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A Feasibility Study of A Home-Based Program to Promote Perceived Adequate Milk

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Abstract

Objective: The purpose of this study was to evaluate the feasibility of a home-based educational skill building program to support exclusive breastfeeding for mothers in the early postpartum period. Specific aims were to: (1) evaluate the effectiveness of the study's recruitment strategy, comparing the use of an intermediary with a direct approach, (2) examine intervention fidelity, (3) examine program adherence, and (4) assess the acceptability of the intervention to participants.

Design and Sample: A mixed methods within-group, three-occasion descriptive design, delivered to 14 dyads of breastfeeding mothers and their full-term singleton infants.

Intervention: The program was implemented during three, 60-90 minute educational training sessions in the home, delivered at 6, 13, and 27 days postpartum.

Results: Mothers who adhered to the intervention protocol correctly attributed their infant's crying behavior to factors other than the adequacy of the mother's milk supply. All participants were recruited through direct approach. The program was delivered as planned with high fidelity, a high retention rate, and with a high rate of acceptability.

Conclusions: A fully scripted, at-home, nurse-delivered educational skill building program can be delivered with efficiency to breastfeeding mothers with full-term singleton infants; intervention fidelity, retention, and acceptability were high.

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Introduction

Breastfeeding promotes the health and wellness of mothers and their infants [1][2], including facilitating the relationships between mother and infant [3]. The World Health Organization (WHO)[4] and the American Academy of Pediatrics [5] both recommend exclusive breastfeeding either through breastfeeding on the breast or expressed breast milk in a bottle for the first 6 months of life in addition to solid food along with continuation of breastfeeding for 2 years of life or beyond as long as mutually desired. The breastfeeding goals of Healthy People 2020 in the U.S. set targets for breastfeeding initiation rates of 81.9% and exclusive breastfeeding rates at 3 months at 46.2% and 6 months at 25.5% [6]. While current U.S. breastfeeding initiation rates of 81.1%, 44.4% by 3 months, and 22.3 % by 6 months [7] approach the Healthy People 2020 goals [6], the duration and exclusivity of breastfeeding rates fall far below than the actual global exclusive breastfeeding rates of 36 % at 6 months. The goal of exclusive breastfeeding rate at 6 months set by WHO is at least 50% by 2025 [8].

The highest breastfeeding attrition rate occurs in the first month postpartum with exclusive breastfeeding rates as low as 57.1% [9]. The mother's view of the sufficiency of her breast milk supply (perceived insufficient milk-PIM) is a paramount concern for breastfeeding globally [10][11][12][13]. International data show that mothers 'read' the adequacy of their infant's crying and fussiness [14][15], frequent feeding demands [16], and perceived infants' poor weight gain [17][18] as signs that the mother's milk supply is inadequate. When a mother is uncertain about her breast milk supply, she has reduced confidence in breastfeeding [19][20], leading to quantifying the amount of breast milk [21]. When frequency of infant suckling decreases, breast milk production also decreases because breast milk production matches infant intake. When milk volume is added through formula supplementation, decreased infant suckling and failure of breast milk removal will occur [22][23][24], ultimately decreasing the breast milk production [25]. This is problematic because it will shorten the duration and exclusivity of breastfeeding on the breast.

Despite the toll of PIM on the mother and infant, programs and services lag behind the need. Previous randomized controlled trials reported that breastfeeding exclusivity and duration were improved by building maternal confidence in breast milk supply without quantifying which is separated from expressing milk in a bottle, i.e., breast milk feeding [26][27]. However, another contributing factor for PIM, maternal misattribution of infant behavior to her milk supply remained unanswered [28].

The program for the current study, the *Protecting Your Ability to Breastfeed Your Baby* [29], was designed to address two mutable causes of PIM: (1) maternal misattribution of infant behavior to her milk supply, and (2) maternal confidence to breastfeed her infant [28]. The goals of the program were to add to the mother's knowledge and skills in breastfeeding by increasing her sensitivity to her infant's behavior, her unrestricted breastfeeding, and by enhancing the mother's breastfeeding confidence. By achieving these goals, the hypothesis is that the mother will be less likely to think her infant's crying reflects the adequacy of the mother's milk supply, enabling the mother to more likely establish and sustain exclusive breastfeeding on the breast in the first month postpartum. We focused on breastfeeding directly on the breast because this is the natural way of feeding infants. Results from the short-term impact of this study that have been previously presented revealed significant changes in mother's sensitivity to infant behavior, breastfeeding confidence, decreased attribution of infant crying to her milk supply [30], as well as improved relationship between mother and infant [3].

