

BREASTFEEDING EXPERIENCES OF MOTHERS  
USING TELEHEALTH AT ONE AND FOUR  
WEEKS POSTPARTUM

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## ABSTRACT

Research demonstrates that breastfeeding provides many health benefits for both mothers and infants. However, many mothers stop breastfeeding in the early postpartum period due to problems such as sore nipples, engorgement, mastitis, and insufficient milk supply. Lactation support is associated with increased breastfeeding duration. However, in underserved rural and urban areas some mothers lack access to lactation support. Telehealth technology has not been used to address this problem in the U.S., but may be an alternative means to provide mothers with lactation support. The purpose of the parent study was to evaluate the feasibility and reliability of telehealth methods for assessing and providing lactation support in women's homes over the first four weeks after birth. The purpose of this ancillary study was to identify the breastfeeding experiences of mothers at one and four weeks postpartum, and to determine if telehealth enhanced breastfeeding support. Seven mother-baby dyads were recruited from the maternity unit of a 600 bed Midwestern university-affiliated hospital and a free standing birthing center. Data were collected using videoconferencing and face to face home visits to compute LATCH breastfeeding assessment scores. *The Breastfeeding Experience Scale* (BES) was administered via the telephone at one and four weeks postpartum. Data analyses included descriptive statistics and narrative analysis. At one week, the most frequent experiences of mothers were feeling tired/fatigued, (85.8%), followed by baby's reluctance to nurse due to sleepiness (85.7%), and sore nipples (85.7%). On a 5-point scale, the most severe experiences were sore nipples (moderate, 3) and engorgement (mild, 2). At week four, the most frequent experiences were mothers feeling tired/fatigued (85.8%), mothers feeling tense and overwhelmed (85.8%), and baby's reluctance to nurse due to fussiness (71.5%). The most severe experiences were feeling tired/fatigued (moderate, 3), sore nipples, baby's reluctance to nurse due to sleepiness and fussiness, leaking breasts, and feeling tense and overwhelmed (mild, 2). The majority of mothers (n=6) reported they had an improved breastfeeding experience and that they had a decrease in breastfeeding problems

because of their telehealth experience. At four weeks, 5 were exclusively breastfeeding. In conclusion, telehealth may be an important tool in breastfeeding assessment and support and more research in this area is needed.

## INTRODUCTION

Breast feeding has been designated as a national health priority by the Healthy People 2010 Objectives. The American Academy of Pediatrics (2005) reports that 70% of all United States women initiate breastfeeding, but only 33% continue to breastfeed at 6 months, and only 18% of mothers breastfeed at 1 year. The current rates fall short of the Healthy People 2010 objectives which aim to increase the number of women initiating breastfeeding to 75%, 50% of women breastfeeding 6 months post partum, and 25% of women breastfeeding at 1 year (American Academy of Pediatrics, 2005). While the number of women who initiate breastfeeding is much closer to the Healthy People 2010 goal, the number of women still breastfeeding at 6 months and exclusively breastfeeding is much further behind (American Academy of Pediatrics, 2005; Forste & Hoffmann, 2008).

According to the American Academy of Pediatrics (2005), human milk is considered the best source of nutrition and maternal antibodies for infant development. Infants who are breast fed have a lower incidence and decreased severity of infectious diseases such as diarrhea, bacteremia, bacterial meningitis, respiratory tract infection, urinary tract infection, atopic dermatitis, gastrointestinal infections, asthma, and otitis media (American Academy of Pediatrics, 2005; Ip et al., 2007). Furthermore, Ip et al. (2007) reported that “there is an association between a history of breastfeeding and a reduction in the risk of being overweight or obese in adolescence and adult life” (p.4). Additionally the American Academy of Pediatrics (2005) reports that breast fed infants have a 20% reduction in mortality as compared to non breast fed post neonatal infants. While breastfed infants receive balanced nutrition and may experience less illness and death, mothers who breastfeed also experience health benefits. Breastfeeding reduces the incidence of post partum hemorrhage because it allows the uterus to contract and decrease in size more rapidly (American Academy of Pediatrics, 2005). Over time breastfeeding also promotes maternal weight loss and

contraception. Ip et al.'s (2007) meta analysis reported that breastfeeding has also been associated with decreased the risk of breast and ovarian cancer, postpartum depression, and maternal Type 2 Diabetes. Post menopausal women who have breast fed also have a decreased risk of osteoporosis and hip fractures (American Academy of Pediatrics, 2005). The strong evidence base supporting breastfeeding has led the American Academy of Pediatrics (2005) to recommend that women exclusively breastfeed their infants for the first 6 months of life and to continue to breastfeed for the first year.

