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Becoming Baby-Friendly: Overcoming the Issue of Accepting Free Formula

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Commentary

Becoming Baby-Friendly: Overcoming the Issue of Accepting Free Formula

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Keywords: breastfeeding, Baby-Friendly, formula, hospital

Baby-Friendly is a World Health Organization/UNICEF international designation that is awarded to hospitals or birthing sites that meet certain criteria related to supporting and promoting breastfeeding.[1] Those criteria are called the Ten Steps to Successful Breastfeeding (see Table 1). This article focuses on Step 6 of the Ten Steps: "Give newborn infants no food or drink other than breast milk, unless medically indicated." To comply fully with the Baby-Friendly Hospital Initiative, an institution must pay fair market price for all formula and infant-feeding supplies that it uses, and it cannot accept free or heavily discounted formula and supplies. In our view, it is not surprising that many hospitals have major problems achieving this step to being designated Baby-Friendly. When a hospital is already receiving free formula, breastfeeding advocates are put in the difficult position of persuading administrators to reverse a trend and pay for a product that is usually free.

The majority of US hospitals do not purchase infant formula and related products such as nipples, glucose water, and pacifiers. In addition, many institutions also accept free discharge bags, supplies, literature, videos, and other gifts from formula companies, such as lunches, pens, calendars, and trips (Marsha Walker, personal communication, January 2000). Products such as hospital discharge bags that contain formula samples have been shown to adversely affect breastfeeding initiation and duration rates.[2,3] After being designated a baby-friendly hospital in December 1999, Boston Medical Center (BMC) received many calls and e-mails on the topic of paying for formula. During BMC's journey toward Baby-Friendly designation, paying for formula was a key issue, and information on the topic was hard to find. This article addresses the gray area surrounding paying for formula and offers practical solutions for other hospitals interested in the Baby-Friendly certification process.

Background

BMC is a private, not-for-profit institution formed in 1996 by the merger of Boston City Hospital, a public (city-run) hospital, and University Hospital, a private institution. Pediatric and maternity services are provided at the Harrison Pavilion (the former Boston City Hospital), and the pediatric and maternity clientele has not changed since the institutions merged. In 1998, BMC had 1,600 births and served a population composed mainly of African Americans, Hispanics, recent immigrants, and the urban poor. In addition to the BMC Birth Place, the hospital has a 15-bed, Level III neonatal intensive care unit (NICU) with 320 admissions per year.

The history of formula purchase at BMC is complex. During the 1970s, three formula companies provided free formula to Boston City Hospital on a rotating basis,

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Table 1. Ten Steps to Successful Breastfeeding

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits of breastfeeding.
4. Help mothers to initiate breastfeeding within 1 hour of birth.
5. Show mothers how to breastfeed and how to maintain lactation, even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk, unless medically indicated.
7. Practice rooming-in—allow mothers and infants to remain together 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

SOURCE: WHO/UNICEF. Baby-Friendly Hospital Initiative: 1. The Global Criteria for the WHO/UNICEF Baby-Friendly Hospital Initiative. Geneva, Switzerland: WHO/UNICEF; 1992.

with the supplier changing every 4 months. In the 1980s, formula companies began competing to have their products used in the hospital. Offers included free formula and monies for other services such as fellowships, laboratory support, conferences, and patient transportation.

In 1993, Formula Company A won the Massachusetts contract for providing formula to the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). In 1995, the WIC contract for the New England states, which negotiated as a group, went to Formula Company B (Deborah Krauter, personal communication, January 2000). Many patients at Boston City Hospital received WIC benefits. Free formula offered to mothers and hospitals is a form of advertising. Formula companies anticipate that women will continue to use their brand of formula when the women leave the hospital. However, formula-feeding women receiving WIC benefits automatically use whatever brand of formula is supplied by WIC. The brand of formula will depend on whichever company has the current state contract with WIC. When large numbers of women on WIC deliver at a particular hospital, formula companies may be less interested in offering free formula to that hospital because most of the women will not continue to use their brand of formula after discharge. We are unsure as to whether this is what happened at Boston City Hospital, but throughout most of the 1990s, there were no bids from formula companies, and the institution was paying for formula. In 1994, Boston City Hospital received its first certificate of intent for Baby-Friendly designation, but the certificate later expired.

In 1996, Boston City Hospital merged with University Hospital to become BMC. At the same time, the pediatric residency program merged with the pediatric residency program at Children's Hospital in Boston, and the number of pediatric residents rose from 30 to 108. The multidisciplinary BMC Baby-Friendly Task Force was formed in September 1997 and grew to more than 40 members, with representatives from pediatrics, obstetrics and gynecology, midwifery, family medicine, nursing, postpartum, the NICU, prenatal services (the Women's Center, a private doctors' group, and the Adolescent Center), WIC, and associated neighborhood health centers. The task force obtained a certificate of intent as the initial step in the process of being designated Baby-Friendly.

In February 1998, Formula Company C entered into a 3-year agreement to provide BMC with free formula and numerous related products. The task force was not aware of this new agreement. It was only when task force members began reviewing formula company receipts in early 1999, in preparation for the Baby-Friendly site visit (a hospital must demonstrate a prior and current record of purchase of formula during the assessment visit), that the task force realized that Formula Company C had begun giving free formula to BMC.

The head of nutritional services collated the invoices of the formula company free items, listing more than 30 different products supplied by the company free of charge, and informed the task force that the amount of formula and formula company products promised for free totaled approximately $6,000 per month, or $72,000 per year.

Formula company products listed as being free of charge included diaper discharge bags, which were not, in fact, being used at BMC because the task force had insisted they not be distributed. Ceasing distribution of discharge bags caused an outcry among many staff members who were displeased that new mothers in other Boston hospitals were receiving gifts that we were denying to BMC's own needier patients. Addressing this concern, the Kids Fund, a BMC pediatric department charity, funded a discharge bag bearing the BMC logo, which is given to all new mothers. The bag contains diapers, a picture frame, infant nail clippers, a thermometer, a baby bib, diaper cream, a mother's water bottle with the breastfeeding support line telephone number printed on it, and nursing pads.

At this point, the task force faced a crisis. After 2 years of work, the task force had 9 of the 10 steps in place but suddenly needed a significant amount of money to over-

come this final hurdle. The task force also needed evidence to support its argument that the hospital could not possibly be using the $72,000 to $100,000 worth of formula that was being cited at senior management meetings.

Problem-Solving Approach

To substantiate the task force's belief that the items in the agreement were in excess of the hospital's need, representatives from each department (the postpartum unit, the NICU, the pediatric wards, the emergency department, and outpatient services) surveyed the amount of formula actually being used. The NICU was the most expensive area, using approximately 92 bottles a week. NICU costs were high because of expensive special formulas for premature infants and specialty feeding bottles and nipples. In the spring of 1998, the postpartum unit's breastfeeding initiation rate was approximately 80%, and the NICU initiation rate was around 75%. Initiation rate includes any baby that begins breastfeeding in the hospital, even if supplements are given by the mother. A survey conducted by the task force confirmed that either the hospital was using far less formula than was listed or more formula was entering the hospital than was being used. At the very least, it was clear that, as a free product, formula was being used liberally throughout the hospital, without concern for cost.

Besides estimating the amount of formula used, task force members worked to determine a fair market cost for formula. Baby-Friendly USA's guidelines require that formula be "purchased by the facility at a fair market value in the same competitive manner as other foods and medical supplies."[4] International guidelines identify that a fair price must be within 80% of retail cost. However, given the complexities of hospital purchasing and the fact that most hospitals do not pay for formula, there are few standards by which to ascertain a fair price for formula. As part of the technical assistance provided to certificate-of-intent hospitals, Baby-Friendly USA supplied the task force with its publication "A Worksheet for Estimating the Cost of Infant Formula" [4] but could not cite a specific price per bottle because of concerns about price fixing. The task force also contacted the National Alliance for Breastfeeding Advocacy and other Baby-Friendly hospitals.

After many phone calls and discussions, the task force concluded that, based on 1998 figures, a price of $0.15 to $0.20 per bottle (whether the bottles were 2 oz. or 4 oz. was irrelevant to cost) would be a realistic figure on which to base negotiations acceptable to BMC, the formula company, and baby-friendly criteria. Based on $0.20 per bottle, 1,600 births per year, a breastfeeding initiation rate of approximately 80%, and the amount of formula actually used, the task force came up with an estimated annual total cost for formula and formula products of around $20,000 per year for BMC. This was a far cry from the original $72,000 figure.

Outcome

Negotiations of formula purchase are complicated by the need for good will and fair negotiations with the formula company, which has a vested interest in retaining the status quo. Faced with hospital administrators who work hard to get the best deal on all products in a financially constrained situation and a formula company whose best deal is offering formula free of charge, practical negotiations of payment are almost laughable. For example, during early negotiations, one administrator suggested we pay $1,000 per year for formula, a competitive price compared to other hospitals that were not paying for formula. While frustrating to task force members, the argument had some validity. From there, the suggested offer rose to $3,000 and then to 5 cents per bottle before task force members convinced administrators of the implications of fair market value and the need to pass the site visit.

