1991) that mothers have a difficult time obtaining enough milk without using an electric pump. Having access to an electric pump is helpful for maximizing breast milk supply.

Beneficial effects of a maternal support network are reported by Buckner and Matsubara (1993). They note that lactation consultants and nurses were the most effective resources for answering questions, assisting with first feeding, explaining principles of supply and demand, and providing prenatal information. Support for the decision to breastfeed and encouragement during difficulties came more often from close personal resources such as one's husband or friends.

Research results suggest that in-hospital interventions can promote breastfeeding success for premature infants during the period of hospitalization. There are, however, few statistics for the preterm population documenting the post-discharge experiences of these mother-infant pairs nor the rate of attrition from breastfeeding in the months after discharge.

Gunn (1992), in her study which utilized the mothercraft teaching plan reported that eighty-eight percent of the mothers who had been discharged breastfeeding were still doing so three months later.

Meier, Engstrom, Mangurten, Estrada, Zimmerman, and Kopparthi (1993) indicated that a post-discharge support contact occurred for approximately half of those mothers of preterm infants who participated in their research-based in-hospital

interventions, but feeding outcomes were not measured in their sample.

Kavanaugh, Mead, Meier, and Mangurten (1995) interviewed twenty mothers of premature infants approximately one month after their infants' discharge from the hospital regarding their breastfeeding experiences in the post-discharge period.

Interview data were qualitatively analyzed and the following maternal concerns emerged: adequate volume of milk taken during breastfeeding sessions, milk composition, and the mechanics of breastfeeding a premature infant.

In summary, the literature tells us that the process of learning to breastfeed is affected by many factors which influence the success of the mother-infant pair. The vulnerability of the breastfeeding pair is greater when the infant is premature. Hospitalization and the need for medical supervision delay the initiation of breastfeeding and multiple barriers exist during this period of time. However, studies have shown that breastfeeding support interventions, when utilized by nursing staff in neonatal units, can help the mother establish her milk supply and prepare for the transition to breastfeeding. Maternal concerns in the post-discharge period appear to focus on the vulnerabilities specific to the preterm infant. Little is known about the period of time after discharge when mothers are attempting to complete the transition from bottle to breast.

Conceptual Framework

The model of transfer of care from nurse to mother discussed by Scharer and Brooks (1994) provides specific guidelines for conceptualizing a four-stage process for the mothers who wish to breastfeed their premature infants. Initially before the infant is

given oral nutrition breast milk is pumped and stored. At the initiation of oral feedings breast milk may be provided first by tube or bottle (pumping only); second, the infant will go to breast for the first time (pumping mostly and breastfeeding a little). This phase may last through the rest of the hospitalization period depending upon the number of opportunities there are for the infant to go to breast. Third, the infant will go to breast for the majority of feedings (pumping less and breastfeeding more); and finally the infant will have made the transition to breastfeeding and there will be no need for continued pumping (breastfeeding only). For this staging process to occur, nursing interventions must support the mother's efforts. In addition, mothers must establish a regular pumping schedule and be able to be at the bedside at intervals in order to put the infant to breast. This framework provides four areas for questions about the experience of breastfeeding mothers in the neonatal care center.

Research Question

What is the breastfeeding experience of mothers of preterm infants during the infants' hospitalization and during the six to twelve weeks after discharge from the neonatal care center?

CHAPTER THREE

Methods

Design

A retrospective descriptive survey in the form of a questionnaire developed by the researcher was the method selected for this study. The majority of questions were designed to collect information about the assistance provided for the mothers and the experience of breastfeeding during the infant's hospitalization and after discharge that could be examined quantitatively. Three open-ended questions were included to allow the sample of mothers freedom to provide feedback about their perceptions and experiences not elicited by the other questions. This format provided nominal, interval and ratio level data enriched by detailed descriptions of personal experiences. No mothers were approached regarding this study during the period of infant hospitalization. Rather, a questionnaire was mailed to all eligible subjects approximately six to nine weeks after discharge.

The research proposal was submitted to the Oregon Health Sciences University (OHSU) Human Subjects Committee and was approved October 3, 1995.