Because human milk is recognized as the optimal source of nutrition for infants and data suggest that not enough U.S. women are meeting the goals for initiation and duration of breastfeeding, it is important to examine this problem. Research demonstrates that women who receive professional support by lactation consultants have higher rates of breastfeeding initiation and duration (Bonuck, Trombley, Freeman, & McKee, 2006). Additionally, researchers suggest that breastfeeding support early in the postpartum period is more strongly associated with increased duration and exclusivity of breastfeeding (Wambach et al., 2005). Together these studies suggest that providing post partum women with access to lactation consultants after they are discharged from the hospital could promote initiation and longer duration of breastfeeding. Research also shows that many women in underserved rural areas lack access to lactation support (Flower, Willoughby, Cadigan, Perrin, & Randolph, 2008). In order to connect post partum women with lactation consultants, this study examined the use of telehealth. "Telehealth is the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration" (U.S. HRSA, 2009).

The purpose of the parent study was to evaluate the feasibility and reliability of telehealth methods for assessing and providing lactation support in women's homes during the first 4 weeks after birth. The purpose of this ancillary study was to identify the breastfeeding experiences and/or

problems of mothers at 1 and 4 weeks postpartum, and to determine if telehealth enhanced breastfeeding support.

### **Research Questions for Parent Study**

1. Can techniques used in assessing breastfeeding (mother-infant positioning, attachment, suckling, latching, swallowing) be reliably observed over videoconferencing technology?
2. Can videoconferencing technology be used to provide consultation or teaching using educational materials and audio/videotapes?
3. What are women's experiences in receiving breastfeeding support over real-time videoconferencing?

### **Research Questions for Ancillary Study**

4. What are the breastfeeding experiences and problems of mothers at 1 and 4 weeks postpartum?
5. Do mothers think they had an improved breastfeeding experience or a decrease in breastfeeding problems because of their telehealth experience?

## **LITERATURE REVIEW**

The purpose of the current study was to assess both the feasibility and reliability of using telehealth for assessing and supporting breastfeeding in post partum women. Furthermore this study identified the breastfeeding experiences and problems of mothers at 1 and 4 weeks post partum. The literature reviewed for this investigation focused on the use of telehealth and breastfeeding, the use of certified lactation consultants in the home, the early experiences of breastfeeding mothers, and frequently reported problems and concerns of breastfeeding mothers.

While no U.S. study has examined the use of telehealth for assessing and supporting breastfeeding, outside the U.S., researchers Lindberg and Christensson (2007) found videoconferencing between midwives and parents of newborns to be helpful in postpartum care. Lindberg and Christensson piloted a 1 year study to provide support for parents after their hospital discharge. These researchers found that during 23 videoconferences that 7 midwives were able to effectively support 9 couples/new parents. Their results concluded that 87% of participants most frequently sought advice for breastfeeding and overall the equipment was “easy to handle and useful for making assessments” and “almost like a real-life encounter” (Lindberg & Christensson, 2007, p.202). The lack of research utilizing telehealth with breastfeeding support demonstrates the importance for more research in this area to determine if it is feasible and reliable.