The purpose of the current study was to evaluate the feasibility of the program. Specific aims were to: (1) evaluate the effectiveness of the study's recruitment strategy, comparing the use of an intermediary with a direct approach, (2) examine intervention integrity, (3) examine program adherence, and (4) assess the acceptability of fully scripted home-based intervention to program participants.

Materials and Methods

Design, Sample, and Setting

The current study used a mixed methods descriptive design evaluated over a single-group, three-occasions. A target sample of 15 mother and infant dyads whose infants were less than 7 days old were enrolled in the study during the first well-child visit or from a follow-up visit in a pediatric care center in the Pacific Northwest. Attrition was only 7%; only one mother was lost to study because she returned to her home country at two weeks postpartum. This meant that the remaining 14 mothers completed all of the intervention and assessment sessions.

The majority of mothers were in their early 30's (M = 33.3, SD = 4.4), U.S. born Caucasian, educated, married, living with her spouse, employed, primiparous, had normal vaginal delivery, did not smoke but did drink before pregnancy, had term singleton infants (M= 39.69, SD = 1.43) with birth weight 3,447.29 grams on average (SD = 511.45), initiated breastfeeding within 2 hours after delivery, roomed in during the hospital stay, first considered breastfeeding during pregnancy, and had intended to breastfeed on the breast from 6 months to 1 year (Table 1). The average age of the infant for home intervention sessions were 5.57 days for Session 1 (range 4-8 days), 12.78 days for Session 2 (range 11-15 days), and 26.93 days for Session 3 (range 25-29 days).

Recruitment

Following approval by the university human subjects committee, clinic recruitment occurred through four channels to boost enrollment. The receptionist informed mothers about a breastfeeding study and handed out a brochure describing the program. The nurse educator approached the mother either in the waiting room or the nursing room and introduced the study. Interested mothers received further explanation about the study and were asked questions for eligibility screening. The second recruitment method involved interested mothers who opted to receive a follow-up call by the nurse educator at a later time. If the mother agreed to be contacted, the nurse educator obtained the name and phone number of the mother. The third method of recruitment involved mothers who were not sure they wanted to participate and opted to call the nurse educator at a later date. In the fourth situation, interested mothers called the nurse educator about the study, using the contact phone number in the brochure.

The program was designed for all primiparous and multiparous breastfeeding mothers who were concerned about breastfeeding their infants. Inclusion criteria were (1) breastfeeding mothers whose goals were exclusive breastfeeding directly on the breast, (2) mother's ability to speak, write, and read English, (3) ability to attend three intervention sessions within one month postpartum, and (4) full-term singleton infant with no congenital abnormalities. Exclusion criteria included mothers with medical contraindications, breast reduction, and breast cancer.

Intervention

The intervention consisted of three sessions, giving by a nurse educator with specialized training in maternal child nursing (first author), using a fully scripted educator manual. Sessions were delivered on the day after recruitment, at a one-week interval between Session 1 and 2, and at two-week intervals between Session 2 and 3 on the average of 6, 13, and 27 days postpartum. Each intervention session lasted 60 to 90 minutes.

The program was guided by three theories: Bandura's social cognitive theory [31][32][33], Mercer's becoming a mother [34], and Barnard's mother and infant interactions [35]. Bandura's social cognitive theory influenced the structure as well as the sequence of each session, emphasizing a skill building format. Mercer's becoming a mother determined the timing for each session concomitantly occurring around lactogenesis II. Barnard's mother and infant interactions formed the content of the intervention which offered ways to match breastfeeding behavior contingent to the infant's behavior.

The session included the following content: keeping her infant close to enable attention to infant behavior, offering unrestricted breastfeeding directly on the breast in response to her infant's behavior, assessing the adequacy of breast milk supply, identifying breastfeeding patterns contingent to infant behavior, and meeting self-care needs. Each session involved one-on-one interactive didactic teaching, breastfeeding observations and feedback, mother's completion of feeding logs for three weeks, and 24-hour access by phone to the nurse educator between the sessions. Table 2 provides a brief description of the intervention

Table 1. Sample Demographic Characteristics.