Sample and Setting

Subjects were selected from a population of mothers of preterm infants who were born prematurely (30-35 weeks gestation) and hospitalized at Doernbecher Neonatal Care Center (DNCC). Selection criteria included those mothers who wished to breastfeed and who planned to continue breastfeeding after the infant was discharged

home. Mothers of infants with ongoing feeding difficulties associated with chronic respiratory problems, intraventricular hemorrhage, or congenital anomalies were not included.

Data Collection

There were three steps in the process of securing subjects to participate in this study.

Step 1. The list of all admissions and discharges to DNCC encompassing approximately six months was photocopied at intervals. Prospective subjects who fit the criteria were highlighted. This investigator examined bedside graphics at intervals to determine whether a prospective subject was planning to breastfeed. The discharge date was noted.

Step 2. Six to nine weeks after the infant's discharge to home, a number-coded questionnaire (See Appendix A), cover letter and consent form (See Appendix B) were mailed to the mother. A prepaid return envelope was enclosed.

Step 3. A second mailing was made to those mothers from whom no response was received after six to twelve weeks. It was identical to the first mailing except for the addition of a short note announcing to the mother that this was a reminder. No further effort was made to persuade mothers to participate.

Twenty-four mothers were identified as eligible over a three-month period of time and received questionnaires. Ultimately nine questionnaires were completed and returned.

Instrument

The instrument used for data collection was a thirty-six item questionnaire developed by the investigator.

The questions were designed to elicit the following information. Mothers were asked to provide demographic data about themselves and their infants. Questions were then asked regarding initiation and frequency of breast pumping, first time at breast, and, during the last week of infant's hospitalization, amount of milk collected, amount of milk taken both at breast and bottle, and frequency of breastfeeding sessions. The next group of questions covered overall experiences during the hospitalization period such as use of kangaroo care, breastfeeding consultation services, nursing assistance, level of satisfaction with breastfeeding sessions, and description of current feeding method. Finally the mothers were asked to describe what they thought would have helped their experience, what has affected their experience since discharge of the infant, and whatever else they wished to share regarding their breastfeeding experience. The questionnaire was reviewed by the research committee, several neonatal nurses, and the clinical coordinator of DNCC. Multiple revisions were made to improve both clarity and specificity.

Data Analysis

A computer file was initiated naming and labeling the variables elicited by the questionnaire. Responses were entered for each returned questionnaire and verified by a second party. Frequency distributions, percentages, and means were calculated. Cross tabulations were designed to examine the relationship between the feeding method at

follow up and various variables of interest including previous breastfeeding experience, use of breastfeeding consultation services, level of satisfaction with breastfeeding sessions both during hospitalization and at the time of follow up, amount of milk collected, maternal age, infant gestation, infant birth weight, and length of infant hospitalization.

All responses to the open-ended questions were collated and are summarized in the next section.

CHAPTER FOUR

Results

Description of the Sample

Nine mothers completed and returned the questionnaire (37.5%). They ranged in age from 20-39 years with a mean of 27.7 years. Seven (77.8%) were Caucasian, one (11.1%) Native American, and one (11.1%) Hispanic. Seven were married, living with partner; one was married, living alone; and one was single, living alone. Two of the nine reported annual household income of less than \$10,000, three at \$10,000 - \$19,999; two at \$20,000 - \$39,999, one at \$40,000 - \$59,999, and one greater than \$60,000.

There were 10 infants from nine mothers. For the mother of twins, the responses to the questionnaire did not differ for either infant except for infant weights and discharge dates and in the narrative portion where she described personal characteristics for each of them. Therefore the birth weight and discharge weight of the first of the twins to be discharged were selected and data were entered for a total of nine infants.

Infant gestation ranged from 30-35 weeks with mean of 32.6 weeks. Average length of stay in the DNCC was 29.7 days with a range of 10-50 days. Birth weights ranged from 2.2 pounds to 6.6 pounds (mean 3.9 pounds).