While there were few studies outside of the U.S. examining the use of telehealth for breastfeeding support, McKeever et al. (2002) have found that “in-home lactation support appears to facilitate positive breastfeeding outcomes for mothers of term newborns” ( p.258). McKeever et al. (2002) examined 101 mothers out of 156 eligible mothers of term newborns in their randomized controlled trial comparing home versus hospital breastfeeding support for newborns. These researchers randomly assigned mothers to two separate groups: experimental (n=53) and standard care (n=48). The experimental group received standard hospital care with early discharge and home support from certified lactation consultant nurses. The standard care group received standard care and standard length of hospitalization. Overall, there were significant differences found between groups in relation to exclusive breastfeeding rates. More newborns were exclusively breastfed in the experimental group ( $p = .01$ ) or were fed exclusively with expressed breast milk in the preceding 24 hours ( $p = .02$ ). Researchers also concluded that 96% of the experimental mothers “expressed satisfaction with their early postpartum care, which included early discharge and home care visits by lactation nurses” (McKeever et al., 2002, p. 261). Specifically, mothers found the one-to-one support for breastfeeding the most helpful part of their at home care. These

researchers found that mothers who were helped by the certified lactation nurses in their homes had more success with breastfeeding in the first 12 postpartum days as compared to the standard group. This study demonstrated the value of lactation consultant support in the home setting during the early postpartum period.

According to Wambach et al. (2005), maternal characteristics play a large role in whether or not women initiate breastfeeding. Women who are married, older in age, have higher education, and more wealth tend to breastfeed more than women who do not possess these characteristics. Additionally, researchers found that individuals with a “negative breastfeeding experience” were more likely to not breastfeed their infants in subsequent pregnancies (Wambach et al., 2005, p. 247). Forste and Hoffmann (2008) identified some additional maternal factors that were associated with a higher prevalence of breastfeeding. They found that women who live in the western United States and those who were foreign born were more likely to breastfeed.

Common breast feeding concerns of mothers have been identified that may create a negative experience or discourage breastfeeding. These concerns are “sore nipples, engorgement, mastitis, and perceived or actual insufficient milk supply” (Wambach et al., 2005, p.248). One of the most often reported reasons for women to stop breastfeeding was due to sore nipples (Wambach et al., 2005). Researchers also found that both teen mothers and adult women had comparable types of physical breast discomforts, worries about insufficient milk, and fatigue when it comes to breastfeeding experiences (Wambach et al., 2005). One nurse researcher reported that mothers who experienced problems with the baby latching on and who felt pain while breastfeeding were more likely to supplement their breastfeeding or discontinue breastfeeding altogether (Cadwell, 2007). Additionally, she found that when a woman’s breastfeeding was assessed methodically it played a part in successful breastfeeding (Cadwell, 2007). In another study, researchers found similar results. Scott, Binns, Oddy, and Graham (2006) found that the women in their study who

experienced early difficulty in breastfeeding were at higher risk for early cessation of breastfeeding. Specifically women that had problems breastfeeding within the first 4 weeks “were significantly more likely to discontinue full breastfeeding before 6 months and to have a shorter duration of breastfeeding overall” (Scott et al., 2006, p.653).

Another study done by Kanotra et al. (2007), examined the challenges faced by new mothers in the early postpartum period and found that breastfeeding issues were the second most common theme; 23.5% of the new mothers in the study had concerns about breastfeeding. This study utilized qualitative data from the Pregnancy Risk Assessment Monitoring System (PRAMS). These researchers coded data from 324 women that commented on their postpartum concerns and concluded that new mothers would like more support and education. Many of the mothers commented on the isolation of staying home with their infants and desired having someone with experience to provide support (Kanotra et al., 2007). This study demonstrated the potential for telehealth to connect new mothers with the support and assistance of a certified lactation consultant.

Researchers Graffy and Taylor (2005) examined what type of information, advice, and support women desire with breastfeeding. They performed a qualitative analysis of women’s responses to a questionnaire that was administered when the mother’s infants were 6 weeks old. The questionnaire asked about the mother’s experiences of breastfeeding support. There were 654 women who began breastfeeding and completed the questionnaire. Of the total, 492 (75%) of the participants were first time mothers. Researchers reported that at 6 weeks, 249 (38%) of participants were exclusively breastfeeding, 183 (28%) of participants were doing both formula feedings and breastfeedings, and 222 (34%) were exclusively formula feeding (Graffy & Taylor, 2005). Among the women who had stopped breastfeeding, researchers found that many wished they had been able to breastfeed longer and felt that they did not have the necessary support for