	No.	%
Mother's ethnicity		
U.S. born Caucasian, Non-Hispanic	8	57
Asian (Japan, Taiwan, & Thai)	3	21
Asian & Hispanic (Brazil)	1	7
Hispanic	1	7
European (Hungary)	1	7
Mother's education		
High school	1	7
College	13	93
Mother's marital status		
Married	13	93
Cohabiting	1	7
Employment status		
Full-time	5	36
Part-time	4	29
Not employed	5	35
Parity		
Primiparous	13	93
Multiparous	1	7
Type of delivery		
NVD	10	71
Forceps	1	7
C-section	3	21
Drinking before pregnancy		
Yes	9	64
No	5	36
First breastfeeding (hours)		
<2	12	86
3-12	1	7
>12	1	7
Method of feeding in Baby Friendly Hospital		
Breast	12	86
Formula	1	7
Breast + Formula	1	7
Roomed in		
Yes	13	93
No	1	7
Intentions to breastfeed		
Breast	9	64
Breastfeeding on the breast plus breast milk feeding	5	36
Planned breastfeeding duration		
6 months-1 year	10	71
>1 year	4	29

Note. NVD = Normal vaginal delivery. N = 14 mother and infant dyads (self-report).

Table 2. Description of the Intervention Sessions.

Session 1: Building on mother's sensitivity and breastfeeding directly on the breast in response to her infant's behavior
• Adding to her breastfeeding skills by:
◊ keeping her infant close to enable attention to infant behavior
◊ Breastfeeding directly on the breast in response to her infant's behavior
◊ Assessing the adequacy of breast milk supply through audible swallowing and 24 hour excretions
◊ Reinforcing performance enactment by breastfeeding observations and feedback
Session 2: Adding to her ways to take care of herself
• Adding to her ability to elicit the patterns of her breastfeeding in response to her infant behavior by:
◊ Learning more about her infant behavior and identifying breastfeeding patterns contingent to infant behavior
◊ Self-monitoring and feedback from breastfeeding observation and the feeding logs
• Adding skills for her self-care needs to improve postpartum recovery and wellness
Session 3: Establishing and sustaining breastfeeding relationship
• Building on Session 1 and 2 focusing on gains she made in attributed infant behavior to her perceived milk supply by:
◊ Sustaining exclusive breastfeeding on the breast
◊ Gaining available resources
◊ Anchoring maternal competencies in her ability to breastfeed her infant

sessions. Figure 1 identifies the components of the intervention.

Measures

The sample size and the validity and reliability of the measures that were used for this study were reported elsewhere [3][30]. Recruitment was monitored by using a spreadsheet to assess the success of each different recruitment strategy. Fidelity and dosage of the intervention integrity was assessed by audio recording followed by the use of performance checklists for each of the 3 intervention sessions; they focused on the adequacy with which the nurse educator carried out each intervention session as planned. These checklists contained observable behavior of the nurse educator and consisted of 51 criteria: 19 for Session 1, 20 for Session 2, and 12 for Session 3. Each criterion was rated 2 if the behavior was present; 1 if the behavior was partially present or if the behavior was ineffective or misleading; and 0 if the behavior was absent or misinformation was given. NA denotes not applicable when observable behavior is not included in the criteria. There is a total possible score of 102(Section 1, 38; Session 2, 40; and Session 3, 24).

Program adherence was assessed by observing mother and infant interactions pertaining to breastfeeding during each intervention session and by reviewing mothers' feeding logs. This level of review