In some cases, ethics committees can be of help in this issue. The ethics committee in one hospital blocked the routine distribution of free formula company diaper bags because the members viewed such distribution as bypassing informed consent, prioritizing financial issues above patient care, and implying medical endorsement of formula, all of which amounted to acceptance of a bribe.[5] Many US military hospitals do not accept free formula because it is not considered ethical (Marsha Walker, personal communication, January 2000).

BMC's negotiations, however, involved the direct support of top administrators, who were approached by the task force founder, a senior pediatrician. She presented them with the health benefits of breastfeeding, as outlined by the American Academy of Pediatrics[6]; with the fact that all the other steps were in place for Baby-Friendly designation; and with the task force's data and calculations about formula use. Several arguments proved useful for the task force. The task force could cite a united groundswell of support from pediatrics, obstetrics, nursing, midwifery, associated neighborhood

health centers, and WIC. The hospital's own insurance plan, the Boston Medical Center HealthNet Plan, supported the task force, impressed by the cost savings of breastfeeding. These cost savings have been calculated as being between $331 and $475 per child in 1 year, based on less frequent episodes of three common illnesses—otitis media, diarrhea, and lower respiratory tract infections—for breastfed infants when compared with formula-fed babies.[7] Administrators also hoped the Baby-Friendly title would encourage more women to give birth at BMC. After several months of discussion, to the jubilation of the task force members, senior management agreed that the relatively low annual cost of formula should not stand in the way of gaining the esteemed Baby-Friendly status.

Once the task force gained the support of top-level administration, all that remained was to negotiate a new deal with the formula company, which was a time-consuming process. Although BMC was part way through a 3-year agreement, there was no problem terminating the deal, and formula company representatives cooperated agreeably. After several months, a new arrangement was reached, and 2 months prior to the inspection for Baby-Friendly designation in September 1999, BMC began paying for formula.

Since that time, expenditure on formula and other formula company products that were previously free of charge has been closely monitored. BMC's average monthly cost is around $1,400, with a projected annual cost of $16,800: lower than the original estimates. Since all departments know the hospital is now paying for formula, its distribution is carefully monitored. Access to formula is more carefully controlled than before. For example, formula was previously delivered to storage closets accessible to all staff on the postpartum unit. Now it is stocked only in the rarely used nursery. Because the nursery is some distance from the mothers' rooms, formula is less readily available, the temptation to unnecessarily hand out formula has been reduced, and auxiliary hospital staff no longer have easy access to formula.

The task force's efforts to achieve the Ten Steps to Successful Breastfeeding and to purchase infant formula were well rewarded. In December 1999, BMC was awarded Baby-Friendly status. Currently, there are approximately 15,000 hospitals worldwide with Baby-Friendly status. BMC was the 22nd US hospital to be designated Baby-Friendly and the first in Massachusetts.

Summary

Although, in the current financial climate, paying for formula is a difficult step for US hospitals, demystifying the process helps. Actual formula costs may be lower than perceived costs because agreements with formula companies may list unnecessary or unused products and services. Fair market value is difficult to define, but by contacting other hospitals with Baby-Friendly status, those costs can be determined. While we do not recommend that other institutions forge ahead on the track to Baby-Friendly designation without considering the formula issue, we would encourage them to apply for the certificate of intent and begin work, even if it is not immediately clear how the hospital will pay for formula. Each of the Ten Steps takes the hospital along an important course, is never wasted effort, and increases the number of breastfeeding mothers (thereby reducing formula costs). Demonstrating a willingness to invest time and energy for the benefit of patients and the institution as a whole is valuable when requesting support for formula payment. Hospital administrators, who may make the final decision regarding formula payment, will be more willing to listen to breastfeeding advocates if they have already accomplished significant goals within the institution and have collected supporting data. The authors conclude that although for BMC not accepting free formula was the most difficult barrier to overcome on the path to Baby-Friendly designation, it was not insurmountable, and we hope other institutions will be helped by learning how we dealt with this problem.

References

1. WHO/UNICEF. Baby-Friendly Hospital Initiative: 1. The Global Criteria for the WHO/UNICEF Baby-Friendly Hospital Initiative. Geneva, Switzerland: WHO/UNICEF; 1992.
2. Frank DA, Wirtz SJ, Sorensen JR, Heeren T. Commercial discharge packs and breastfeeding counseling: Effects on infant feeding practices in a randomized trial. *Pediatrics*. 1987;80:845-854.
3. Bergerin Y, Dougherty C, Kramer MS. Do infant formula samples shorten the duration of breastfeeding? *Lancet*. 1983;1:1148-1153.
4. A worksheet for estimating the cost of infant formula. Baby Friendly USA, 8 Jan Sebastian Way, Sandwich, MA 02563; (508) 888-8044.
5. O'Hara MA. A strategy to reform hospital breastfeeding policies: Engaging the ethics committee. Paper presented at: Third International Meeting of the Academy of Breastfeeding Medicine; November 6, 1998 [Abstract].
6. American Academy of Pediatrics, Work Group on Breastfeeding and the Use of Human Milk. Breastfeeding and the use of human milk. *Pediatrics*. 1997;100:1035-1039.
7. Ball TM, Wright AL. Health care costs of formula feeding in the first year of life. *Pediatrics*. 1999;103:870-878.

International Code of Marketing of Breast-milk Substitutes

The International Code of Marketing of Breastmilk Substitutes is an international health policy framework for breastfeeding promotion adopted by the World Health Assembly (WHA) of the Health Organization World (WHO) in 1981.[1] The Code was developed as a global public health strategy and recommends restrictions on the marketing of breastmilk substitutes, such as infant formula, to ensure that mothers are not discouraged from breastfeeding and that substitutes are used safely if needed. The Code also covers ethical considerations and regulations for the marketing of feeding bottles and teats. A number of subsequent WHA resolutions have further clarified or extended certain provisions of the Code.[2][3]

Since 1981, 84 countries have enacted legislation implementing all or many of the provisions of the Code and subsequent relevant WHA resolutions.[4]

Provisions

The Code aims to shield breastfeeding from commercial promotion that affects mothers, health workers and health care systems. The Code and resolutions also contain specific provisions and recommendations relating to labeling of infant formula and other breastmilk substitutes

I. Mothers

- Information and educational materials on infant and young child feeding should be objective and consistent and emphasize the importance of breastfeeding. In no case should such materials refer to a brand name of a product.
- All forms of product advertising and promotion are prohibited.
- Mothers should not be given free product samples.
- Promotional devices such as discounts and special displays at the retail level are prohibited.
- Company representatives may not initiate direct or indirect contact with mothers.
- Health risks to infants who are artificially fed or who are not exclusively breastfed should be highlighted through appropriate labeling and warnings.

II. Health workers

- The Code gives health workers the responsibility to encourage and protect breastfeeding.
- Materials regarding products given to health professionals by manufacturers and distributors should be limited to 'scientific and factual' matters. They should not be tools to promote the use of products.
- Product samples may be given only when necessary for professional evaluation or research at the institutional level. In no case should these samples be passed on to mothers.
- In order to prevent conflicts of interest, manufacturers and distributors should not give material or financial inducements to health workers. Three WHA resolutions on infant and young child nutrition subsequent to the adoption of the Code specifically cautioned against conflicts of interest.[5] A 1996 resolution (WHA resolution 49.15) called for caution in accepting financial support for health professionals working in infant and young child health which may create conflicts of interest. The need to avoid conflicts of interest was expanded in 2005 (WHA resolution 58.32) to cover programs in infant and young child health and reiterated in 2008 (WHA resolution 61.20).

III. Health care systems

- Promotion of any product is forbidden in a health care facility. This includes the display of products, placards and posters concerning such products and distribution of materials provided by manufacturers and distributors.
- Formula feeding should be demonstrated only to those mothers or family members who need to use it and the information given should include a clear explanation of the risks of formula feeding and hazards of improper use of products.
- Donated equipment and materials should not refer to brand names of products.
- Free Supplies: Two subsequent resolutions (WHA 39.28 [1986] and WHA 47.5 [1994]) effectively call for an end to all free or low-cost supplies to any part of the health care system.[6] Manufacturers and distributors are therefore prohibited from providing products to health care facilities for free or at low cost. (According to guidelines under the Baby Friendly Hospital Initiative, 'low cost' means less than 80% of the retail price.)

IV. Labeling

- Information on labels for infant formula must be in simple and easy to understand terms in an appropriate language.
- Labels of infant formula must contain a statement on the superiority of breastfeeding and that the product should only be used after consultation with health professionals.
- Pictures or text which may idealize the use of infant formula and certain wordings, such as 'humanized" or "materialized" or similar terms should not be used.
- Nutrition and health claims on labels for breastmilk substitutes should not be permitted unless allowed by national legislation (WHA resolution 58.32 [2005]).[7]
- Labels must contain explicit warnings on labels to inform consumers about the risks of contamination of powdered formula with pathogenic microorganisms (WHA resolution 58.32 [2005]).[7]
- Labels must conform with WHO/FAO guidelines on safe preparation, storage and handling of powdered infant formula (WHA resolution 61.20 [2008]).[8]

In line with the recommendation for exclusive breastfeeding in WHA resolution 54.2 [2001],[9] all complementary foods must be labeled as suitable for use by infants from six months and not earlier.