breastfeeding. From the questionnaires, women reported that they would have liked more accurate information on breastfeeding including what to expect and potential problems they may face. Additionally, participants wished that they had known more about the benefits of breastfeeding to help encourage them to continue. Other comments that participants felt were helpful for breastfeeding support were having advice on how to position their baby and helping the baby to latch on. Women also enjoyed the practical tips about treating and coping with sore nipples, engorgement, how to time the feedings, and express milk. Overall, Graffy and Taylor's (2005) study demonstrated that their participants responded positively to the support they received from their counselors and this increased their comfort and success with breastfeeding.

## METHODS

### **Design and Measures**

This feasibility study utilized a descriptive design to collect observational breastfeeding data via interactive televideo consultation and face to face home visitation. The parent study was designed to test the interrater reliability of breastfeeding assessment techniques between two lactation consultants using the LATCH scoring system. Additionally, the study assessed breastfeeding problems and issues, patient teaching using interactive problem guidance, and the implementation of educational materials. The ancillary study was designed to identify the breastfeeding experiences of mothers at 1 and 4 weeks postpartum via the BES, and to determine if telehealth enhanced breastfeeding support via the guided interview questionnaire.

### **Sample and Setting**

The target sample size for the parent study was 10 mother/baby dyads. The study is ongoing and the target sample has not been achieved at this time. This was a convenience sample. For this ancillary study, seven postpartum mother-infant dyads from the maternity unit of a 600 bed

university-affiliated hospital in the Midwest and a free standing birthing center were recruited for participation. Participants were enrolled during their hospital/birthing center stay or after discharge.

### **Inclusion Criteria**

In order to participate, the postpartum women had to be 18 and older; English speaking, with no medical complications; planned to breastfeed or initiate breastfeeding after birth; had healthy full term infants (>37 weeks gestation or weight>2500 gm); had access to a significant other or helper for the telehealth sessions (spouse/partner, mother, etc), and had high speed internet access with their computer at home.

### **Exclusion Criteria**

Women were excluded if they had multiple gestation births (e.g. twins), infants with complications that separated them from their mothers for longer than 4 hours at birth; postpartum complications such as pre-eclampsia treated with magnesium sulfate or pregnancy-induced-hypertension; and a history of breast surgery or breast reduction.

### **Ethics**

This study was approved by the KUMC Human Subjects Committee. An amendment to the protocol was submitted to include the Breastfeeding Experience Scale for the ancillary study. Informed consent was obtained from all participants at enrollment.

### **Data Collection Instruments**

Participant information regarding gender, age, education, employment, marital status, income, and ethnicity was collected using the demographic data form developed for this study. The participants completed the demographic data form during study enrollment.

The LATCH tool is a 5 item assessment tool that identifies areas of needed intervention and teaching for breastfeeding mothers. The LATCH tool assesses 5 components of breastfeeding: ability of baby to “Latch”, the amount of “Audible” swallowing, mother’s nipple “Types”, mother’s level of “Comfort”, and the amount of “Help” the mother needs. The LATCH scores for each component range from 0 to 2 for a possible total score of 0 to 10. The LATCH scores were collected at baseline in the hospital and weekly through week 4 postpartum (Jensen, Wallace, & Kelsay, 1994).

The Breastfeeding Experience Scale (BES) is a 30-item questionnaire that measures breastfeeding outcomes in terms of early breastfeeding events/experiences, feeding practices/patterns, and breastfeeding duration (Wambach, 1990). The first 18 items of the tool provide information about various breastfeeding experiences or problems and are responded to on a 5-point rating scale of severity (1 = not at all, 2 = mild, 3 = moderate, 4 = severe, 5= unbearable). These items are summed together for a total score ranging from 18-90. The second part of the tool is used to document weaning experiences and formula supplementation practices. Descriptive statistics and content analysis were used for the second section of the BES.

