Abstract

Purpose: To investigate whether implementation of a formal breastfeeding education program including a breastfeeding protocol, a resource guide, and educational presentations would have an impact on knowledge, comfort level, and attitudes toward breastfeeding among healthcare providers, and on amount of exclusive breastfeeding at our hospital.

Design and Methods: Quasi-experimental study that included a survey to obtain a preintervention baseline measurement and a postintervention measurement 6 months after the implementation of the formal breastfeeding education program. The sample was obstetricians, pediatricians, and nurses who interact with breastfeeding mothers at our hospital. Additionally, we surveyed breastfeeding mothers who gave birth at our hospital to determine the impact on the nurse observation of breastfeeding, exclusivity of breastfeeding, and nighttime feedings.

Results: Healthcare providers showed increased levels of knowledge and comfort dealing with breastfeeding issues after the education program. Knowledge scores were significantly improved (pre- vs. postimplementation scores were 20.2 vs. 22.2, $p < .05$). Comfort level scores were also significantly improved (pre- vs. postimplementation scores were 20.7 vs. 29.4, $p < .05$). There was no statistically significant change in attitude toward breastfeeding (preimplementation score = 43.8, postimplementation score = 43.4, $p = .075$). For the mothers, the preintervention group reported exclusive breastfeeding 55% of the time versus 63% ($p = .046$) in the postintervention group. There was an increase in nurse observation of breastfeeding after the intervention: 84% versus 92% ($p = .046$), and breastfeeding patients reported an increase in nighttime breastfeeding after the intervention (55% vs. 71%, $p = 0.001$), with a resulting decrease in formula supplementation in the nursery at night (28% vs. 21%, $p = .006$).

Clinical Implications: This study shows how an educational program and adherence to protocols can increase exclusive breastfeeding as well as improve healthcare provider knowledge, comfort level, and attitudes about breastfeeding. Our interventions also resulted in an increase in nurse observation of breastfeeding, nighttime breastfeeding, and a decrease in the use of formula supplementation at night. This study suggests that positive changes can be made with an educational program and protocols.

Key words: Breastfeeding; Breastfeeding knowledge; Education program; Healthcare providers

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Impact of a Formal

Breastfeeding provides known benefits to infants, mothers, and society. The American College of Obstetricians and Gynecologists (ACOG, 2007) recognizes breastfeeding as the preferred method of feeding for newborns and infants, as do the American Academy of Pediatrics (AAP, Gartner et al., 2005) and the American Academy of Family Physicians (AAFP, 2008). In the United States, the Healthy People 2010 goal is for 75% of newborns to be breastfed and for at least 50% to continue breastfeeding for 6 months (www.healthypeople.gov, 2000). Moreover, 43% of infants born in 2007 were still breastfeeding at least partially at 6 months of age with only 13% breastfeeding exclusively (Centers for Disease Control and Prevention [CDC], 2010). Although 60% to 70% of women in New Jersey initiate breastfeeding, only 35% of breastfeeding mothers are exclusively breastfeeding at the time of hospital discharge (Denk, Kruse, & Rotondo, 2010). Six months later, only 20% to 30% are still exclusively nursing (Feldman-Winter, Kruse, Mulford, & Rotando, 2002).

At our hospital, 79% of mothers initiated breastfeeding, but we have found that only 48% were exclusively breastfeeding at the time of hospital discharge. Our Breastfeeding Task Force also noted that patient complaints (from the patient satisfaction surveys sent to all our patients after discharge) indicated that patients felt they received conflicting information on breastfeeding. In our institution, breastfeeding information is provided by a variety of healthcare personnel, including obstetricians, pediatricians, lactation consultants, and maternity nursing staff.

How should clinicians work to best improve these statistics? Studies of clinician counseling practices about breastfeeding have shown that encouragement from healthcare providers is associated with increased breastfeeding initiation (Lu, Lange, Slusser, Hamilton, & Halfon, 2001) as well as continuation of breastfeeding post discharge.