Initiation of Breastfeeding and Pumping

Five of the nine mothers had previous breastfeeding experience. Initiation of breast pumping ranged from 2.5 hours to 24 hours (mean 7.2 hours) after the birth of

the infant with eight of the nine mothers responding to that question. Nine mothers reported frequency of pumping at 5.5 to 12 times in a 24-hour period (mean 8.3 pumpings in 24-hour time period). The first time for the infant to go to breast occurred an average of 11 days after birth (range 1 to 28 days). The volume of milk collected at each pumping ranged from 20cc to 180cc (mean 98.1cc) from 8 of the mothers. One of the mothers reported she collected 240cc to 360 cc at each pumping. These data were entered as reported by the mother but were excluded from the range and mean calculation for this variable because such high volumes are very unlikely.

Week Prior to Discharge

During the week prior to discharge six of the mothers were putting their infants to breast. For four of them daily frequencies ranged from two to four times. The other two mothers reported frequencies of once a week and four times a week. Of the remaining three, one did not answer the question; one was non-responsive to the question because she reported a volume/frequency schedule; and one was using only the bottle during the last week of hospitalization. Breast milk intake at breast (determined by weighing the baby on a gram scale immediately prior to the breastfeeding session and just after it) ranged from 2 to 37.5cc with a mean of 12.7 cc for six of the subjects. The volume taken from the bottle at each feeding during the last week of hospitalization ranged from 22.5cc to 65cc (mean 45.4cc).

Overall Experience at Follow-Up

At the time of follow up, of the nine mothers responding two (22.2%) were feeding by breast only, six (66.7%) by bottle only, and one (11.1%) by breast and

bottle. Of the seven using the bottle for some or all feedings, one reported feeding all breast milk (pumped), three formula only, and three some of each (See Table 1).

TABLE 1

FEEDING METHOD OUTCOMES AND TYPE OF MILK

Subject ID#	Feeding Method			Type of Milk		
	Bottle	Breast & Bottle	Breast	BrMilk Only	Formula	Both
1	X					X
2			X	X		
3	X					X
4	X				X	
5	X				X	
6		X		X		
7			X	X		
8	X					X
9	X				X	

Eight of the nine had used electric breast pumps during the hospitalization period. One used a hand pump. At the time of follow up, five of the nine respondents were still pumping, four with an electric pump. One mother reported using a hand pump. Four mothers were no longer pumping.

Five mothers reported receiving information regarding skin-to-skin (kangaroo) care. Four of the five spent time in kangaroo care. The remaining four reported they were not told about it.

Six of the nine mothers reported being told about the availability of a breastfeeding consultation. Four of them had such a breastfeeding consultation. Four reported consulting with others regarding breastfeeding. Five responded to the subsequent question which queried with whom did the mother consult. Three mothers selected the response called *other*. Two of these further specified LaLeche League, home care nurses, and a lactation nurse at a children's clinic. Also selected were a family member and a friend.

Eight of the nine reported receiving assistance from a staff nurse with breastfeeding; one reported she did not.

Five reported that a nurse discussed premature infant behaviors with them; three reported that such a discussion did not occur. One respondent did not answer this question.

Three of the final questions in this section were Likert-scale. Mothers were asked to select their level of satisfaction with breastfeeding sessions during the hospitalization period. Eight mothers completed this question; four stated they had been very satisfied, three moderately satisfied, and one moderately dissatisfied. Six mothers responded to the question about their current level of satisfaction with breastfeeding sessions. Two were very satisfied, one moderately satisfied, one moderately dissatisfied, and two very dissatisfied. In addition they were asked to rate the level of

assistance received from the nursing staff. All nine mothers responded; seven rated the nursing staff very helpful; one reported they were somewhat helpful; and one was neutral.

In order to examine whether a particular variable had a high association with the feeding method outcome cross tabulations for feeding method outcomes were done with the responses to questions about maternal characteristics such as age, previous breastfeeding experience, amount of milk collected at each pumping, whether or not the mother had a breastfeeding consultation and level of satisfaction with both hospital and current breastfeeding sessions.

Previous breastfeeding experience

One of the five (20%) women with previous breastfeeding experience was breastfeeding-only at follow up. The other four were feeding by bottle-only (80%). Three of the four using only the bottle were feeding formula-only. One was pumping and providing a combination of formula and breast milk. Of those four without previous breastfeeding experience one was feeding by breast-only, one by breast and bottle (breast milk only), and two by bottle-only (breast milk and formula).