The Telehealth Assessment Checklist was adapted from Smith, Cha, Kleinbeck, Clements, Cook, and Koehler (2002) and was used to assess the quality of pictures, sounds, and delivery of teaching content during the telehealth visit by both mother and telehealth lactation consultant.

The interactive home telehealth satisfaction scale from the American Telemedicine Association Toolkit was administered to measure participant satisfaction regarding home telehealth and equipment use. The participant section consisted of 20-items, with 6-point response options, and the scores range from 20-120. Higher scores indicate stronger satisfaction. In addition, 3 items asked about the ease and quality of the equipment (American Telemedicine Association, 2009).

Finally, guided interview questions were used to elicit participant perceptions and experiences of the telehealth lactation visit, its impact on their breastfeeding practice, and strengths and weaknesses of the method of support. The guided interview question 1 was used to determine if the mothers felt they had an improved breastfeeding experience because of their telehealth experience. In addition, mothers were asked if they felt they had a decrease in breastfeeding problems because of their participation in the study.

## **Procedures**

After eligible study candidates received study information and agreed to participate in the study, they signed the informed consent form. The participants were then interviewed by a research assistant to obtain demographic information and data on the delivery, family, and hospital breastfeeding experiences using the demographic form. Each participant received 4 telehealth and 2 home visits. These visits were scheduled prior to the participants' discharge from the hospital or shortly afterward if enrolled in the study after hospital discharge.

During the postpartum hospital stay, the hospital lactation consultation conducted an assessment of breastfeeding technique. The lactation consultant also assessed for problems such as sore nipples, cracked nipples, blisters, ecchymosis, engorgement, and tenderness. These data, which are components of the LATCH tool, were shared with the study research assistant who gathered the baseline demographic/birth data. The LATCH assessment tool was also utilized during the telehealth and home visits. For those study participants who were enrolled in the study after hospital discharge, in-hospital or birthing center lactation assessment information was not available.

In addition, the lactation consultant evaluated the quality of pictures, sounds, and delivery of teaching content during the telehealth visit using a standard form. At the first and fourth post partum week, the research assistant administered the BES tool via the telephone. At the end of the 4

weeks, participants were asked to report their experiences and evaluate the teleconferencing equipment and education materials.

During the first 2 weeks, the home and telehealth visit was made simultaneously by the lactation consultants. At the first home visit, the lactation consultant installed the telehealth equipment. To ensure interrater reliability, a total of 20 breastfeeding observations were conducted by the lactation consultants during the 2 visits. The third and fourth postpartum visits were with the telehealth lactation consultant only. If participants stopped breastfeeding during the 4 week study period, they were asked to describe their breastfeeding experiences and their reasons for discontinuing breastfeeding.

Prior to the study, the certified lactation consultants were trained to perform the LATCH assessment to an interrater reliability level of at least 90% to assure consistency in use of the LATCH scoring system (Salkind, 2006). The telehealth lactation consultant was trained to use the teleconferencing equipment at the Kansas University Center for Telemedicine and Telehealth and the home lactation consultant was trained in installing the home teleconferencing equipment.

Lactation consultants used a standard protocol for setting up the equipment, preparing mothers and their participating helper for the telehealth visit, and standard educational materials were used to assure consistency of home equipment set up and study conditions.

The Kansas University for Telemedicine and Telehealth loaned a Logitech web-camera to each participant. The small camera rested on the top of the computer monitor and provided high quality, interactive audio and video conferencing. Each camera-computer system met advanced encryption standards for secure, private, connection to the lactation nurse. Participants were required to have internet access in their home and a minimum bandwidth of 384 kbps. External speakers, headsets, and microphones were also loaned to participants as needed.

## Data Analysis

*SPSS/PC Version 17* was used for statistical analyses. Descriptive statistics were utilized to summarize participants' demographic information and mean LATCH scores. The analysis for each research question is addressed below:

### Parent Study Data Analysis Plan

*Research Question 1.* Interrater reliability of the LATCH scores between the two lactation consultants was computed for percent of agreement ( $P_0$ ) on each of the 5 LATCH items at 1 and 2 weeks postpartum (20 observational units). Cohen's Kappa ( $P_c$ ) was computed to provide correction for chance agreement (Waltz et al., 2005).