Implementation

The baby food industry has been the subject of pointed criticism from non-governmental organizations, international agencies and campaign groups for failing to abide by the Code. One of the largest food and beverage manufacturers in the world, the Swiss giant Nestlé, has been the subject of an international boycott campaign since 1977 for its milk-substitute marketing practices prior to and since the development of the Code (see Nestlé boycott).

On its own, the International Code is not legally enforceable. Companies are only subject to legal sanctions for failing to abide by the Code where it has been incorporated into the legislature of a nation state. Many countries have fully or partially adopted the Code as law.[4] Other countries have no legislation on baby food marketing at all.

Code violations by baby food manufacturers are still widespread, especially (but not exclusively) in countries that have not implemented the Code as a national measure or where monitoring and enforcement is weak.[10] The WHO, International Baby Food Action Network (IBFAN), UNICEF, Save the Children and other international organizations perform monitoring of implementation of the Code across the world both independently and with governments.[11][12][13]

World Alliance for Breastfeeding Action

The World Alliance for Breastfeeding Action (WABA) is a network of people working on a global scale to eliminate obstacles to breastfeeding and to act on the Innocenti Declaration. The groups within this alliance tackle the problems from a variety of perspectives or point of views, such as consumer advocates, mothers, and lactation consultants.[14][15]

Among the various organizations and individuals involved in the creation of WABA, Derrick and Pat Jelliffe, two experts in tropical pediatrics and infant nutrition, were instrumental in its founding and in the launching of some of its more visible early initiatives.[16][17][18][19]

WABA organizes the *World Breastfeeding Week*, held annually August 1 through the 7th, to put together the efforts of all breastfeeding advocates, governments, and the public in more than 170 countries.[20]

Campaigns

Several campaigns are associated with the WABA:

1991 to present - The Baby Friendly Hospital Initiative (BFHI) is a joint campaign by UNICEF and The World Health Organization, and focuses mainly on hospital practices, implementing the principles of the Innocenti Declaration.[21]

1993 - This campaign tackled the problem of developing mother-friendly workplaces. In general, they wanted mothers to be able to combine breastfeeding with their working atmosphere.

1994 - The main focus of the '94 campaign was to implement again the International Code of Marketing of Breast-milk Substitutes in all countries to meet the demands of the Innocenti Declaration.

International Code of Marketing of Breast-milk Substitutes

International Code of Marketing of Breast-milk Substitutes (Checklist of rules for industries, health workers, and governments to regulate the promotion of baby products through marketing):[22][23][24]

No advertising of any of these products to the public. There should be no advertising of breastmilk substitutes or other form of promotion to the general public.
Manufacturers and distributors should not provide, directly or indirectly, to pregnant women, mother or members of their families, samples of their products, including discount coupons.
No promotion of products in health care facilities, including the distribution of free or low-cost supplies.
No company sales representatives to advise mothers.
No gifts or personal samples to health workers.

No words or pictures idealizing artificial feeding, including pictures of infants on labels of the products (i.e. infant milk containers).
Information to health workers should be scientific and factual.
All information on artificial infant feeding, including that on labels, should explain the benefits of breastfeeding, and the costs and hazards associated with artificial feeding.
Unsuitable products, such as sweetened condensed milk, should not be promoted for babies.
All products should be of a high quality and take account of the climatic and storage conditions of the country where they are used
Manufacturers and distributors should comply with the Code's provisions even if countries have not adopted laws or other measures.

References

1. World Health Organization. *International Code of Marketing of Breast-milk Substitutes.* Geneva, 1981.
2. World Health Organization. *International Code of Marketing of Breast-milk Substitutes: Frequently Asked Questions.* Geneva, 2008. Accessed 5 August 2011.
3. FTSE. "FTSE4Good Inclusion Criteria for the Marketing of Breast Milk Substitutes." *FTSE4Good Index Series*, accessed 5 August 2011.
4. UNICEF. International Code of Marketing of Breast-milk Substitutes. Accessed 6 February 2012.
5. Baby Milk Action. "World Health Assembly: New UN Resolution tackles intrinsic contamination." *Baby Milk Action Update*, Issue 41, November 2008.
6. The Boycott Book. *Reinstating the Nestlé Boycott (1988).* Accessed 5 August 2011.
7. IBFAN. Understanding the International Code. Accessed 5 August 2011.
8. World Health Organization and Food and Agriculture Organization of the United Nations. *Guidelines for the safe preparation, storage and handling of powdered infant formula.* Geneva, 2007.
9. WHA Resolution 54.2 - 2001: Infant and young child nutrition.
10. Aguayo VM, Ross JS, Kanon S, Ouedraogo AN (January 2003). "Monitoring compliance with the International Code of Marketing of Breastmilk Substitutes in west Africa: multisite cross sectional survey in Togo and Burkina Faso". *BMJ (Clinical research ed.)* 326 (7381): 127. doi:10.1136/bmj.326.7381.127. PMC 140002. PMID 12531842.
11. World Health Organization. *The International Code of Marketing of Breast-Milk Substitutes: A common review and evaluation framework.* Geneva, 1996.
12. IBFAN. Code Watch. Accessed 5 August 2011.
13. UNICEF Ukraine. *Compliance with the International Code of Marketing of Breastmilk Substitutes.* Kyiv, 2004.
14. "WHO | World Breastfeeding Week". *World Health Organization*. Retrieved 11 November 2010.
15. Moen, Christian. "Health facilities are vital in promoting good breastfeeding practices, says UNICEF". *UNICEF Media*. UNICEF. Retrieved 11 November 2010.
16. "Derrick and Eleanore "Patrice" JELLIFFE - Obituaries (2)". *Family History & Genealogy Message Board*. Ancestry.com. Retrieved 11 November 2010.
17. "IN MEMORIAM: Derrick B. Jelliffe". *Journal of Tropical Pediatrics* 38 (Oxford University Press): 145. 4 August 1992. Retrieved 11 November 2010.
18. C. Latham, Michael. "A special tribute to Pat Jelliffe". World Alliance for Breastfeeding Action. Retrieved 11 November 2010.
19. Calisphere. "Obituary". University of California. Retrieved 11 November 2010.
20. "LLLI | World Breastfeeding Week Celebration". *La Leche League International*. Retrieved 11 November 2010.
21. "The Baby-Friendly Hospital Initiative (BFHI)". *WABA Research Task Force (RTF)*. August 2010. Retrieved 11 November 2010.
22. "International Code of Marketing of Breast-milk Substitutes". *World Health Organization*. Retrieved 11 November 2010.
23. World Health Organization (1981). *International Code of Marketing of Breast-Milk Substitutes*. pp. 1–36. ISBN 92-4-154160-1.

24. "The International Code of Marketing of Breastmilk Substitutes". *World Health Organization*. ITCILO. Retrieved 11 November 2010.

Implementing the Ten Steps for Successful Breastfeeding in Hospitals Serving Low-Wealth Patients

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Objectives. The Ten Steps to Successful Breastfeeding is a proven approach to support breastfeeding in maternity settings; however, scant literature exists on the relative impact and interpretation of each step on breastfeeding. We assessed the Ten Steps and their relationship with in-hospital breastfeeding rates at facilities serving low-wealth populations and explored the outcomes to identify step-specific actions.

Methods. We present descriptive and nonparametric comparisons and qualitative findings to examine the relationship between the Ten Steps and breastfeeding rates from each hospital using baseline data collection.

Results. Some steps (1-policy, 2-training, 4-skin-to-skin, 6-no supplements, and 9-no artificial nipples, followed by 3-prenatal counseling, 7-rooming-in) reflected differences in relative baseline breastfeeding rates between settings. Key informant interviews revealed misunderstanding of some steps.

Conclusions. Self-appraisal may be less valid when not all elements of the criteria for evaluating Step implementation may be fully understood. Limited exposure and understanding may lead to self-appraisal errors, resulting in scores that are not reflective of actual practices. Nonetheless, the indication that breastfeeding rates may be better mirrored by a defined subset of steps may provide some constructive insight toward prioritizing implementation activities and simplifying assessment. These issues will be further explored in the next phase of this study. (*Am J Public Health.* 2012;102:2262–2268. doi:10.2105/AJPH.2012.300769)

UNICEF and the World Health Organization (WHO), along with USAID and Swedish International Development Agency (SIDA), launched a comprehensive approach to protect, promote and support breastfeeding with the 1990 Innocenti Meeting and Declaration.[1] This document called for the implementation of Ten Steps to Successful Breastfeeding[2,3] to strengthen health care practices, along with calls for national committees, controls for formula marketing, and paid maternity leave. The Ten Steps have been shown to have a direct impact on breastfeeding rates at the hospital, national, and international level (see the box on the next page).[4–13] The Baby-Friendly Hospital Initiative (BFHI) was introduced in 1991 as a method to encourage national support and to recognize hospital-level adherence to all Ten Steps. Over the years, more than 22 000 health care facilities in more than 150 countries around the world have been designated "baby friendly" by global and national BFHI approaches, representing about 28% of all maternity facilities worldwide.[14a-b,15] Nonetheless, only about 5% of facilities in the United States are designated as baby friendly.