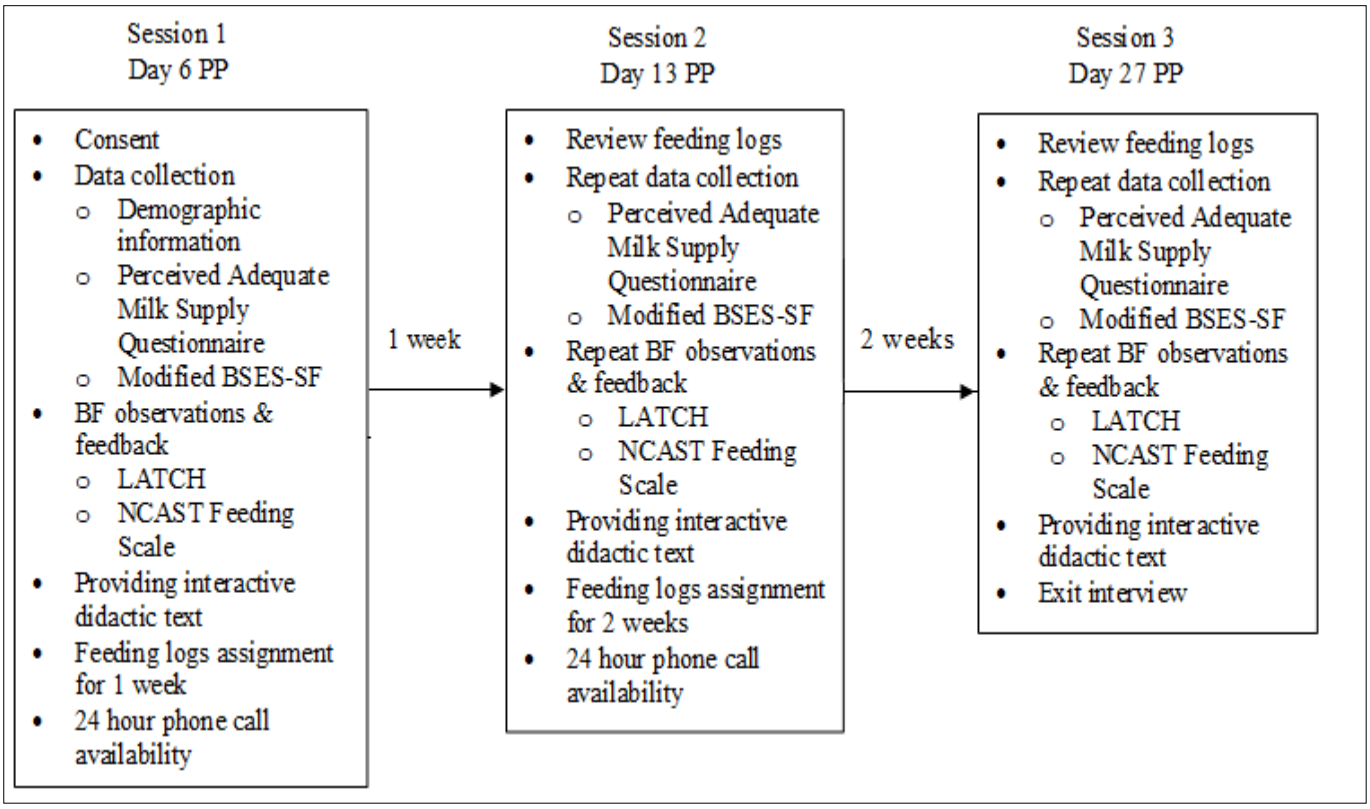

Figure 1. The Components of Intervention.

Note. PP = Postpartum; BF = Breastfeeding; NCAST Feeding Scale = Nursing Child Assessment Satellite Training Feeding Scale [44]; BSES-SF = Breastfeeding self-efficacy scale-short form [45].

*The pretest took place on average 6 days postpartum and the posttest on average of 13 and 27 days postpartum.

*Breastfeeding observations and didactic text occurred interchangeably depending on infants' feeding readiness.

*Each session was audio recorded and reviewed to assess the fidelity and dosage of the intervention integrity by using performance checklist.

enabled identification of patterns of concurrence of participating mothers as well as signaling the need to modify the intervention materials. Acceptability was assessed by the participating mothers' perception of the intervention during audio recorded 12 open-ended questions at the end of Session 3 (Table 3).

Data Collection and Analysis

When mothers and their infants met eligibility criteria, the nurse educator obtained signed informed consent, scheduled appointments for home intervention sessions, and delivered interventions at home. SPSS 19.0 was used to analyze the descriptive data. A recruitment spreadsheet was used to compare the intermediary vs. a direct approach. Performance checklists were used to calculate scores for fidelity and dosage of intervention integrity for each intervention session. Program adherence was determined during breastfeeding observations as well as the analysis of breastfeeding status in the first month postpartum on the feeding logs. Thematic analysis [36] of the open-ended questions at the end of Session 3 proceeded in three steps: transcription with 100% accuracy, open coding for each study participant, and open coding across the study sample. Data for each interview question were individually analyzed, and common or core themes were then identified. Themes that were unique to study participants were summarized.

Results

Recruitment Strategy

Prior to enrollment, the study was reviewed and approved by the university human subjects committee. A total of 122 charts were reviewed of eligible mothers during the seven months in which study participants were recruited to the study. Seventy-one were initially contacted either by the nurse educator or by the clinic receptionists, followed by the nurse educator introducing the study and screening for eligibility. A total of 15 mothers and infant dyads were enrolled in the study through on-site approach by the nurse educator. Mothers participated because they perceived they had insufficient milk to breastfeed their infant, difficulty latching, nipple pain, frequent feedings, infant not sleeping at night, and a history of inverted nipples; 11

Table 3. Open-Ended Questions.