*Research Question 2.* Data from the Telehealth Assessment Checklist was analyzed using descriptive statistics regarding sound, quality of the video camera, and clarity of pictures.

*Research Question 3.* Data from the telephone interview at the end of 4 weeks postpartum was analyzed using qualitative narrative analysis. Information was used to suggest facilitators and barriers to telehealth services and to refine the telehealth protocol for future trials.

### Ancillary Study Data Analysis Plan

*Research Question 4.* Data from the Breastfeeding Experience Scale (BES) at 1 and 4 weeks postpartum was analyzed using descriptive statistics. The total BES scores were calculated by summing individual items/problem severity. At week one, item 18 (breastfeeding in the context of return to work) was not included in the total scoring of the BES because no mothers were working outside the home. At week 4, two mothers were working outside the

home and the total score was based on all 18 items. In addition, individual item scores were ranked by frequency and severity to determine which problems occurred most frequently, as well as which problems were rated as most severe in the sample of 7 mothers. The numbers of mothers who continued to breastfeed and who had weaned at 4 weeks were calculated, and reasons for weaning and formula supplementation patterns were analyzed with frequencies and narrative analysis.

*Research Question 5.* Data from the telephone interview at the end of 4 weeks postpartum about mother's perception of telehealth on their breastfeeding experience were analyzed with narrative analysis. Mothers were asked to tell the research assistant about their experiences with the telehealth lactation consultant in assisting them to breastfeed. In this open ended questionnaire, mothers were asked if they felt that they had an improved experience because of telehealth or if they felt they had less breastfeeding problems because of their participation.

## RESULTS

### **Sample Characteristics**

Table 1 describes the mothers in this sample. Over half of the women were White (57%), the majority were married (71%), and their range in age was 23-37, with a median age of 28 years. The highest level of education ranged from partial college to doctoral degrees. The women's family yearly income ranged from \$10,000 or less to over \$70,000. Table 2 describes the pregnancy and delivery information. Over half of the women were primiparous (57%) and had vaginal deliveries (71%). The women's median gestation was 40 weeks, over half of the baby's were female (57%) with a median weight of 8.1 pounds. Table 3 describes the mother's work and breastfeeding plans. Two of the mothers planned to return to work. Mothers planned length of breastfeeding ranged

from 6-26 months and a median of 12 months. All 7 mothers planned to exclusively breastfeed their infants.

**Table 1** Subject Demographic Distribution

<b>Ethnicity (Frequency)</b>	<b>Age</b>	<b>Marital status (Frequency)</b>	<b>Highest education (Frequency)</b>	<b>Family's yearly income (Frequency)</b>
Black (1)	Range 23-37	Married (5)	Partial college (2)	\$10,000 or less (1)
White (4)	Median 28	Single (1)	Associate's degree (1)	\$10,001 to \$25,000 (1)
French (1)		Living with partner (1)	Bachelor's degree (3)	\$25,001 to \$40,000 (2)
West Indian (1)			Doctoral degree (1)	\$55,001 to \$70,000 (1)
				Over \$70,000 (1)
				Not Applicable (1)

**Table 2** Pregnancy and Delivery Distribution

<b>Parity (Frequency)</b>	<b>Type of delivery (Frequency)</b>	<b>Baby's birth weight (Frequency)</b>	<b>Baby's gestation</b>	<b>Baby's gender (Frequency)</b>
Primiparous (4)	Vaginal (5)	Range: 6.30-9.10 lbs	Range: 39-42 weeks	Female (4)
Multiparous (3)	Cesarean Section (2)	Median: 8.1 lbs	Median 40 weeks	Male (3)

**Table 3** Work and Breastfeeding Plans

<b>Plan to return to work (Frequency)</b>	<b>Breastfeeding status (Frequency)</b>	<b>Breastfeeding plan in months</b>
Yes (2)	Breastfeeding only (7)	Range 6-26 months
No (5)		Median 12 months

**Research Question 4. What are the breastfeeding experiences and problems of mothers at 1 and 4 weeks postpartum?**

Descriptive statistics were calculated for each item in the BES. The week 1 item responses indicated mild problems overall. Sore nipples had a median score of moderate (3), and engorgement had a median score of mild (2). Cracked nipples, difficulty latching on, baby reluctant to nurse due to

fussiness, breast infection, sucking difficulty, and embarrassed when nursing all had median scores of (1) and were not experienced by the mothers.