Possible reasons for the slow progress in the United States include (1) the previously limited recognition by US health professionals and health professional organizations of the importance of breastfeeding, (2) assumptions by hospitals serving low-wealth and minority populations that their patients would not be interested in breastfeeding, (3) general lack of interest in this issue among hospital staff and administration, and (4) the complexity and costs of the US-based approach to designation provided by Breastfeeding Friendly USA (BFUSA), a nongovernment organization designed for this purpose.[16]

To address the first and second of these concerns, the Carolina Global Breastfeeding Institute's Breastfeeding-Friendly Healthcare project (CGBI/BFHC) was designed to support the Ten Steps in a set of hospitals located across North Carolina that serve low-income populations.[17] The overall purpose of this project is to increase breastfeeding initiation, exclusivity, and duration and reduce inequity in breastfeeding support by supporting hospitals to make improvements in the quality of breastfeeding support services by implementing the Ten Steps. CGBI/BFHC offered the opportunity to further explore the steps individually and as they relate to breastfeeding patterns.

METHODS

The CGBI/BFHC was developed to support the implementation of the Ten Steps. CGBI/BFHC includes a quasi-experimental operational research design with pretest and posttest measurement; such operational research designs are used to study the implementation of new practices in situations where random assignment of individuals to the various treatment states is unfeasible.[18–20] Hospitals participating in CGBI/BFHC were systematically assigned to 1 of 2 treatment groups: phase 1, during which hospitals carry out baseline data collection and feedback, and receive the intervention during the first period of time—in this case, 2009 through 2010—and phase 2, during which hospitals carry out baseline data collection and feedback, but no further intervention in the first period of time, and received a modified intervention during the second round, 2010 through 2011, based on lessons learned during the first round. Systematic assignment of the 6 hospitals included in the research was based on 3 initially available hospital characteristics: urbanicity, size, and whether it was a teaching hospital. These criteria were used to create the 2 comparable groups. During the first time period, phase 2 hospitals will serve as the control group for phase 1 hospitals. A group of additional hospitals that approached us for support were included as

The Ten Steps to Successful Breastfeeding

Step 1	Have a written breastfeeding policy that is routinely communicated to all healthcare staff.
Step 2	Train all healthcare staff in skills necessary to implement this policy.
Step 3	Inform all pregnant women about the benefits and management of breastfeeding.
Step 4	Help mothers initiate breastfeeding within the first (half) hour of birth.
Step 5	Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.
Step 6	Give newborn infants no food or drink other than human milk, unless medically indicated.
Step 7	Practice rooming-in—that is, allow mothers and infants to remain together—24 h/d.
Step 8	Encourage breastfeeding on demand.
Step 9	Give no artificial teats or pacifiers to breastfeeding infants.
Step 10	Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

Source. UNICEF/World Health Organization.[3]

a group labeled "Other" hospitals, but were not included in the research design. The project design is further described elsewhere.[17] We used the baseline findings from the larger study.

Data Collection Instruments

A format was developed to collect breastfeeding initiation and exclusive breastfeeding rates from the hospitals by record review.

Breastfeeding initiation and exclusive breastfeeding rates. Feeding data are recorded in nurse's notes and patient charts, but are not available from electronic record systems. To capture "any breastfeeding" and "exclusive breastfeeding" rates, each hospital carried out an intensive chart review of (1) 3 months of records, or (2) 300 consecutive patient charts, whichever were fewer, to capture a sufficient number for later comparison collected in the same fashion. The selection of 300 cases or 3 months was to ensure a large enough sample to be able to detect if a statistically significant change occurred, with a margin of error of 5 to 10 and 95% confidence, when compared with the same season in the same setting after intervention. Because the larger hospitals deliver in the range of 3000 births annually, we selected 300. In smaller hospitals with 300 to 500 births, a 25% sample was adequate for the same purpose. We defined feeding as "any breastfeeding" when there was any documentation of a breastfeeding episode. Exclusive breastfeeding was defined as any breastfeeding plus no documentation of formula use during the hospital stay.

In addition, 3 quantitative tools and 1 qualitative tool were employed to gather information on the Ten Steps.

Self-appraisal tool. The BFUSA self-appraisal tool, used with permission and based heavily on the WHO/UNICEF self-appraisal tool, provides an appraisal of each facility's adherence to the steps.[21,22] It is intended to be completed by a team of key management and clinical staff members. For the purposes of this study, the site coordinator and a breastfeeding interest group at each hospital completed the tool. It consists of a series of 47 yes-or-no questions about policies and practices specific to each step.

Centers for Disease Control and Prevention Survey of Maternity Practices in Infant Nutrition and Care. CGBI/BFHC used the Centers for Disease Control and Prevention (CDC) Maternity Practices in Infant Nutrition and Care (mPINC) as a second measure of participating hospitals' provision of breastfeeding support. The mPINC collects data on maternity center policies and practices that support breastfeeding. The mPINC is a hospital-level instrument completed by an individual selected by hospital administration as the person most familiar with infant feeding practices at each facility.[23] The mPINC instrument was completed either by the same team that completed the self-appraisal tool at each hospital, or by the individual most knowledgeable about the facility's infant feeding practices. Only the 33 question stems and subquestions designed to assess adherence to policies and practices reflecting the Ten Steps were included in analysis.

Knowledge, attitude, and practices eSurvey. An eSurvey, hereafter referred to as the Carolina BF-KAP, was designed that included 25 knowledge, attitude, and practice (KAP) questions selected/developed to reflect each of the Ten Steps' global criteria (i.e., WHO's expanded definition of each of the steps).[22] Questions were from standardized instruments for assessing clinicians' knowledge and attitudes about breastfeeding support and measuring the breastfeeding support practices.[23–25]

Key-informant interviews. The authors developed a key-informant interview guide by using a semistructured approach, with main questions, follow-up questions, and probes,[26] as described in detail elsewhere.[17]

Key informants were selected to include representatives from each of the following cadres responsible for maternity care: management, physicians, nurse-practitioners, nurses and international board certified lactation consultants.

Data Collection

The Carolina BF-KAP was made available to all maternity staff through the hospital site coordinator. Hospitals received both online and paper versions. The incentive of a pizza lunch event was offered as an award for the 2 facilities with the greatest percentage of staff completing the survey.

The key-informant interviews included 34 respondents. CGBI/BFHC staff, in collaboration with each site coordinator, selected respondents using purposeful sampling to represent those staff members responsible for implementation of breastfeeding-related practice change at each hospital,[27] and 3 to 6 interviews were conducted at each hospital. Two research staff trained in qualitative research methods conducted the interviews; 1 member of the interview team facilitated the interviews as the second took notes and asked follow-up questions when appropriate. The interviews, which took place in a private room, were recorded using a digital audio recorder. Each interview lasted between 30 and 50 minutes; the 2 research staff queried

respondents until achieving construct saturation. A professional transcriptionist created verbatim, typed records of the digitally recorded interviews.

Analytic Approach

CGBI/BFHC utilizes established quasi-experimental analytic approaches, in which analyses are based on the individual responses in each phase, recognizing that the systematic assignment is by facility rather than by individual. In addition, multiple-case study methods are employed to explore the support required for and the processes in intervention implementation as they vary by hospital. Previously published studies of hospital implementation of the Ten Steps predominantly explore the processes and experiences of single hospitals. This allows comparison among cases, incorporating the context-sensitive nature of the data.[28,29]

The authors used data from 3 instruments to estimate Step achievement: (1) the BFUSA self-appraisal tool, (2) CDC National Survey of Maternity Practices in Infant Nutrition and Care (mPINC), and (3) the Carolina BF-KAP. Step-specific scores for the self-appraisal tool and mPINC were calculated using each instrument's specific scoring approach.[22,23] The CGBI/BFHC eSurvey included a set of knowledge, attitude, and practice questions to reflect the content of each of the Ten Steps, based on the global criteria. The questions measuring steps 3 through 9 asked the respondent to indicate the percentage of patients in the respondent's care that received the relevant baby-friendly practice. The hospital score for each step is the average of the scores from all respondents in that hospital, presented as a percentage. For steps in which more than 1 question was used to assess compliance, the score is the percentage of total possible points from all questions measuring the step. The eSurvey measured staff training for step 2 by assessing respondents' clinical knowledge of breastfeeding support using 7 knowledge questions on breastfeeding support and promotion; a step 2 score is the percentage of knowledge questions answered correctly. The document review of hospital policies conducted during the baseline assessment provided the data needed to assess adherence to steps 1 and 10; therefore, the eSurvey did not assess these steps directly, but rather measured staff commitment to each. All quantitative analyses were conducted in Stata/IC version 10.1 software.[30]

Given the nature of the data available, descriptive nonparametric rank assignment approaches are used to discuss the relationship between relative initial breastfeeding rates and the relative scores on each of the individual steps. We ranked the hospitals from 1 to 6, creating a breastfeeding ranking, and ranked the score on each step similarly. If the rank on the score for the top 2 hospitals was among the top 2 step scores by rank order, and the score for the bottom ranked 2 hospitals was among the bottom 2 step score rankings, we considered this to be generally reflective of an observed association between that step and the breastfeeding ranking. No statistical test is applied.