DiGirolamo, Grummer-Strawn, and Fein (2003) found that women who did not receive positive breastfeeding messages from their physicians and hospital staff were less likely to be breastfeeding at 6 weeks. Taveras et al. (2004) reported that exclusive breastfeeding was more likely to be discontinued if the pediatrician did not consider duration of breastfeeding to be important or recommended formula for weight gain.

When the AAP surveyed pediatricians about breastfeeding support and promotion practices, they found that pediatricians received more education about breastfeeding in 2004 than they did in 1995, yet fewer pediatricians felt that the benefits of breastfeeding outweighed the difficulties. More pediatricians reported reasons to recommend against breastfeeding (Feldman-Winter, Schanler, O'Connor, & Lawrence, 2008). This survey also found that only 12% of pediatricians were familiar with the "Ten Steps to Successful Breastfeeding" guidelines, and only 44% of pediatricians had attended education programs or

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Breastfeeding Education Program

grand rounds on breastfeeding topics (Feldman-Winter et al., 2008). Other barriers to breastfeeding promotion by both obstetric and pediatric clinicians include limited time during visits to give routine advice, address breastfeeding problems, and limited availability of lactation consultants or other breastfeeding support services (Taveras et al., 2004).

Some studies have been published which show that training physicians about breastfeeding can help improve breastfeeding rates. A training program on the basics of breastfeeding for medical residents was shown to increase problem-solving skills and comfort with breastfeeding (Haughwout, Eglash, Plane, Mundt, & Fleming, 2000). Feldman-Winter et al. (2010) also found that breastfeeding education during residency increased physician knowledge and confidence with breastfeeding issues. Patients of physicians trained in breastfeeding support reported increased initiation rates and more exclusive breastfeeding at 6 months.

Nursing support has been shown in research to have an important impact on the success of breastfeeding. Hong, Callister, and Schwartz (2003) studied desired breastfeeding support for first-time mothers and found that breastfeeding women dislike it when inconsistent information if offered in teachings about breastfeeding. The physical presence of the nurse during breastfeeding to observe and assist increased the breastfeeding mother's confidence, and a positive attitude toward breastfeeding by the nurse had a significant positive impact on the breastfeeding experience (Hong et al., 2003). Graffy and Taylor (2005) also found that breastfeeding women did not receive the information and support they needed from hospital nurses, with women stating that they wanted consistent advice and information and acknowledgment

Breastfeeding patients reported that the number of nighttime breastfeedings increased after the intervention on postpartum day one (55% vs. 71%, p = .001) with a resulting decrease in formula supplementation in the nursery at night (28% vs. 21%, p = .006).

of their breastfeeding experiences. These women also wanted encouragement and physical help with positioning. Durand, Labarere, Brunet, and Pons (2003) showed that breastfeeding education provided to the nursing staff increased breastfeeding supportive nursing behaviors such as increased breastfeeding in the first hour after birth, less mother–infant separation at night, and a decrease in the use of formula supplementation.

In light of the less than optimal breastfeeding rates at our institution, we decided to introduce a formal breastfeeding education program (including a breastfeeding protocol, a breastfeeding resource guide, and an educational program) for our healthcare providers and to measure whether such a program could change (1) knowledge, (2) comfort level, and (3) attitudes regarding breastfeeding. Further, we wanted to determine whether such a breastfeeding educational program could have an impact on the exclusivity of breastfeeding in women discharged from our hospital.

Methods and Design

Our research team included an obstetrician, the nursing manager, a lactation consultant, and the clinical nurse specialist. We designed the study, developed the survey tools, and obtained Institutional Review Board approval to conduct the study.

This was a quasi-experimental study that included a survey to obtain a preintervention baseline measurement and a postintervention measurement 6 months after the implementation of the formal breastfeeding education program. Healthcare providers who interact with breastfeeding mothers at our hospital (a level III Regional Perinatal Center with an average of 3,500 births per year) completed the survey. At the same time, breastfeeding mothers who gave birth at our hospital were also asked to complete a survey.