The total BES score at week 1 ranged from 23-45 out of a possible range of 17-85 and the median was 30. The most frequently reported problem at 1 week was mothers feeling tired/fatigued (85.8%). The next most frequently reported problems were sore nipples (85.7%) and baby's reluctance to nurse due to sleepiness (85.7%). The most severe problems reported at 1 week were sore nipples (3), engorgement (2), baby's reluctance to nurse due to sleepiness (2), leaking breasts (2), baby nursing too frequently (2), worry about not having enough milk (2), mothers feeling tired/fatigued (2), worry that baby not getting enough milk (2), difficulty positioning baby (2), worry about baby's weight gain (2), and mother feeling tense and overwhelmed (2).

The week 4 individual item indicated mild responses overall. The only item with a moderate median score was feeling tired/fatigued (3). Baby reluctant to nurse due to sleepiness, baby reluctant to nurse due to fussiness, leaking breasts, and feeling tense and overwhelmed had a mild median score (2). Sore nipples, cracked nipples, engorgement, difficulty latching on, breast infection, baby nursing too frequently, worry about not having enough milk, sucking difficulty, worry that baby not getting enough milk, difficulty positioning baby, worry about baby's weight gain, embarrassed when nursing all had a median score of not at all (1).

The total BES score at week 4 ranged from 23-40 out of a possible range of 18 – 90, and the median was 25; overall very low severity total scores. The most frequently reported problems at 4 weeks were mothers feeling tense and overwhelmed (85.8%), mothers feeling tired and fatigued (85.8%), baby's reluctance to nurse due to fussiness (71.4%), and baby's reluctance to nurse due to sleepiness (71.4%). The most severe problems reported at 4 weeks were mothers feeling tired/fatigued (3), mothers feeling tense and overwhelmed (2), baby's reluctance to nurse due to fussiness (2), and leaking breasts (2).

At week 1, only one mother was supplementing with formula 3 times a day. The reason for using non breast milk was to serve as extra nourishment. At week 4, two mothers were supplementing with formula. One mother was supplementing to substitute a breastfeeding session and 1 mother used formula to serve as extra nourishment. Of the 2 mothers who were supplementing, 1 mother used non-breast milk 2 times every day and 1 mother used non-breast milk every 2 days. At 4 weeks, all 7 mothers were continuing to breastfeed and no mother had weaned.

**Research Question 5. Do mothers think they had improved breastfeeding experience or a decrease in breastfeeding problems because of their telehealth experience?**

Qualitative narrative analysis was used to analyze these questions. In the following paragraphs, quotes from the mothers will be used to illustrate their telehealth experiences. Mothers were asked to discuss their experiences about breastfeeding with the use of telehealth. Six mothers thought the use of telehealth had benefited their breastfeeding experience and they believed that they had experienced fewer problems as a result of being in the study. One multiparous mother who felt she had an improved breastfeeding experience stated “it helped to support and encourage my breastfeeding.” Another multiparous mother reported that “they brought a lot of wisdom and experience that I didn’t have with my other two kids.” Similarly, 1 primiparous mother said, “I had an improved experience because they had the knowledge to help and were able to see what I was doing so they could help me.” Another primiparous mother felt stated, “I had sore nipples in the beginning and they [lactation consultants] gave me lanolin and told me about Hydrogel™ pads.” Six of the mothers reported a decrease in breastfeeding problems. One multiparous mother explained her improved breastfeeding experience when she compared it to her previous pregnancies. “Yes, I had less problems breastfeeding this time. With my last two pregnancies I had cracked nipples and bleeding and was just really sore.” One primiparous mother agreed that during the four weeks of the study, “I had a decrease in breastfeeding problems. It has made it easier. I had my questions