Step adherence was evaluated using the data from the key-informant interviews. The authors developed a codebook that comprised a list of codes corresponding to the respondents' reports of their hospital's current practices of each of the Ten Steps; decision rules for when to apply each code were more fully described in a companion article.[17] The typed transcripts were analyzed using ATLAS.ti.[31]

The results from the quantitative and qualitative analyses were triangulated to establish how well a hospital achieved a specific step. Where discrepancies between data type existed, project staff discussed potential explanations based on their on-site observations. Results from both the quantitative and qualitative data were presented back to those who completed the self-appraisal tool and the mPINC survey at each hospital and discussed.

RESULTS

The scores for each step for each hospital from the Carolina BF-KAP instrument at baseline are presented in Table 1. The scores for steps 3 (prenatal education), 5 (counseling), and 8 (cues) were among the higher scores overall, although steps 4 (skin-to-skin), 6 (no supplements), and 10 (community support) received lower scores. Cross-case analyses revealed that among the phase 1 and phase 2 hospitals, the larger teaching hospitals tended to score higher across all steps than did the smaller nonteaching hospitals, especially on steps 1 (policy), 2 (training), 4 (skin-to-skin), and 9 (no artificial nipples). Larger teaching hospitals did slightly better than smaller nonteaching hospitals on step 3 (prenatal education). In addition, larger teaching hospitals reported more opportunities for staff to receive hands-on training than staff at smaller nonteaching hospitals.

The initial breastfeeding rates and the scores on the different steps provide a descriptive indication of which steps appear to best mirror progress in breastfeeding. Table 2 illustrates the baseline breastfeeding initiation and exclusive breastfeeding rates and the associated rank order for each hospital. The scores for each of the Ten Steps were also included as rank ordered from the highest (1) to the lowest (6). In considering which step's rankings best reflected the top 2 and bottom 2 hospitals in terms of breastfeeding rates and rank, we found that steps 1 (policy), 2 (training), 6 (no supplements), and 9 (no artificial nipples) best reflected the rankings for breastfeeding rates, followed by steps 3 (prenatal), 4 (skin-to-skin), and 7 (rooming-in). The steps that best reflected exclusive breastfeeding rate ranking were steps 1, 2, 4, and 9, followed by 3, 6, and 7. Steps 8 (cues) and 10 (community support) did not appear to be related to the rank levels of breastfeeding or of exclusive breastfeeding.

Table 3 presents brief summaries of baseline key-informant interviews by step. It is clear that there are many areas of misunderstanding or lack of forward movement on individual steps. Cross-case analyses suggested little variation exists between the phase 1, 2, or other hospitals in the project, but not within the study design, with a few exceptions, as noted in Table 3.

DISCUSSION

The Ten Steps have been shown in the literature to be associated with increased breastfeeding rates, both in studies in individual hospitals, as well as at the national level.[4–13] However, these studies also indicate that there are barriers both to the full implementation of all of the Ten Step practices, and to seeking and achieving the BFUSA designation. The barriers are both internal (e.g., motivation to consider and actions to change current practices) and external (e.g., seeking this designation includes annual fees from the year of

TABLE 1—Step Status by Combined Score, Research Phase, and Hospital: Maternity Practices In Infant Nutrition and Care (mPINC) and Carolina Breastfeeding Knowledge, Attitude and Practice Surveys

Phase and Hospital	Step1 (Policy), Score, Mean, or Mean ±SD	Step 2 (Training), Score, Mean, or Mean ±SD	Step 3 (Prenatal Education), Score, Mean, or Mean ±SD	Step 4 (Skin-to-Skin), Score, Mean, or Mean ±SD	Step 5 (Counseling), Score, Mean, or Mean ±SD	Step 6 (No Supplements), Score, Mean, or Mean ±SD	Step 7 (Rooming-in), Score, Mean, or Mean ±SD	Step 8 (Cues), Score, Mean, or Mean ±SD	Step 9 (No Artificial Nipples), Score, Mean, or Mean ±SD	Step 10 (Community Support), Score, Mean, or Mean ±SD
Phase 1										
A	80	72	86	85[a]	91	59	89[a]	88	68	66
B	53	52	79	42	83	25[a]	21[a]	86	33	45
C (L)	83	90[a]	90[a]	67	90	62	70	85	78	73
Mean	72.0	71.3	85.0	64.7	88.0	48.7	60.0	86.3	59.7	61.3
Phase 2										
A	60	64	74	51	87	36	85	90	25	88[a]
B	83	84[a]	79	60	83	48	70	83	91[a]	62
C (L)	49	57	64[a]	37	91	39	61	91	20[a]	77
Mean	64.0	68.3	72.3	49.3	87.0	41.0	72.0	88.0	45.3	75.7
Other[b]										
A	84	75	84	45	92	51	59	95	83	51
B	51	59	76	41	75	68	76	84	67	47
C	82	79	88	80	84	57	31	73	32	84
D	88	81	76	65	95	53	56	91	32	51
E	70	52	80	45	90	42	95	86	83	51
F	18	30	77	17	55	28	24	55	15	52
Mean	65.5	62.7	80.2	48.8	81.8	49.8	56.8	80.7	52.0	56.0
Overall	67 ±21	66 ±17	80 ±7	53 ±19	85 ±11	48 ±14	61 ±25	84 ±11	52 ±28	62 ±15

Note. L = larger hospitals. Step score was derived from the self-appraisal tool, mPINC, and Carolina BF-KAP eSurvey.
[a]Hospitals that fell outside of 1 SD.
[b]Other hospitals were not included in the research design, but were included in discussion and informed planning.

registration until the hospital is assessed and designated). Thereafter, there is a recurrent annual fee in addition to the ongoing required training costs.[16] This expense may serve as a barrier, especially if it is taken from the lactation management accounts.

We gathered data from 5 hospitals that chose not to participate in a study designed to change their practices at this time. Interestingly, these "other" hospital scores were similar or not significantly below the means of the hospitals included in the study, as seen in Table 2. This finding indicates that it is not necessarily current status alone that dictates whether a hospital feels ready to take on a process of change. If it is not progress on the steps that is the motivation, what other factors may be important? Organizational readiness to change will be more fully explored in a future publication[32]; however, there may be factors within and beyond the facility itself that are not captured in this study. Less expensive or stepwise approaches to designation might encourage more facilities to consider taking action on the Ten Step practices.

The differences in step scores observed between the larger, teaching hospitals and the smaller, nonteaching hospitals could be attributed to a number of factors. First, some of the larger hospitals were also teaching hospitals, perhaps increasing the likelihood that they would have the impetus to implement the more recent, evidence-based practices. Alternatively, it is possible that the teams completing the research instruments in the larger teaching hospitals may have had varying levels of awareness of all the breastfeeding support practices within their facility than did the smaller hospitals.

Of particular interest is the possibility that a smaller number of steps are most associated with breastfeeding achievement. This study did not find statistical association between the breastfeeding or exclusive breastfeeding rates and the step scores using standard statistical tests. However, there was a rather clear association between initial hospital breastfeeding rate rankings and relative rank on scores on specific steps. In particular, level of achievement of steps 1 (policy), 2 (training), and 9 (no artificial nipples) seemed to best differentiate between the hospitals with the high and low breastfeeding rankings at baseline. It should be noted that we found little association of steps

TABLE 2—Baseline Breastfeeding and Exclusive Breastfeeding Rates by Facility, Presented in Rank Order: data from Maternity Practices in Infant Nutrition and Care (mPINC) and Carolina BF-KAP instruments

	Breastfeeding, % (Rank Order)	Step 1 (Policy), Range or Rank	Step 2 (Training), Range or Rank	Step 3 (Prenatal Education), Range or Rank	Step 4 (Skin-to-Skin), Range or Rank	Step 5 (Counseling), Range or Rank	Step 6 (No Supplements), Range or Rank	Step 7 (Rooming-in), Range or Rank	Step 8 (Cues), Range or Rank	Step 9 (No Artificial Nipples), Range or Rank	Step 10 (Community Support), Range or Rank
Any breastfeeding											
Step Score		49-83[b]	52-90[b]	64-90	37-85	83-91	25-62[b]	21-89	83-91	20-91[b]	45-88
Facility[a]											
1C	87 (1)	1[c]	1[c]	1[c]	2[c]	3	1[c]	3	5	2[c]	6
2B	66 (2)	1[c]	2[c]	3	3	5	3	3	6	1[c]	3
1A	64 (3)	3	3	2	1	1	2	1	3	3	5
2C	55 (4)	6	5	6	6	1	4	5	1	6	4
2A	52 (5)	4	4	5[c]	4	4	5[c]	2	2	5[c]	2
1B	44 (6)	5[c]	6[c]	3	5[c]	5[c]	6[c]	6[c]	4	4	1
Exclusive breastfeeding											
Step Score		49-83[b]	52-90[b]	64-90	37-85[b]	83-91	25-62	21-89	83-91	20-91[b]	45-88
Facility[a]											
2B	57 (1)	1[c]	2[c]	3	3	5	3	3	6	1[c]	2[c]
1C	51 (2)	1[c]	1[c]	1[c]	2[c]	3	1[c]	3	5	2[c]	5
1A	27 (3)	3	3	2	1	1	2	1	3	3	3
2A	19 (4)	4	4	5	4	4	5	2	2	5	4
1B	17 (5)	5[c]	6[c]	3	5[c]	5[c]	6[c]	6[c]	4	4	1
2C	14 (6)	6[c]	5[c]	6[c]	6[c]	1	4	5[c]	1	6[c]	6[c]

Note. Any breastfeeding rate defined as any documentation of a breastfeeding episode during the hospital stay; exclusive breastfeeding rate defined as record of any breastfeeding plus no documentation of formula use during the hospital stay; data obtained from patient chart review.