Breastfeeding consultation

One of four (25%) who received a breastfeeding consultation was feeding by breast-only at follow up. One of five (20%) who did not receive a breastfeeding consultation was feeding by breast-only and one (20%) by breast and bottle. All others were feeding by bottle only (75% of those receiving consultation and 60% of those not receiving consultation).

Satisfaction level during hospitalization

Eight responded to the question about satisfaction with breastfeeding sessions during hospitalization. Two of the mothers feeding by bottle-only at the time of follow up and all (two) of the breastfeeding-only mothers were very satisfied with their breastfeeding sessions during hospitalization. Three other bottle-feeding mothers expressed moderate satisfaction. The one mother who was feeding by both methods expressed moderate dissatisfaction with the hospital sessions.

Satisfaction level at time of follow up

Both breastfeeding-only mothers were very satisfied with breastfeeding sessions at the time of follow up. The mother feeding by both methods was moderately dissatisfied. Three of the six bottle feeding-only mothers responded to this question. One was moderately satisfied (currently feeding formula only), and two were very dissatisfied (feeding both breast milk and formula).

In addition feeding outcomes were compared with the maternal factors of age, amount of milk pumped and infant characteristics such as birth weight, birth gestation, and length of hospitalization (See Table 2).

Amount of milk pumped

The overall mean volume of milk pumped at each pumping was 98.1 cc (mean calculated from eight responses). For the bottle feeding-only mothers (n=6) the mean pumped volume was 81.0 cc. The volumes of milk pumped by those mothers feeding all formula at the time of follow up were 20 cc, 30 cc (lowest volumes of sample) and 180 cc (mean 76.7 cc). The breast and bottle-feeding mother pumped 100 cc and the

breast-only mothers' mean volume was 140 cc.

Maternal age

The mean age of mothers feeding by bottle-only was 28.7 years. The mother feeding by breast and bottle was 33 years of age and the two feeding by breast-only were 24 and 20 years of age (mean 22 years).

Infant length of hospitalization

For those infants feeding by bottle-only (6), length of hospitalization ranged from 19 days to 50 days (mean 34.8 days). For the breast-only infants (2) hospitalization was 10 and 22 days (mean 16 days). The breast and bottle-fed infant was hospitalized for 27 days.

Infant gestation and birth weight

The mean gestational age of those infants fed by bottle-only at the time of follow up was 32.5 weeks; their mean birth weight was 3.2 pounds. The breast and bottle-fed infant was 32 weeks gestation and weighed 3.6 pounds. The mean gestational age of the two breastfeeding-only infants was 33.3 weeks (reported gestational ages); their mean birth weight was 6.3 pounds.

TABLE 2

MATERNAL AND INFANT CHARACTERISTICS vs FEEDING METHOD

	Feeding Method at Follow Up		
	Bottle Only	Both	Breast Only
Maternal Age (Mean, in years)	28.7	33.0	22.0
Volume Milk Pumped (Mean, in ccs)	81.0	100.0	140.0
Length of Hospitalization (Mean, in days)	34.8	27.0	16.0
Infant Birth Gestation (Mean, in weeks)	32.5	32.0	33.3
Infant Birth Weight (Mean, in pounds)	3.2	3.6	6.3

Also examined were the volumes of pumped breast milk compared with mothers' reports regarding spending time in kangaroo care. Volumes for those who did not (n=5) ranged from 20cc per pumping to 100cc per pumping (mean 57cc). Volumes for those who did spend time in kangaroo care (n=4) ranged from 140cc to 240cc (mean 185cc). Excluding the outlier (as was done previously when listing pumping volumes for the entire sample) the range was 140cc to 180cc (n=3, mean 166.7cc) (See Table 3).