answered faster. I had more access to resources because I had the lactation consultant's support. It kept me going." As a result of being in the study, 1 primiparous mother received help for her sore nipples. She stated "I had sore nipples during the first couple of weeks. She [lactation consultant] told me that I could buy lanolin cream to put on and also taught me how to hold the baby right." Another primiparous mother stated, "I have had less positioning problems." Overall, regardless of parity 6, of the 7 mothers agreed that being in the study had been beneficial to their breastfeeding experience and that they felt they had fewer problems over the course of the 4 weeks due to their participation in the study.

## DISCUSSION

The results of this study indicate that in the first week postpartum the majority of mothers most frequently felt tired and fatigued, experienced sore nipples, and some felt their babies were reluctant to nurse due to sleepiness. At 4 weeks, mothers expressed the same issues. They continued to feel tired and fatigued and they reported their babies were reluctant to nurse due to sleepiness. The experience of sore nipples was more frequent early on and by 4 weeks this was not a frequent experience for mothers in this study.

The results of this study indicate that in the first week postpartum, sore nipples and engorgement were the most severe experiences of mothers. By week 4 however, mothers reported feeling more tired and fatigued and being tense and overwhelmed. This finding was supported in the literature as engorgement occurs when there is an "imbalance between supply and demand of the milk. This is most likely to happen in the first few days" (Bainbridge, 2005, p.552). In addition to engorgement, maternal fatigue levels in the early postpartum period are common. Research demonstrates that that "maternal fatigue levels tend to be moderate, with peak levels occurring between 2 and 6 weeks postpartum" (Wambach, 1998, p.219).

Total BES scores during week 1 had a larger range and the median group problem severity score of 30 was higher than the week 4 median score of 25. Actual total severity scores ranged from 23-45 at week 1 and 23-40 at 4 weeks. Therefore the mothers at week 1 ranked their breastfeeding experiences as more severe than at week 4. This is consistent with other research using the BES, with severity of breastfeeding problems decreasing over the early postpartum weeks (Wambach, 1998; Wambach, Aaronson, Breedlove, Domian, & Yeh (in press)).

The results from the narrative analysis demonstrate that the majority (n=6) of women regardless of their parity found telehealth lactation support helpful for their breastfeeding experience and believed they had a decrease in breastfeeding problems during the 4 weeks because of their participation in the study. One primiparous mother stated, "it was nice to have them help me, having encouragement and support were huge positives. It gave me the strength to carry on." These positive results support earlier findings that lactation support in the early postpartum period is related to increased duration and breastfeeding exclusivity (Wambach et al., 2005). At four weeks, all of the women in the study were breastfeeding and 5 of the 7 were breastfeeding exclusively. This study suggests that in home lactation support using telehealth may promote positive breastfeeding experiences and outcomes for women in the first 4 weeks postpartum.

### **Limitations**

This is a small pilot study designed to examine the feasibility and reliability of using telehealth for assessment and breastfeeding support. Since the primary aim was to determine if telehealth could be used for this purpose it may not be generalized to all breastfeeding mothers. In addition, due to the small sample size, the (n=7) and the large number of highly educated women who participated, the results may not be representative of all breastfeeding mothers.

## CONCLUSION AND IMPLICATIONS

Results from this study demonstrate that women in the early postpartum period experience many concerns such as sore nipples and engorgement that may pose as a barrier to breastfeeding. However with the help of lactation consultants the women in this study had access to the resources to encourage and support their breastfeeding. In addition the majority of mothers (n=6) felt that they had fewer problems during the study due to the use of telehealth lactation support. This study demonstrated that telehealth lactation consultants are able to assess breastfeeding and provide support to breastfeeding mothers. The majority of women (85%) in this study reported that telehealth was beneficial to their breastfeeding experience. In addition the majority of women (85%) in this study stated that they did feel that they had a decrease in breastfeeding problems because of their telehealth breastfeeding support. This small study demonstrates that telehealth may be a useful tool in providing breastfeeding assessment and support and more research is essential in this area.

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