[a]Number indicates phase group, letter indicates individual hospital.

[b]Range indicates steps where at least 3 of the rankings were reflective of the breastfeeding rate rank order.

[c]Number indicates that the highest and lowest 2 rankings reflect the highest and lowest breastfeeding rankings. Tie scores are both given the same rank score.

8 (cues) and 10 (community support) with levels of breastfeeding in the hospitals. Perhaps this is partially explained by the findings from the key-informant interviews in that cues were not well understood and outreach to the community was limited, but also would impact posthospitalization breastfeeding rates rather than in-hospital rates. The key-informant data revealed these and other gaps in understanding the meaning and intent in several of the steps. Hence, self-appraisals of the Ten Steps completed by facility level staff may suffer from the fact that the steps themselves may not be fully self-explanatory, and therefore may be misunderstood without the further explanation provided in background materials. This may occur even among staff in facilities attempting to implement them.

Limitations

Limitations of this study include 1) self-selection bias in that hospitals that had staff interested in the subject were more likely to enroll, and 2) the quasi-experimental design only allowed for comparison between treatment groups, and did not support testing for between-hospital statistical significance. However, the small number of hospitals also allowed us to explore in-depth the processes of step implementation and monitor actual step achievement. Furthermore, there may have been selection bias in the respondents who participated in the Carolina BF-KAP and in the key-informant interviews. Although whether these hospitals are truly representative of the majority of hospitals in the state or nation may be questioned, the fact that multiple hospitals were studied and the use of a multiple case approach allow for additional insights that may better serve the interests of additional sites attempting to increase exclusive breastfeeding during the hospital stay.

Conclusions

This study identified the fact that the Ten Steps, as stated, may not be fully understood, even by those attempting to implement them, and all involved should obtain access to the documents that further elucidate the activities necessary for their implementation. Furthermore, there were indications that achievements in some of the steps (1-policy, 2-training, 4-skin-to-skin, 6-no supplements, and 9-no artificial nipples) are

TABLE 3—Key-Informant Interview Findings on Individual Step Status at Baseline: data from Maternity Practices in Infant Nutrition and Care (mPINC) and Carolina Breastfeeding Knowledge, Attitudes and Practices Surveys

Step	Summary of Findings: Key-Informant Interviews
Step 1 (policy)	Lack of awareness among staff of the existence and content of a breastfeeding policy across all hospitals. This included hospitals where the hospital received a high score on step 1 on both the self-appraisal tool and the mPINC.
Step 2 (training)	Only 1 hospital had a comprehensive approach to training staff on providing breastfeeding support; only 2 others had opportunities for staff to receive hands-on training.
Step 3 (prenatal education)	Respondents indicated that step 3 was not provided by hospital and no impact on the prenatal counseling offered by care providers.
Step 4 (skin-to-skin)	Most respondents interpreted step 4 to refer exclusively to establishing breastfeeding within an hour making no mention of the practice of skin-to-skin; few staff report supporting either skin-to-skin or the establishment of breastfeeding within the first hour.
Step 5 (counseling)	Staff state that the responsibility for supporting breastfeeding, hence step 5, falls solely on the IBCLC(s) at the hospital; few noted that nurses were responsible for showing moms how to breastfeed.
Step 6 (no supplements)	Breastfeeding infants often receive formula supplementation in the nursery; this practice exists in most hospitals.
Step 7 (rooming-in)	Nurses will typically offer to take the baby to the nursery to provide the mother an opportunity to rest; this practice was instigated both by the staff and the mothers. Respondents from only 2 hospitals indicated that infants routinely roomed-in with their mothers
Step 8 (cues)	Most reported that staff respond to infant feeding cues; however, some respondents said that infant feeding cues meant feeding the infant every 4 h because "that is what the formula can says," whereas others could only identify late hunger cues such as crying. No interview included comment on satiety cues.
Step 9 (no artificial nipples)	Although respondents reported awareness that breastfeeding infants should not receive pacifiers or bottle nipples, most indicated that breastfed infants often received pacifiers or were supplemented using nipples. One hospital had gotten rid of all pacifiers and artificial nipples.
Step 10 (community support)	Many reported that their hospital practiced step 10; however, when respondents were asked what resources were provided to breastfeeding mothers, few were able identify resources other than the IBCLC at their facility.

Note. IBCLC = international board-certified lactation consultant.

more closely aligned with breastfeeding rates than are the other 5. If this hypothesis proves true, it may be logical to strategically prioritize specific steps for greater impact. In addition, if steps are shown to not be associated with increased breastfeeding rates, independently or as part of the package, it may be possible to omit them from assessment approaches. These possibilities will be further explored in the next phase of this study. ■

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Contributors

E. C. Taylor was the project director and oversaw all project activities and contributed to writing of the draft and editing of the final article. N. C. Nickel carried out all analyses and prepared all tables, created the original draft, wrote the methods section and prepared tables for the final article, and edited the final article. M. H. Labbok contributed the development of the project and study design, conceptualization for the draft, and the preparation and editing of the final article.

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Human Participant Protection

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References

1. UNICEF/WHO Innocenti Declaration. 1990. Available at: http://www.unicef.org/programme/breastfeeding/innocenti.htm. Accessed April 10, 2011.

2. Naylor AJ. Baby-Friendly Hospital Initiative: Protecting, promoting, and supporting breastfeeding in the twenty-first century. *Pediatr Clin North Am.* 2001;48(2):475–483.

3. *Protecting, Promoting and Supporting Breastfeeding: The Special Role of Maternity Services.* Geneva: World Health Organization; 1989.

4. Britton C, McCormick FM, Renfrew MJ, Wade A, King SE. Support for breastfeeding mothers. *Cochrane Database Syst Rev.* 2007;1:CD001141.

5. Kramer MS, Chalmers B, Hodnett ED, et al: PROBIT Study Group. Promotion of Breastfeeding Intervention Trial (PROBIT): a randomized trial in the Republic of Belarus. *JAMA.* 2001;285(4):413–420.

6. Merten S, Dratva J, Ackermann-Liebrich U. Do baby-friendly hospitals influence breastfeeding duration on a national level? *Pediatrics.* 2005;116(5):e702–e708.

7. Rosenberg KD, Stull JD, Adler MR, Kasehagen LJ, Crivelli-Kovach A. Impact of hospital policies on breastfeeding outcomes. *Breastfeed Med.* 2008;3(2):110–116.

8. DiGirolamo AM, Grummer-Strawn LM, Fein SB. Effect of maternity-care practices on breastfeeding. *Pediatrics.* 2008;122(suppl 2):S43–S49.

9. Cattaneo A, Buzzetti R. Effect on rates of breast feeding of training for the baby friendly hospital initiative. *BMJ.* 2001;323(7325):1358–1362.

10. Caldeira AP, Goncalves E. Assessment of the impact of implementing the Baby Friendly Hospital Initiative. *J Pediatr (Rio J).* 2007;83(2):127–132.

11. Pérez-Escamilla R. Evidence based breast-feeding promotion: the Baby-Friendly Hospital Initiative. *J Nutr.* 2007;137(2):484–487.

12. Hofvander Y. Breastfeeding and the Baby Friendly Hospitals Initiative (BFHI): organization, response and outcome in Sweden and other countries. *Acta Paediatr.* 2005;94(8):1012–1016.

13. Abrahams SW, Labbok MH. Exploring the impact of the Baby-Friendly Hospital Initiative on trends in exclusive breastfeeding. *Int Breastfeed J.* 2009;4:11–18.

14a. Labbok MH. Global baby-friendly hospital initiative monitoring data: update and discussion. *Breastfeeding Med.* 2012;7(4):210–222.

14b. UNICEF. The Baby-Friendly Hospital Initiative. Available at: http://www.unicef.org/programme/breastfeeding/baby.htm. Accessed April 10, 2011.

15. UNICEF: 1990-2005. *Celebrating the Innocenti Declaration on the Protection, Promotion and Support of Breastfeeding: Past Achievements, Present Challenges and Priority Action for Infant and Young Child Feeding.* 2nd Ed. Florence, Italy: UNICEF Innocenti Research Centre; 2006.

16. Baby-Friendly USA. Inc. Fee Schedule. Available at: http://www.babyfriendlyusa.org/eng/docs/4-D%20Pathway%20fee%20schedule%2012.10.pdf. Accessed April 10, 2011.