TABLE 3

KANGAROO CARE AND MILK VOLUMES

Kangaroo Care	Pumped Milk Volumes
Yes (N=4)	140 - 240cc, mean 185 cc
Yes, minus outlier (N=3)	140 - 180cc, mean 166.7cc
No (N=5)	20 - 100cc, mean 57cc

Summary of Open-ended Responses

Eight subjects responded to the question *What do you think would have helped your breastfeeding experience during your infant's hospitalization?* Most responses described barriers to breastfeeding such as living far from the hospital and thus being unable to be there for more feedings, receiving negative input from a personal pediatrician about the prospects of successfully breastfeeding twins, experiencing impatience of the nursing staff with a new mom learning to breastfeed, living the "day to day" stress of having a high-risk infant, and having an infant too small to go to breast successfully. Better communication among nurses about a mother's intention to put her infant to breast versus bottle-feed at particular feedings was suggested as helpful, and one felt having previous breastfeeding experience would have been helpful. One reported that her previous experience with breastfeeding had been the best help and that if she hadn't had previous experience, a breastfeeding consultation definitely would have helped.

Eight mothers responded to *What do you think has affected your breastfeeding experience since your baby came home?* These include increased exhaustion and less patience, twins' care leaving little time for breastfeeding, using the breast pump and "when my baby got to come home I went dry", the lack of opportunity to breastfeed in the hospital leading to poor results at home, specifically because the baby had *learned* the bottle and now preferred it because "it's instant gratification". Also reported were increased relaxation at home, ability to be home with other children, and a good home breastfeeding experience attributed to suggestions and ideas from nurses. One stated that the question was not applicable (because she was not breastfeeding).

Seven responded to *What else do you want to tell me about your breastfeeding experience?* The mother of twins regretted being unable to convert them from bottle to breast stating the emotional and physical energy required was too difficult and she was too worried about the amount of milk they were getting. She praised the assistance she received from the breastfeeding consultant and strongly recommended that new mothers consult with an expert *before* the birth of their babies. One woman reported that the entire experience of having a premature child was extremely difficult and led to her frustration with the breastfeeding experience. She didn't get to see her daughter for 24 hours and held her for just ten minutes before her own discharge from the hospital. She lived more than sixty miles away, became physically and emotionally exhausted and believes she experienced something akin to post-traumatic stress syndrome. Above all, she wished there had been some kind of counseling after giving birth to a preemie. She

continues to pump and try to breastfeed but is nearly ready to quit. Another mother stated that her milk did not come in and so she became unsuccessful. Two mothers reported the experience was good and the advice and support they received were very positive. One remarked that even with prior experience she needed reminding of some things.

CHAPTER 5

Discussion

This chapter discusses the findings for the research question *what is the breastfeeding experience of mothers of preterm infants*. In addition, a summary of this study, including implications for nursing practice, are assessed. Finally, limitations of the study and suggestions for further research conclude this chapter.

Discussion of Results

Results from this sample indicate that the percentage (66.7%) of women not breastfeeding at follow-up was high. The two mothers who were feeding by breast-only at the time of follow up had infants with the shortest hospital stays, the highest birth weights and the greatest mean gestational age of the sample. These infants also took the largest volume of breast milk during each breastfeeding session as reported for the last week of infant hospitalization. In this sample, the more mature, larger premature infants with shorter hospital stays had more success at breastfeeding. This is not surprising since all of the barriers to breastfeeding success as reported in the literature are minimized by these infant factors.

It is interesting to note that among mothers in this sample, previous breastfeeding experience did not increase the likelihood of breastfeeding after discharge. One of five (20%) with previous experience and two of four (50%) with no previous experience were still breastfeeding at the time of follow-up.

Mothers who had a breastfeeding consultation did not have a higher rate of breastfeeding after discharge either. No details about the consultation and the specific

nature of breastfeeding assessment of the mother-infant pair were collected. These results, while not anticipated based on the review of the literature, do not provide enough information for further analysis.

There was little variation among all the mothers regarding time of initiation of breast pumping. There was little to distinguish from among the reported frequencies of pumping or the first time at breast to suggest a better breastfeeding outcome. However, the greater the volume of milk produced and pumped clearly showed a trend toward success at breastfeeding. Another variable which has been reported in the literature to lead to more productive lactation is the practice of kangaroo care (Anderson, 1991). It is interesting to note that the four mothers who spent time in kangaroo care reported the highest pumped breast milk volumes of the sample.