1	What, if anything, did you gain from participating in the program?
2	What were disappointments you had about the program?
3	In your own words, please tell me what you thought about each of the three intervention sessions with the nurse educator?
4	To what extent, if at all, were Sessions 1, 2, and 3 applicable to you?
5	Please comment on the location (home), the timing (within 8 days postpartum, 2 weeks postpartum, and 1 month postpartum), the duration (60-90 minutes), and the interval between intervention sessions in the program?
6	Please comment on the intervention materials used in the program.
7	How challenging was it for you to keep feeding logs for 3 weeks of breastfeeding?
8	How challenging was it for you to attend the three home intervention sessions?
9	How did you feel about the nurse educator observing you breastfeed?
10	What, if anything, were the positive aspects of the three home intervention sessions?
11	Given what you have learned, how do you feel about breastfeeding your baby? How long would you like to continue to breastfeed your baby now?
12	Is there anything else you would want us to know about?

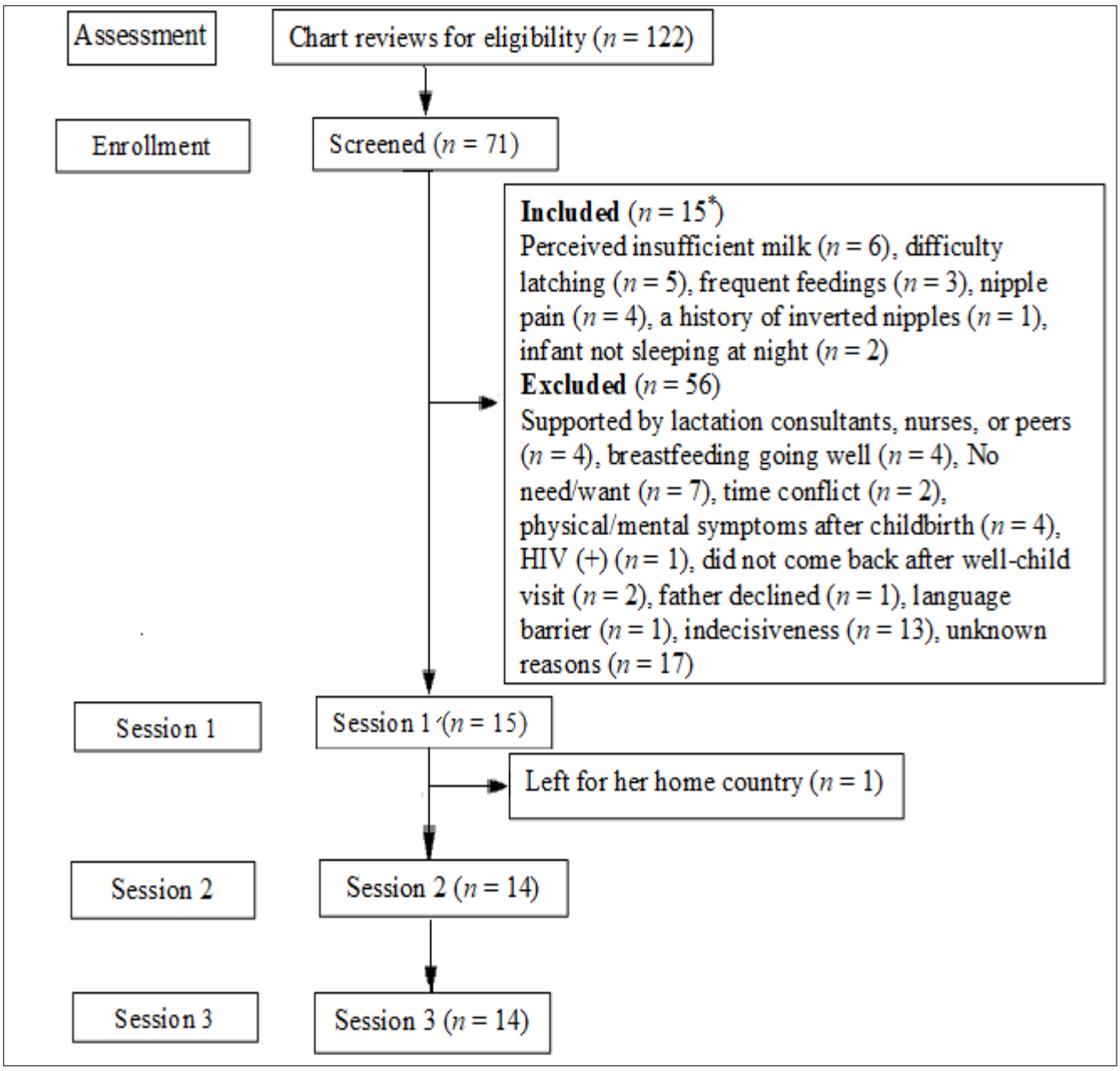

Figure 2. Recruitment Flow Diagram.
Note. *Eleven participating mothers had multiple concerns.

mothers had multiple concerns (Figure 2).