17. Labbok MH, Taylor EC, Nickel NC. Implementing the Ten Steps in hospitals serving low-wealth patients: operational research design and baseline findings. *Int Breastfeeding J.* In press.

18. Shadish WR, Cook TD, Campbell DT. *Experimental and Quasi-Experimental Designs for Generalized Causal Inference.* Boston: Houghton Mifflin; 2002.

19. Fisher AA, Foreit JR, Laing J, Stoeckel J, Townsend J. *Designing HIV/AIDS Intervention Studies: An Operations Research Handbook.* New York, NY: The Population Council Inc.; 2002.

20. The Global Fund To Fight AIDS Tuberculosis and Malaria, USAID, World Health Organization, TDR, UNAIDS, The World Bank Global HIV/AIDS Program. *Framework for operations and implementation research in health and disease control programmes.* Geneva: The Global Fund to Fight AIDS, Tuberculosis and Malaria TDR; 2008.

21. Baby-Friendly USA. BFHI USA: Implementing the UNICEF/WHO Baby Friendly Hospital Initiative in the U.S. Info for Hospitals and Birth Centers. Available at: http://www.babyfriendlyusa.org/eng/04.html. Accessed April 10, 2011.

22. World Health Organization. *UNICEF. Baby-Friendly Hospital Initiative: Revised, Updated and Expanded for Integrated Care.* Geneva, Switzerland: World Health Organization; 2009.

23. Centers for Disease Control and Prevention. Breastfeeding: Data: mPINC | DNPAO | CDC. Atlanta, GA: Centers for Disease Control and Prevention; 2009. Available at: http://www.cdc.gov/BREASTFEEDING/data/mpinc/index.htm. Accessed April 10, 2011.

24. Freed GL, Clark SJ, Sorenson J, Lohr JA, Cefalo R, Curtis P. National assessment of physicians' breastfeeding knowledge, attitudes, training, and experience. *Am J Obstet Gynecol.* 1995;50(8):583–585.

25. Riordan J, Wambach K. *Breastfeeding and Human Lactation,* 4th ed. Burlington, MA: Jones and Bartlett; 2009.

26. Rubin HJ, Rubin I. *Qualitative Interviewing: The Art of Hearing Data.* 2nd ed. Thousand Oaks, CA: Sage Publications, Inc.; 2005.

27. Strauss AL, Corbin JM. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory.* Thousand Oaks, CA: Sage Publications Inc.; 1998.

28. Yin RK. *Case Study Research: Design and Methods.* 4th ed. Thousand Oaks, CA: Sage Publications Inc.; 2009.

29. Stake RE. *The Art of Case Study Research.* Thousand Oaks, CA: Sage Publications, Inc.; 1995.

30. StataCorp. *Stata Statistical Software: Release 10.* College Station, TX: StataCorp LP; 2007.

31. Muhr T. ATLAS.ti: The Knowledge Workbench. 6.0.23 ed. Berlin: ATLAS.ti Scientific Software Development GmbH; 2009.

32. Nickel NC. *Breastfeeding Friendly Healthcare: A Mixed Methods Evaluation of the Implementation and Outcomes of Maternity Practices to Support Breastfeeding.* [dissertation]. Chapel Hill, NC: University of North Carolina at Chapel Hill; 2011.

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Breastfeeding Among Minority Women: Moving From Risk Factors to Interventions[1–3]

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ABSTRACT

The gap between current breastfeeding practices and the Healthy People 2020 breastfeeding goals is widest for black women compared with all other ethnic groups. Also of concern, Hispanic and black women have the highest rates of formula supplementation of breast-fed infants before 2 d of life. These disparities must be addressed through the scale-up of effective interventions. The objective of this critical review is to identify and evaluate U.S.-based randomized trials evaluating breastfeeding interventions targeting minorities and highlight promising public health approaches for minimizing breastfeeding disparities. Through PubMed searches, we identified 22 relevant publications evaluating 18 interventions targeting minorities (peer counseling [$n = 4$], professional support [$n = 4$], a breastfeeding team [peer + professional support, $n = 3$], breastfeeding-specific clinic appointments [$n = 2$], group prenatal education [$n = 3$], and enhanced breastfeeding programs [$n = 2$]). Peer counseling interventions (alone or in combination with a health professional), breastfeeding-specific clinic appointments, group prenatal education, and hospital/Special Supplemental Nutrition Program for Women, Infants, and Children enhancements were all found to greatly improve breastfeeding initiation, duration, or exclusivity. Postpartum professional support delivered by nurses was found to be the least effective intervention type. Beyond improving breastfeeding outcomes, 6 interventions resulted in reductions in infant morbidity or health care use. Future research should include further evaluations of successful interventions, with an emphasis on determining the optimal timeframe for the provision of support, the effect of educating women's family members, and the impact on infant health care use and cost-effectiveness. *Adv. Nutr. 3: 95–104, 2012.*

Introduction

Breast milk is recognized as the optimal source of nutrition for infants because of its unique nutritional and immunological characteristics. The American Academy of Pediatrics recommends exclusive breastfeeding for the first 6 mo of an infant's life, followed by the introduction of appropriate complementary foods along with continued breastfeeding until at least 12 mo of age (1). Despite the well-documented benefits of breastfeeding for the infant and the mother, breastfeeding outcomes lag behind public health goals.

Disparities in the breastfeeding practices of U.S. women are quite evident when comparing the 2007 National Immunization Survey data by ethnic group (2). Breastfeeding initiation rates are markedly lower among black women (60%) compared with other ethnic groups (Fig. 1A). Hispanic and Asian women are currently meeting the Healthy People 2020 (HP2020)[4] breastfeeding initiation goal of 81.9%, whereas Native American and white women are close to attaining the goal. The widest variations in breastfeeding outcomes by ethnicity are reflected in the rates of any breastfeeding at 6 mo post partum (PP) (Fig. 1B), in which no ethnic groups are meeting the HP2020 goals. At both 6 and 12 mo PP, Asian women have the highest rates of any breastfeeding, whereas black women have the lowest. The

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[4] Abbreviations used: HP2020, Healthy People 2020; LC, lactation consultant; PC, peer counseling; PP, postpartum; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children.

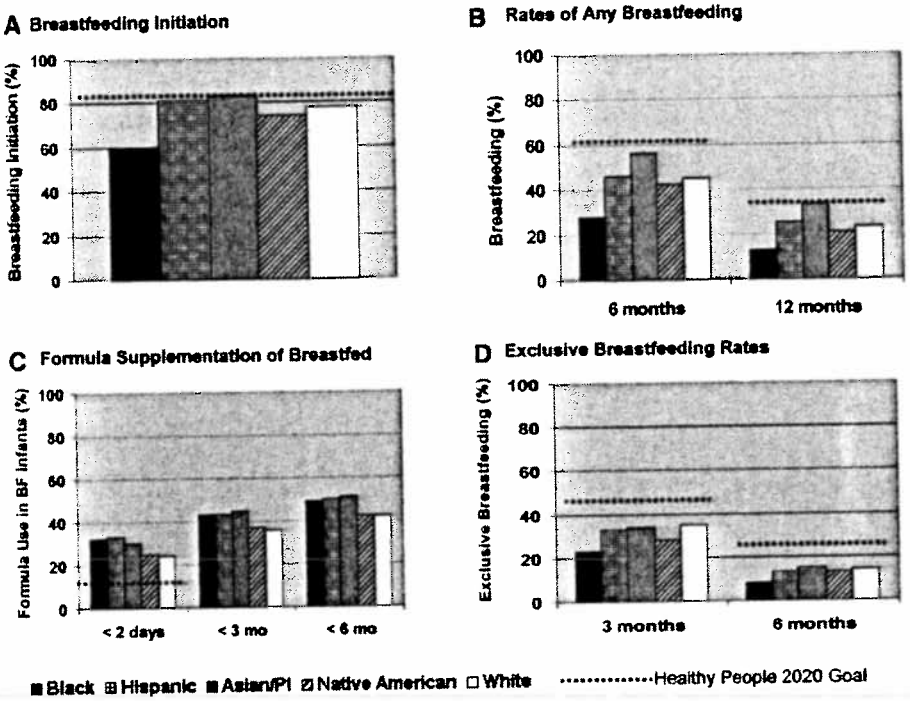

Figure 1 Breastfeeding and supplementation rates by ethnicity/race: National Immunization Survey data (2,4). A. Breastfeeding Initiation: Black women have the lowest rates; B. Rates of Any Breastfeeding: Black women have the lowest rates of any breastfeeding at 6 and 12 months; C. Formula Supplementation: Excessive formula supplementation of breastfed infants in all ethnic groups; D. Exclusive Breastfeeding Rates: Lowest rates among black women, but no ethnic group meets Healthy People 2020 goals.

rates of any breastfeeding at 6 and 12 mo among Hispanic, Native American, and white women are quite similar, but still require substantial improvement to meet the HP2020 goals of 61% at 6 mo, and 34% at 12 mo. Exclusive breastfeeding (i.e., provision of only breast milk and vitamin/mineral drops to infants [3]) rates are suboptimal for all ethnic groups. On average, 24% of the breast-fed infants in the United States receive formula supplementation by 2 d of life (4), with this practice being most common among Hispanic (33%) and black (32%) infants (Fig. 1C). At this point, no ethnic group is meeting the HP2020 goal to reduce supplementation of 2-d-old breast-fed infants to 14%. Exclusive breastfeeding rates at 3 and 6 mo PP follow a similar pattern, with the lowest rates observed among black women (Fig. 1D).