The frequency of breastfeeding sessions during the last week of infant hospitalization while not predictive of continued breastfeeding at follow-up, did suggest that those who reported rates of two to four times per day were continuing to breastfeed and/or pump. Seventy-five percent of the mothers who reported frequencies of once a week or less were bottle feeding formula only.

What has emerged from these responses is that they do not provide enough information about the development of the breastfeeding pair during the course of the infant's hospitalization nor the factors affecting continued breastfeeding after discharge to home. As noted in the introduction, no formal system is utilized by the nursing staff to document individual breastfeeding progress. If it were the practice of the hospital unit to document each breastfeeding session and the findings of the breastfeeding

consultant using a system such as LATCH (Jensen, Wallace, & Kelsay, 1994), more would be known and could be communicated about specific areas of concern for each mother-infant pair.

The relative irregularity of breastfeeding sessions during the period of infant hospitalization is apparent. The mothers were not asked how often they visited, nor if there had been visiting times when they had wished to breastfeed and were told not to. During the last week of hospitalization regular breastfeeding sessions occurred at the most four times a day (for one mother-infant pair) and at the least (for three mother-infant pairs) not even once a week. For some mothers these data might be indicative of breastfeeding failure actually occurring during the hospitalization period.

Despite the high reviews the nursing staff received for helpfulness, the narrative data suggest there were many occasions when mothers felt otherwise. No assessment of the nursing staff of the neonatal unit was attempted.

Satisfaction with breastfeeding sessions was high, as expected, for those mothers breastfeeding-only at the time of follow up. For those still attempting to do both, satisfaction was lower.

The responses to the open-ended questions listed many factors which were reported in the research to be common barriers for breastfeeding mothers of infants who are hospitalized (Nyqvist, Sjoden & Ewald, 1994). A few mothers indicated that supportive interventions from nurses were important and others stressed the value of the input from the breastfeeding consultant. The significance of the nurse-mother relationship (Scharer & Brooks, 1994) and the benefits of breastfeeding consultation

(Matsubara, 1993) are also reported in the literature.

As discussed in the conceptual framework, the questions asked were intended to elicit information about the first phase of establishing breastfeeding (pumping milk and supplying by tube or bottle), the second phase (pumping milk and breastfeeding a little) and the third and fourth phases (breastfeeding more and pumping less, breastfeeding-only). There were no specific questions regarding the progression of breastfeeding sessions after discharge home. Mothers completing the questionnaire reported only whether or not they were still breastfeeding. This does not provide information about the process. Comments made by the mothers in the open-ended portion of the questionnaire alluded to factors which made their breastfeeding efforts difficult. It is interesting to note the comment made by the mother who pumped throughout the hospitalization and upon discharge no longer had the pump to use and "went dry". The loss of the pump may have been one factor responsible for her failure to continue breastfeeding efforts. (It is the policy of the DNCC to require the mothers to return the rented breast pump to the unit upon discharge).

Summary and Implications for Nursing Practice

In summary, nine mothers of premature infants responded to a questionnaire regarding their breastfeeding experience during infant hospitalization and their feeding methods at follow up. The mothers in this small sample shared experiences similar to those reported in the literature especially with regard to barriers encountered. Are current breastfeeding support interventions as practiced by the staff of DNCC actually supporting the breastfeeding process? At the time of follow up 33.3% were still

breastfeeding, at least some of the time. The remaining 66.7% were feeding by bottle only although half of these continued to pump and provide breast milk in addition to formula. Transition to full breastfeeding had occurred for two of the nine. Results from this sample suggest that the difficulties associated with breastfeeding premature infants have not been surmounted by in-hospital support interventions.

Limitations of This Study

This study is limited first by the small sample size and may be considered a pilot project. Second, reporting error may affect results in a questionnaire of this design. In retrospect, it might have lessened the potential margin of error for the investigator to take some of the data directly from the records. As an example, three of the infants' charts were reviewed in order to clarify responses made by the mothers. It was noted that there were differences between what the mother reported and what was documented in the chart for some of the variables. For example, one of the breastfeeding-only mothers reported her infant's birth gestation as 32 to 33 weeks. The chart recorded a gestational age of 35 weeks. Another mother wrote a discharge date twelve days later than the one of record. For the sake of consistency the mothers' responses were entered. Changing the gestational age of the aforementioned infant to 35 weeks would change the mean from 33.3 to 34.5 weeks for the two infants who were breastfeeding-only at the time of follow up further emphasizing the findings.