A total of 56 eligible mothers declined enrollment for a variety of reasons, including prior visits to lactation services, support from nurses or peers, breastfeeding going well, not wanting or needing the study, physical discomfort, HIV positive and did not want to breastfeed, unable to speak English, unable to keep the appointments, unable to return after their well-child visit for further explanation, and father declined. Thirty-five mothers kept the brochure. Of those, 13 mothers said they would contact the nurse educator to enroll in the study if they were interested, but none called (Figure 2).

Intervention Fidelity

Standardized, session specific performance checklists were used to assess the nurse educator's behavior in each of the three intervention sessions for each study participant. Analysis of data for the 14 study participants revealed that the program was delivered as planned for all of the intervention sessions. The possible range of scores for each criterion for the performance checklist ranged from 33 to 38 in Session 1, from 31 to 40 in Session 2, and from 14 to 24 in Session 3. The scores varied mostly because of mothers' employment status related to feeding her infant as well as one mother not able to keep the feeding logs for 2 weeks.

Program Adherence

Eight mothers (57%) established and sustained exclusive breastfeeding directly on the breast in the first month postpartum. Three mothers (21%) fed exclusively breast milk by using bottle or nipple shield. Thus, a total of 11 mothers (79%) exclusively breastfed either through breastfeeding directly on the breast or breast milk feeding. Of those mothers who established exclusive breastfeeding directly on the breast, two supplemented with formula either through finger feeding, or a bottle as recommended by either their pediatrician or the lactation consultant in the early postpartum. One mother completely switched to exclusive breastfeeding directly on the breast when adequate milk supply was confirmed on Day 8 during Session 1. The other mother continued occasional formula supplementation until Day 18 when she decided she was not producing enough milk even though adequate milk supply was confirmed during Session 1 and 2. However, she was able to persevere with her breastfeeding relationship with her infant even during formula supplementation, resulting in the establishment and sustainment of exclusive breastfeeding directly on the breast.

The use of alternative feeding methods such as a nipple shield, finger feeding, or a bottle supplementary to breastfeeding was discouraged when proper latch on and infant suckling along with adequate breast milk supply was confirmed. However, six mothers (43%) were unable to persevere with breastfeeding directly on the breast while strictly using alternative feeding methods.

Mothers were encouraged to keep their infants close to them so that mothers could attend to their infant's behavior and offer breastfeeding directly on the breast. Twelve mothers (86%) kept their infants in the same room as the parents', either in a bassinet or a crib within mother's arm's reach, nine mothers (64%) slept with the infant in the same bed.

Acceptability

All except one mother completed all of the sessions (93% completion rate). The non-completer mother returned to her home country within two weeks after childbirth, precluding her further participation in the program. For Session 1, eight mothers (57%) reported that the session helped resolve concerns and gain skills about not producing enough milk. For Session 2, seven of the mothers (50%) said they did not have time to do most things listed but they knew they should, including how to compensate for sleep deprivation or alteration while the infant was sleeping and to maintain personal hygiene, nutrition, and family support. For Session 3, most of the mothers (93%) claimed they were satisfied at what they had accomplished, including three mothers (21%) who were not able to establish exclusive breastfeeding directly on the breast during the program. Only one mother, who was multiparous (7%), claimed Session 3 was unnecessary.

The location, timing, duration, and interval of the program sessions with the mothers were good

overall. All mothers stated delivering the program in their home was the best location for them. Four mothers (29%) commented that the timing of the interval between Session 1 and Session 2 could have been shorter because of nipple pain and their uncertainty about milk supply coupled with the infant's physiological and/or iatrogenic weight loss [37] and increased infant fussiness. One mother (7%) who achieved first optimal latch on Day 27 wanted to have an additional session after Session 3.

All mothers except one mother (93%), who was unable to keep the feeding logs, said that the feeding logs were helpful to increase their awareness of infant patterns, including feeding, sleep-awake cycles, and crying. One mother said, "*I think that [the log] was helpful especially for trying to look for like a sleep pattern, there was one only clear time like the late morning he goes to sleep that was reliable*." Another mother said she was, "*starting to realize that he is getting tired at 3 pm…that is a good thing to get from the sheet because if he misses that, I think it makes him fussier. So knowing that if he's trying to get sleep, I can cater to that so he will be less fussy… so very beneficial*."

Tracking the number of excretions was useful to assess whether the infant was getting enough milk. Four mothers (29 %) had already started feeding logs on their own prior to enrolling in the program. Two mothers (14 %) who simultaneously participated in a jaundice study kept a different form of feeding logs along with the one used in the current study. One mother (7 %) preferred the paper and pencil ones because everything could be seen all on one paper. Two mothers (14 %) asked for copies of their feeding logs, and one mother (7 %) asked for extra feeding logs for another month.