We developed the survey tools and had them reviewed by lactation experts for content validity. The healthcare provider survey had three subscales that included a combination of multiple choice and fill-in-the-blank questions to determine knowledge about breastfeeding, and also had Likert-type scales to determine comfort with and attitudes toward breastfeeding. In addition to demographic data, the survey asked 11 knowledge questions ranging from three about knowledge of breastfeeding and medications, one about identification of structural breast issues that might impact ability to breastfeed, two about recognition of maternal and infant benefits of breastfeeding, two about recommended frequency and length of feeding, and three questions to determine familiarity with World Health and national recommendations. In a second subscale, healthcare providers identified their comfort level on a 5-point scale, with 4 indicating very comfortable and 0 indicating very uncomfortable, on items such as their comfort with "assisting a breastfeeding woman with the first latch-on"; "discussing the benefits of breastfeeding"; and "describing your hospital's breastfeeding policies and procedures." A third subscale of the survey allowed healthcare providers' to select their level of agreement with 15 statements reflecting attitudes on breastfeeding, also on a Likert scale ranging from strongly agree (4) to strongly disagree (0). Statements included "breastfeeding is best for most babies"; "formal discharge packs affect breastfeeding success"; "formula supplementation in the first 2 weeks of life is a cause of breastfeeding failure"; and "when a mother in my practice hasn't made a decision about infant feeding, I advocate breastfeeding." We established survey reliability using test–retest method (r = 0.96). Total scores ranged from 40 to 87. Alpha coefficients for each subscale were as follows: knowledge, 0.98; comfort, 0.98; and attitudes toward breastfeeding, 0.93.

A power analysis based on the number of obstetricians, pediatricians, and nurses actively interacting with breastfeeding mothers (200) determined that, in order to obtain a 90% confidence level with a 50% response distribution, a minimum sample size of 51 healthcare providers was needed.

The patient survey asked 35 questions to gather basic demographic information, previous experience with breastfeeding, breastfeeding education before birth, how soon after birth breastfeeding occurred, was any formula supplementation used and the reason, nursing observation of breastfeeding, and nighttime feeding. In addition, there were four statements regarding healthcare provider interactions about breastfeeding and one item on satisfaction with the breastfeeding experience. Patients rated their agreement with each statement on a 5-point Likert-type scale ranging from strongly agree (4) to strongly disagree (0). Sample statements were "the nurses were knowledgeable and supportive of breastfeeding"; "in general, my obstetrician or pediatrician encouraged me to breastfeed"; and "I was satisfied with my breastfeeding experience." Breastfeeding patients reported items such as assistance with breastfeeding received from maternity nursing staff, use of formula supplementation, and nighttime feeding practices. Exclusive breastfeeding was defined as a baby who received no formula supplementation. We established content validity by expert review using lactation consultants, nurse leadership, and a pediatrician. A power analysis determined that, in order to maintain a 90% confidence level with a 50% response distribution, based on the number of breastfeeding women delivering each year at our hospital, a minimum sample size of 67 was needed in both the preintervention and postintervention patient groups.

Recruitment

We used a convenience sample of the obstetricians, pediatricians, nurses, and breastfeeding patients in the maternity department of our level III Regional Perinatal Center who were recruited for voluntary participation in the study during the first quarter of 2006, before the implementation of the interventions. Surveys were distributed at departmental meetings and by mail postal delivery. Each survey was assigned a number and included a return envelope for participant confidentiality. Healthcare providers who completed and returned the survey tool were considered to have consented to participate. Healthcare provider participants completed the survey again 6 months after the breastfeeding education intervention.