For some mothers, the wording of three of the questions may have been unclear. For example, *how often was your baby offered the breast each day?* was left blank by one and a question mark written in by another. *How many times did you*

breastfeed your baby each day? might have been more clear. In another example, the intent of questions 17 and 18 (See Appendix A) was to determine how much of a full feeding the infant was taking at breast. Question 17 asked how much taken at breast; question 18 asked how much by bottle. The sequencing may have suggested to the mother how much taken at bottle *after* the session at breast. This was a common feeding pattern when the mother was present for a feeding.

Suggestions for Future Research

It would be interesting to begin a future study with an assessment of the nursing staff regarding their perceptions of breastfeeding support and specifically what they do to provide such support. Results of this assessment could direct staff training. In addition a subsequent study of infant and mother responses to a formal program of breastfeeding support with a documentation method in place as well as planned support measures continuing after infant discharge would facilitate an understanding of the successes and failures of breastfeeding efforts.

Another avenue for future study would be a replication of the study by Gunn (1992) in which facilities are provided to support the transition to full breastfeeding prior to discharge.

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Appendix A
Questionnaire

QUESTIONNAIRE

*Please complete the following by filling in or checking the appropriate response.
[Questions refer to a single baby, but you may respond for twins]*

1. Your baby's Birth Date _____
[month] [day] [year]
2. Baby's Discharge Date _____
[month] [day] [year]
3. Baby's Gestation at Birth _____[in weeks]
4. Baby's **Birth** Weight _____[in pounds & ounces or in grams]
_____ [for twin, if applicable]
5. Baby's **Discharge** Weight _____[in pounds & ounces or in grams]
_____ [for twin, if applicable]
6. **How old are you?** _____ years
7. **Marital Status**
____ Married, living with partner
____ Married, living alone
____ Single, living with partner or family member
____ Single, living alone
8. **Household Income** [annual]
____ Less than \$10,000
____ \$10,000 - 19,999
____ \$20,000 - 39,999
____ \$40,000 - 59,999
____ Over \$60,000
9. **Race**
____ Caucasian ____ African-American ____ Hispanic
____ Asian ____ Native American ____ Other
10. Have you had any breastfeeding experience prior to the birth of this infant?
____ Yes ____ No

11. About how many hours after your baby's birth did you first use the breast pump? _____
12. In general, how often did you pump in a 24-hour period while your baby was hospitalized? _____
13. About when did your baby go to breast for the first time?

[Please write in baby's age in days]

The next five questions are about your pumping & breastfeeding during the last week of your baby's hospitalization.

14. In the week prior to your baby's discharge, about how much milk were you collecting (in cc) at each pumping? [Remember 30 cc = 1 oz] _____
15. In the week prior to discharge, how often was your baby offered the breast each day? _____
16. If less than once a day, how often? _____
17. In the week prior to discharge, about how much milk (in cc) did your baby take at each breastfeeding? _____
18. In the week prior to discharge, how much milk (in cc) by bottle was your baby taking at each feeding?

The remaining questions are about your overall experiences during your baby's hospitalization as well as your experiences since bringing your baby home.

19. Please check the answer that best describes how you are feeding your baby now.

_____ Bottle only
_____ Breast and Bottle
_____ Breast only
_____ Other

20. If you are using the bottle for any feedings, please check which best describes what your baby is taking.

☐ Breast milk only
☐ Formula only
☐ Some of each

21. While your baby was hospitalized, what kind of breast pump did you use?

☐ Manual expression
☐ Hand pump
☐ Electric pump [rented]
☐ Electric pump [purchased]

22. Since your baby came home from the hospital, what kind of breast pump have you been using?

☐ Manual expression
☐ Hand pump
☐ Electric pump [rented]
☐ Electric pump [purchased]
☐ Not pumping

23. During your baby's hospitalization, was kangaroo care discussed with you?

☐ Yes ☐ No

24. Did you and your baby spend time in Kangaroo care?

☐ Yes ☐ No

25. During your baby's hospitalization, did a nurse or physician talk with you about having a breastfeeding consultation?