All mothers stated that the nurse educator's breastfeeding observations and feedback were reassuring. One-on-one observations helped the mothers address their concerns and built confidence that they were breastfeeding right. Two mothers (14 %) who were not able to successfully breastfeed on the breast described their disappointments. One mother wanted to know about alternatives when breastfeeding was not successful. Based on the open-ended questions, the following themes were identified: What increased breastfeeding directly on the breast, Self-care improvement, Breastfeeding confidence, and Getting ready to return to work.

What Increased Breastfeeding Directly on the Breast

This was defined as the components of the intervention that were actually used by the mothers to increase breastfeeding directly on the breast. It consisted of five codes: knowledge about infant's behavior, breastfeeding skills consisting of breastfeeding on demand, keeping the infant close at night to breastfeed, assessing the adequacy of breast milk supply, and bonding during breastfeeding. One mother said, *"It was helpful to hear that I should calm him down before feeding so I watched you do that and then I did it* later." Another mother stated, *"how to keep my breast milk supply up by letting him cluster feeding, knowing that he was cluster feeding and it was not just me not giving him enough milk from my breast. That was a good thing to know. He's going to go through a growth spurt and need to feed every hour that was a good thing for me to learn because I was getting a little bit stressed out because I was not producing enough, yeah."* One mother stated about bonding, *"It's so weird and awkward but once I did it like he would be fussy and then as soon as he's on my breast, he is like a different baby, so calm and relaxed that make me feel good about myself because I can provide that for him."*

Self-Care Improvement

This was defined as the self-care behaviors mothers implemented to facilitate their recovery from delivery and meeting their own needs. It consisted of five codes: getting more sleep, gaining family support, maintaining good hygiene, nutritious intake, and breastfeeding in a side lying position. Three mothers (21 %) reported that they were trying to stay in bed longer in the morning until the infant woke up and/or to take a nap when the infant was sleeping. Five mothers (36 %) reported that they were more likely to ignore taking care of themselves when their focus was on the infant. It was a good reminder of how important it is to take care of themselves, to fit this in the schedule while they are in the recovery period. Two mothers (14 %) reported they had advanced in making efforts to feed themselves. All

mothers spoke of the importance of gaining family support to breastfeed their infant. One mother said, "*Making sure that I'm getting my need time in, getting my husband to watch the baby while I take care of myself like with a shower or reading a book.*"

Breastfeeding Confidence

This was defined as mother's ability to breastfeed her infant directly on the breast. It consisted of four codes: how the mothers feel about breastfeeding their infant, values of breastfeeding, feeding during the time the infant is being fussy, and the length of time the mothers want to continue to breastfeed their infant. One mother stated *"I feel good about it. I feel maybe a little more empowered about it like knowing how good it is for him, makes me feel like I really want to feel to do it as long as I can and feed him as much as I can."* Eight mothers (57%) wanted to continue to breastfeed over 1 year and two mothers (14%) said as long as the infant wants.

Getting Ready to Return to Work

This was defined as the mothers' readiness to go back to work after maternity leave was over while at the same time breastfeeding their infant. Five mothers (36%) reported that starting to think about returning to work early was beneficial. One mother whose breastfeeding was well established and who had a maternity leave for 13 weeks stated that, *"I feel a little more comfortable now that he had a couple of bottles (on Day 25 & 26) and he is being able to switch back because I was kind of worried about that."*

Discussion of Results

This is the first known study of a home-based program for promoting mothers' perception of the adequacy of their milk supply that also evaluated the feasibility of the program, including recruitment strategy, intervention fidelity, program adherence, and program acceptability. Current breastfeeding support in the U.S. is limited. Practices that support breastfeeding include skin-to-skin contact for early breastfeeding initiation, no use of pacifier/artificial nipple or formula supplementation in the Baby Friendly Hospital during the hospital stay. Immediate breastfeeding support after early postpartum discharge (<48 hours after normal vaginal delivery and <72 hours after C-section for healthy term infants) is limited to outpatient lactation services. Community support at the clinic or on limited home visits is available mainly for the most vulnerable mothers with low income at high health risks. Breastfeeding is integral to the mother's relationship with her infant and occurs most often in the home environment, especially in the neonatal period. Home-based interventions were selected as the most natural way to achieve the therapeutic intervention goals. All mothers who attended Session 1 also attended Session 2 and 3, except one mother who returned to her home country. A prior completed randomized controlled trial of a breastfeeding home-based intervention averaged 1-3 times in the first five weeks significantly increased the rates of breastfeeding exclusivity and duration. A home-based intervention, like the study by Kronborg [26] and the current study [3] [30] may have high potential to positively impact reciprocity between mother and infant pertaining to breastfeeding [3] [30]. Further, a high retention rate of the current study suggests that home intervention sessions were preferred over other types of delivery.