The preintervention patient group was recruited by approaching all breastfeeding women who gave birth at our hospital during the 3-month period before the implementation of the intervention. Patients were approached on the mother–baby unit after birth and before discharge and asked to participate in a study on breastfeeding practices at our hospital. We reinforced that the survey would be confidential, participation was strictly voluntary, and study participation would not have any impact on patient care. If a patient expressed interest, informed consent was obtained. Each survey was assigned a number and included a return envelope to ensure participant confidentiality. Participating patients completed and returned their surveys before discharge. Inclusion criteria included uncomplicated singleton pregnancy between 37 and 42 completed weeks of gestation, 2,500 g or more, and a 5-minute Apgar score of 7 or greater. Exclusion criteria included intention to formula feed, a medical condition or treatment that would contraindicate breastfeeding, and/or admission of the infant to the NICU or prematurity.

We recruited the postintervention patient group 6 months after the completion of the education by asking all breastfeeding women giving birth to term, singleton infants at our hospital to participate in the study. The recruitment time for the postintervention group was limited by the maternity unit moving to a new building. A different physical environment might introduce an additional variable that might alter results.

Intervention

The formal breastfeeding program was composed of three elements that included (1) the implementation of a breastfeeding protocol, (2) the development of a "Breastfeeding Resource Guide," and (3) an educational presentation developed by a multidisciplinary group, including obstetricians, pediatricians, the nurse manager, a lactation consultant, the clinical nurse specialist, and nursing staff. An obstetrician served as one of our breastfeeding champions and provided the educational presentation to the obstetricians and pediatricians, while nurses were provided with the same education by the clinical nurse specialist and lactation consultants. The breastfeeding protocol included long-standing practices such as asking all patients on admission whether they planned to breastfeed as well as many changes in breastfeeding practice such as early initiation of breastfeeding within 2 hours of birth, use of cue-based feeding, observation and evaluation of breastfeeding every shift, no formula supplementation unless medically indicated, and pacifier use only for pain management or at parent request (Table 1).

The Breastfeeding Resource Guide listed resources available in the community, and was developed and given to the obstetric and pediatric physicians and the maternity nursing staff.

The breastfeeding educational program was a 1-hour evidence-based presentation given to all maternity nurses,

Table 1. Components of a Breastfeeding Protocol.

- Ask all patients feeding plan on admission.
- Early initiation of breastfeeding within 2 hours of birth.
- Cue-based feeding.
- Observe and evaluate breastfeeding every shift.
- Encourage mothers to keep babies with them as much as possible.
- Provide consistent, evidence-based breastfeeding education to parents
- No formula supplementation unless medically indicated.
- Pacifier use only for pain management or at parent request.
- Patients with breastfeeding problems will be referred to the lactation consultant.

Note: Table developed by the Morristown Memorial Hospital Maternity Center based on the UNICEF/World Health Organization 10 Steps to Successful Breastfeeding. Adapted from Shealy, Li, Benton-Davis, and Grummer-Strawn. The CDC Guide to Breastfeeding Interventions. (2005, p. 3).

Table 2. Evidence-Based Breastfeeding Education.

- World and national breastfeeding goals and recommendations
- Importance of skin-to-skin contact immediately after birth
- Benefits of breastfeeding for infant
- Benefits of breastfeeding for mother
- Breastfeeding and maternal rest
- Impact of supplements and pacifiers on breastfeeding
- Recognizing cues for feeding readiness
- Frequency and length of breastfeeding to establish milk supply
- Review of hospital breastfeeding protocol
- Formal observation and evaluation of breastfeeding couplets every shift
- How to assess latch and milk transfer
- Trouble-shooting breastfeeding issues

Note. Table is based on Mannel, Martens, and Walker (2002); Riordan (2005); Shealy et al. (2005); Svensson, Matthiesen, and Widstrom (2005); and U.S. Department of Health and Human Services (2000).

In light of the less than optimal breastfeeding rates at our institution, we decided to introduce a formal breastfeeding education program (including a breastfeeding protocol, a breastfeeding resource guide, and an educational program) for our healthcare providers to measure whether such a program could change (1) knowledge, (2) comfort level with breastfeeding, and (3) attitudes regarding breastfeeding.

pediatricians, and obstetricians regardless of study participation. Content included national breastfeeding goals and recommendations, importance of early skin-to-skin contact, cue-based feeding, impact of supplements and pacifiers on breastfeeding, feeding frequency and duration, and troubleshooting breastfeeding difficulties (Table 2).