☐ Yes ☐ No

26. Did you have a breastfeeding consultation?

☐ Yes ☐ No

27. Since the birth of your baby have you consulted with anyone else for help with breastfeeding?

☐ Yes ☐ No

28. If Yes, with whom?

☐ Family member ☐ Friend ☐ Acquaintance ☐ Other

29. While your baby was in the hospital, did a nurse ever assist you to breastfeed your baby?

☐ Yes ☐ No

30. Overall, what was your level of satisfaction with your breastfeeding sessions during the last week of your baby's hospitalization?

☐ Very satisfied
☐ Moderately satisfied
☐ Moderately dissatisfied
☐ Very dissatisfied

31. Overall, what is your level of satisfaction with your current breastfeeding sessions?

☐ Very satisfied
☐ Moderately satisfied
☐ Moderately dissatisfied
☐ Very dissatisfied

32. While your baby was in the hospital, did a nurse discuss **premature** infant behaviors with you?

☐ Yes ☐ No

33. How would you rate the level of assistance you received from the nursing staff?

☐ Very helpful
☐ Somewhat helpful
☐ Neutral
☐ Somewhat unhelpful
☐ Very unhelpful

34. What do you think would have helped your breastfeeding experience during your infant's hospitalization?

35. What do you think has affected your breastfeeding experience since your baby came home?

36. What else do you want to tell me about your breastfeeding experience?

Appendix B

Cover Letter and Consent Form

The Breastfeeding Experience of Mothers of Preterm Infants**Graduate Student Investigator: Cathleen Amen****Advisor: Pam Hellings, RN, PhD, CPNP**

Dear Mother:

My name is Cathleen Amen and I am a graduate nursing student at Oregon Health Sciences University. I work as a staff nurse in the Doernbecher Neonatal Care Center and may have worked with you while your infant was in the hospital.

I am conducting a study of the breastfeeding experience of mothers of preterm infants. You are invited to participate in this research study because you recently gave birth to a premature infant and you were one of the mothers who wished to breastfeed your infant. The purpose of this study is to understand the breastfeeding experience from your perspective so that we who work with mothers of premature infants may better support successful breastfeeding during and after hospitalization of the infant.

At the bottom of this letter you will find a signature line for you to sign indicating your consent to participate in this study. Enclosed is a questionnaire for you to complete. Please return both the signed consent and completed question-naire to my faculty advisor as shown on the mailing label of the stamped, addressed envelope which has been included for your convenience. A second copy of the consent letter is enclosed for you to keep. Consent forms and questionnaires will be separated and kept in a locked file. Neither your name nor your identity will be used for publication or publicity purposes.

The Oregon Health Sciences University, as a public institution, is subject to the Oregon Tort Claims Act and is self-insured for liability claims. If you suffer any injury from this research project, compensation would be available to you only if you

establish that the injury occurred through the fault of the University, its officers, or employees. If you have further questions, please call the Medical Services Director at (503) 494-8014. If you have any questions regarding your rights as a research subject, you may contact the Oregon Health Sciences University Institutional Review Board at (503) 494-7887. You may refuse to participate without affecting your relationship with or treatment at the Oregon Health Sciences University.

While you may not personally benefit from participating in this study, your assistance with these questions may contribute to our understanding of the needs of breastfeeding mothers of preterm infants. Your sharing of your experiences may be of vital benefit to mothers in the future. If you wish to contact me for any reason, you may leave a message for me at the office of my advisor Pam Hellings, RN, PhD, CPNP at 494-3872. Please identify yourself as a participant in the research study conducted by Cathleen Amen.

Thank you for your willingness to participate.

Sincerely,

Cathleen Amen
Graduate Nursing Student
Oregon Health Sciences University

Your signature below indicates that you have read the foregoing and agree to participate in this study.

_____ Date _____

You may keep one copy of this letter/consent form for your records.