All mothers except one kept the feeding logs for the three weeks of the study, suggesting low subject burden. This is a consistent finding from a previous randomized controlled study of keeping paper and pencil logs for three weeks which significantly increased full breastfeeding rates at 6 months postpartum among older, educated primiparous mothers [38]. In a recent randomized controlled study of web-based monitoring system, mothers in the experimental group entered breastfeeding data in the software for 30 days and received tailored messages for their breastfeeding status and problems significantly increased exclusive breastfeeding rates at 1, 2, and 3 months postpartum [39]. Even though a high attrition rate was noted, acceptability was reported in their previous feasibility study [40]. Although, a revision of the forms of our feeding logs are recommended, there was more benefit than burden in maintaining feeding logs.

Field observations suggest that several additional modules need to be created, especially for mothers who may need more intervention than was provided during the current study. Mothers who are uncertain about their milk supply coupled with infant

physiological or iatrogenic weight loss [37] may require additional breastfeeding observations and feedback along with a review of their feeding logs during the first week postpartum. Since PIM is the main reason for early breastfeeding discontinuation, providing two interventions during the first week may be ideal to help mothers persevere with their breastfeeding relationship with their infant. On the other hand, multiparous mothers who had experienced breastfeeding in prior pregnancies may not require Session 3 once breastfeeding is well established. However, the core elements of the intervention, linking breastfeeding in response to infant behavior should be retained.

This study demonstrated that even mature, well-educated, and primiparous as well as multiparous mothers were concerned about breastfeeding their infants. Each session added to the mother's breastfeeding skills and built on the mother's ability to breastfeed her infant in response to her infant's behavior. We speculate that self-monitoring and feedback from breastfeeding observations and the feeding logs were key elements in enhancing breastfeeding confidence. By keeping their infants close to mothers, they can attend to their infant behavior and offer breastfeeding directly on the breast, thereby preventing erroneous attribution of infant crying to PIM. Given the home-based nature of the program, this program could be incorporated to vulnerable, fiscally challenged, underserved mothers who could potentially benefit. Furthermore, this program requires longer follow-ups. With combined analyses of health outcome disparities and health care disparities pertaining to breastfeeding, cost analysis over the utilization of provision of maternity child health is necessary [41][42].

Recruitment occurred through four channels, but recruitment was challenging. The initial plan for recruitment through an intermediary: the receptionists handing out the brochure when the mothers checked in and then having mothers approach the nurse educator in the waiting room or nursing room did not result in mothers calling about the study; therefore, had to be modified to allow the nurse educator to directly approach the mothers. None of the mothers called to schedule their own appointments based on the information in the brochure. This indicates that offering home interventions through a face-to-face approach might be an ideal way of reaching out to mothers. Additionally, future studies need to recruit more diverse clientele by securing multiple recruitment sites that serve diverse populations. This will require more organizational planning, including gathering information on the facility's demographic information, population trends, resources that are readily available for research studies, and other ongoing research studies. The ability of the program [3][30] suggests that the inclusion of both primiparous and multiparous mothers who report breastfeeding problems, concerns, and/or challenges, not necessarily only mothers with PIM will improve recruitment efficacy.

The current study's limitations deserve comment. The study involved a convenience sample of educated mothers and had no control group. It is always possible that other sources could have affected study outcomes. For example, some mothers, especially those who had difficulty with breastfeeding, had sought help from either a pediatrician or a lactation consultant before or after their enrollment into the current study. Nonetheless, this study addressed an intervention for the early struggles that even mature, well-resourced mothers face after hospital discharge after delivery. Results suggest that mothers significantly benefited from the one-on-one interactions, gained breastfeeding skills and confidence in response to infant behavior, and promoted mother's view of the adequacy of the mother's breast milk supply at home. Further, findings suggest that it is reasonable for nurse educators to follow mothers during the early critical weeks at home. This is consistent with a prior study with vulnerable populations [43].

Conclusions

Preliminary evidence indicates that a fully scripted at-home, nurse delivered educational and skill building program to promote mother's perception of the adequacy of their milk supply can be efficiently delivered and was well accepted. Program fidelity and acceptability were high. Future research will be directed toward evaluating the program in different settings with diverse populations and exploring ways in which the program can be initiated with scarce resources or adapted and

incorporated into existing provider systems.

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