Data Analysis

A paired *t*-test was used to examine differences in knowledge, comfort level, and attitudes regarding breastfeeding in the pre- and postimplementation groups. Knowledge was assessed based on the total number of correct answers (maximum total score = 34). Comfort level was defined as feeling somewhat comfortable or very comfortable counseling patients on specific breastfeeding issues. A positive attitude toward breastfeeding was defined as strongly agreeing or somewhat agreeing with probreastfeeding statements. Statistical comparisons of pre- and postintervention responses to patient survey items were made using the χ^2 and Fisher's exact test.

Results

Healthcare Provider Survey

A total of 53 healthcare providers completed both the pre- and postintervention surveys. All healthcare providers provided direct patient care. Approximately 25% were obstetricians, 25% were pediatricians, and 50% were nurses. The age range of all healthcare providers was 26 to 74 years (M = 46.2 years), with only slight variation between obstetricians with a range of 32 to 64 years (M = 48.2 years), pediatricians with a range of 34 to 74 years (M = 45.9 years), and nurses with a range of 26 to 65 years (M = 44.4 years). The obstetricians were 50% male (5) and 50% female (5); pediatricians were 25% male (3) and 75% female (9); and nurses were 100% female (31). Seventy-five percent of the healthcare providers (40) reported having breastfed.

Pre- and postimplementation knowledge was assessed based on the total number of correct answers (maximum total score = 34). Knowledge scores were significantly higher after the intervention (mean preintervention score = 20. 2 [range 8–30]; mean postintervention score = 22.2 [range 7–34] ($p < .05$).

Overall, healthcare providers had a significant increase in comfort level with breastfeeding issues after the intervention. The mean comfort score before the formal breastfeeding program was 20.7 (range 12–40, *SD* 1.29), with 40 being the highest possible score. After intervention, the mean comfort score was 29.4 (range 14–40, *SD* 1.2) ($p < .05$).

There was no statistically significant change in attitude toward breastfeeding with a preimplementation score of 43.8 and a postimplementation score of 43.4 ($p = .075$).

Patient Survey

Regarding the survey for the mothers, there were 130 breastfeeding mothers in the preintervention group and 77 in the postintervention group. Demographics were similar for both groups (Table 3).

The preintervention group reported 55% exclusive breastfeeding during the hospital stay, while the postintervention group had 63% exclusive breastfeeding ($p = .046$). Patients also reported an increase in active observation by nurses during breastfeeding after the intervention: 84% versus 92% ($p = .046$). Breastfeeding patients reported that the number of nighttime breastfeedings increased after the intervention on postpartum day 1 (55% vs. 71%, $p = .001$), with a resulting decrease in formula supplementation in the nursery at night (28% vs. 21%, $p = .006$) (Figure 1). The preintervention group was already highly satisfied with the breastfeeding experience, so there were no statistically significant differences in maternity patient satisfaction with the breastfeeding experience after the education intervention.

Clinical Nursing Implications

This is an important study for mother–baby nurses to read and understand, for it shows that an educational program and adherence to protocols can increase the amount and duration of breastfeeding, and can improve knowledge, comfort level, and attitudes about breastfeeding of healthcare providers. Patients also reported an increase in nurse observation of breastfeeding and nighttime breastfeeding, and a decrease in the use of formula supplementation at night. These are topics that are commonly discussed at hospitals all over the United States, and it would seem from this study that positive changes can be made with an educational program and protocols.

We cannot emphasize enough the importance of the breastfeeding protocol in attaining the positive results in our study. All healthcare providers interacting with breastfeeding mothers were educated to follow the same protocol and to provide consistent standardized information. We found enthusiastic physician breastfeeding champions for this program and believe that they made

Table 3. Patient Demographics

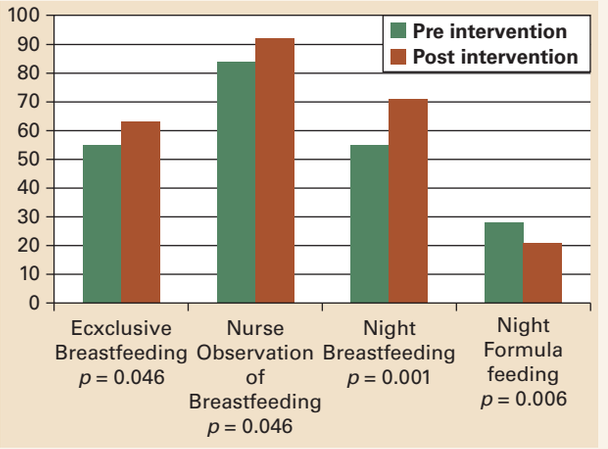
Patient Demographics		Preintervention Group	Postintervention Group
Age in years	Mean	31.9	31.4
	Range	21–41	24–47
Marital status	Married	93%	95%
	Single	5%	5%
Race	White	72%	81%
	Black	2%	0%
	Hispanic	11%	3%
	Asian	4%	10%
	Asian Indian	11%	6%
Education	College graduate	87%	88%
	Some college	11%	8%
	High School Graduate	2%	4%
Health insurance	Private	95%	91%
	Medicaid or self-pay	5%	9%
Other children		60%	60%
Previous breastfeeding experience	Yes	59%	55%
	No	41%	45%
Breastfeeding class before birth of this child	Yes	14%	16%
	No	86%	84%

an important difference in the overall compliance with the protocols.

Nurses showed the greatest increase in knowledge about breastfeeding of all healthcare providers. This increased nursing knowledge and the presence of several nurse breastfeeding champions were critical in the success of the intervention. Nurses, more than pediatricians or obstetricians, spend the largest amount of time with a breastfeeding mother, and it is clear that mother–baby nurses can facilitate or hinder successful breastfeeding. This program demonstrated increased nursing observation of breastfeeding, which has been identified as important in successful breastfeeding. Hospital practices that decrease formula supplementation and increase nighttime breastfeeding have also been identified as keys to breastfeeding success. The increased nursing knowledge and comfort with breastfeeding were clearly demonstrated by the improvement in observation and nighttime breastfeeding. There was also a significant increase in exclusive breastfeeding at discharge.

Healthcare provider results from this study are limited by the small sample size as well as the fact that this study was carried out in a suburban hospital with a primarily affluent White population. Results may not be generalizable to other populations or settings. Replicating this study using a larger, more racially/ethnically diverse sample and in other settings should be considered. Other areas for future research include examining whether increased healthcare provider knowledge about breastfeeding is associated with increased comfort in dealing with clinical difficulties with breastfeeding, and whether increased comfort translates into increased healthcare provider–patient interaction about breastfeeding. ✣

Figure 1. Impact on Breastfeeding Patients



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Clinical Nursing Implications

- A formal education program can increase provider knowledge and comfort with breastfeeding.
- Adherence to a breastfeeding protocol is important to provide consistent information and practice.
- A resource guide can be helpful to identify lactation resources for physicians.
- Healthcare providers interacting with breastfeeding mothers need to provide consistent, standardized breastfeeding information.
- Nurses need to encourage increased nighttime breastfeeding.
- Nighttime breastfeeding decreases use of formula supplementation.
- Nurse observation of breastfeeding is important to breastfeeding success.

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Centers for Disease Control and Prevention
www.cdc.gov/breastfeeding

The National Women's Health Information Center
www.womenshealth.gov/breastfeeding

National Library of Medicine Drug and Lactation Database
http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?LACT

United States Breastfeeding Committee (USBC)
www.usbreastfeeding.org