U.S. national data do not typically report the breastfeeding practices of ethnic subgroups and can thus mask wide variation among subgroups (5). For example, national breastfeeding data for Hispanics reflect breastfeeding practices of Mexicans, Puerto Ricans, and immigrants from several other Spanish-speaking countries. The variability in the breastfeeding practices of ethnic subgroups is clearly demonstrated with data obtained from our previously published breastfeeding peer counseling (PC) randomized trial conducted in Hartford, Connecticut (6). Significantly different patterns of breastfeeding continuation are evident for the Puerto Ricans (median breastfeeding duration, <0.5 mo) versus other Hispanic women derived primarily from Mexico, Peru, and Colombia (median breastfeeding duration,

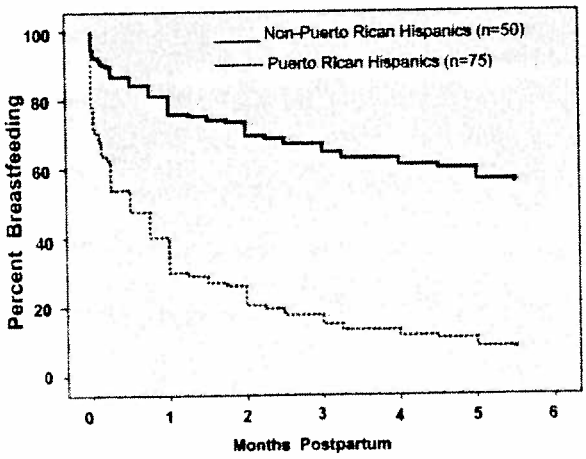

Figure 2 Comparison of the rates of any breastfeeding by Hispanic subgroups in Hartford, Connecticut . Secondary analysis of randomized control trial data (6).

>6.0 mo) in this sample of low-income women (Fig. 2) ($P < 0.05$). Thus, targeted breastfeeding interventions are needed for ethnic subgroups whose breastfeeding outcomes fall below the national rates for their ethnic/racial group.

The reasons for disparities in breastfeeding practices are complex. Research in this area has moved beyond simply identifying demographic and socioeconomic risk factors for poor breastfeeding outcomes and has identified novel, potentially modifiable risk factors. Some of the potential causes of poor breastfeeding outcomes among black and Puerto Rican women include breastfeeding ambivalence (7), the availability of free formula from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (8), a high level of comfort with the idea of formula feeding (9), limited availability and lower intensity of WIC breastfeeding support for minority women (10,11), and issues surrounding trust building and perceived mistreatment by providers (12). Further research is needed to better understand the root causes of breastfeeding disparities and how these can be addressed through public health interventions.

The consequences of poor breastfeeding practices are substantial. Breastfeeding is associated with a lower risk of the development of several health conditions in the child, including acute otitis media, childhood leukemia, obesity, type 2 diabetes, sudden infant death syndrome, gastroenteritis, and asthma (13). Exclusive breastfeeding is associated with decreased risk of atopic dermatitis, necrotizing enterocolitis, severe lower respiratory tract infections, otitis media, gastroenteritis, and sudden infant death syndrome (13–15). With the exception of otitis media and childhood leukemia, each of these conditions has a documented black/white health disparity, with higher rates observed among black (vs. white) children (16–23). The potential consequences of lower breastfeeding rates among black women is especially concerning because their children experience health disparities for most of the conditions for which breastfeeding is known to be protective. This overlap between conditions for which breastfeeding is protective and conditions for which black/white disparities exist does not necessarily reflect causality. However, it does highlight the need for well-designed research evaluating the relationship between breastfeeding status and common health disparities, which carefully assess breastfeeding duration and exclusivity.

To minimize breastfeeding disparities in the United States, culturally sensitive interventions targeting groups with the worst breastfeeding outcomes need to be developed and evaluated, with widespread dissemination of those that are effective. Currently, there is a growing body of literature describing breastfeeding interventions among minority groups, some of which have been featured in *The CDC Guide to Breastfeeding Interventions* (24). The objectives of this critical review are to identify and evaluate U.S.-based randomized trials evaluating breastfeeding interventions targeting minorities and highlight promising public health approaches designed to minimize breastfeeding disparities.

Current status of knowledge

To evaluate the current status of knowledge regarding the effectiveness of breastfeeding interventions targeting minorities, we conducted PubMed searches in February 2011 using "breastfeeding" and "randomized trial" along with each of the following descriptors: Latina, Latino, Hispanic, black, African American, Asian, Native American, First Nation, Indian, minority, and low income. Reference lists of relevant articles and lactation conference proceedings were hand searched to identify pertinent research. To be included in this critical review, studies had to be U.S.-based randomized trials evaluating a breastfeeding promotion intervention, reporting breastfeeding outcome data, enrolling primarily minority participants, and conducting analyses by intention to treat. After identifying relevant abstracts, the full text article of each was reviewed to identify those meeting the inclusion criteria.

Based on the main focus of the intervention, included studies were grouped into 1 of the following 6 categories: PC, professional support, breastfeeding team (PC combined with professional support), breastfeeding-specific clinic appointments, group prenatal counseling, and enhanced breastfeeding programs (program add-ons). Unless otherwise noted, breastfeeding outcomes were consistent with the following definitions. Breastfeeding initiation reflects that the infant was ever breast-fed or received breast milk. Post partum breastfeeding rates indicate that the child received breast milk at the specified time point. Exclusive breastfeeding indicates that the infant received only breast milk, allowing for medications and vitamin/mineral drops, consistent with the WHO definition of exclusive breastfeeding (3).

This search yielded 117 abstracts, of which 22 full text relevant articles were reviewed, yielding 20 publications that described 18 interventions. The target populations of these interventions were black women (10/18), Latinas (6/18), and black and Latina groups (2/18). We did not identify a single randomized trial targeting Asians or Native Americans. The identified interventions included PC ($n = 4$), professional support ($n = 4$), a breastfeeding team (peer + professional support, $n = 3$), breastfeeding-specific clinic appointments ($n = 2$), group prenatal education ($n = 3$), and enhanced breastfeeding programs ($n = 2$). The details of each randomized trial are summarized in Table 1.

Peer counseling

Four randomized trials evaluating PC interventions were identified (Table 1). Three PC trials targeted a low-income, predominantly Puerto Rican sample delivering at a Baby-Friendly Hospital in Hartford, Connecticut (6,25,26). Each of these interventions involved PC prenatal home visits, daily in-hospital support, PP home visits, telephone support, and free breast pumps as needed. Chapman et al. (6) evaluated the effectiveness of an existing PC program (vs. standard care), whereas Anderson et al. (25) evaluated the efficacy of a more intensive intervention promoting exclusive breastfeeding (vs. standard care). In the third PC trial

Table 1. Summary of published randomized trials evaluating breastfeeding interventions targeting minority women[1]

Study	Study Population	Intervention	Outcomes (I vs. C)
Peer counseling			
Chapman et al. (6)	*N* = 219; 80% Hispanic (mostly Puerto Rican), 9% black	Home visits: 1 prenatal, 3 PP Hospital visits: daily Telephone support and breast pumps available	Initiation: 91 vs. 77%* BF 1 mo: 64 vs. 51% BF 3 mo: 44 vs. 29% EBF: NS at any time point
Anderson et al. (25)	*N* = 182; 72% Hispanic (mostly Puerto Rican), 18% black	Focus: EBF promotion/support Home visits: 3 prenatal, 9 PP Hospital visits: daily Telephone support and breast pumps	Initiation: 91 vs. 76%* BF 3 mo: 49 vs. 36% EBF 3 mo: 27 vs. 3%* Infant diarrhea, 3 mo: 18 vs. 38%* Maternal amenorrhea, 3 mo: 52 vs. 33%*
Chapman et al. (26)	*N* = 206; overweight/obese, low-income women, 82% Hispanic (mostly Puerto Rican), 10% black	Focus: specialized PC for obese women, EBF promotion Home visits: 3 prenatal, 11 PP Hospital visits: daily EBF promotion, telephone support, breast pumps and BF sling available	Initiation: 97 vs. 99% >50% BM feedings, 2 wk PP: 81 vs. 67%* BF 3 mo: 47 vs. 51% EBF 1 mo: 18 vs. 12% Infant rehospitalization 3 mo: 8 vs. 22%*
Merewood et al. (27)	*N* = 101; BF mothers of healthy, preterm, NICU infants (26–37 wk gestational age); 69% black, 19% Hispanic	Focus: BF support for preterm infants Hospital visits: within 72 h of birth and weekly through 6 wk PP (if still hospitalized) Telephone support: weekly after hospital discharge through 6 wk PP	Feeding at 12 wk: any BF (OR: 2.81, 95% CI: 1.11–7.14; *P* = 0.03) EBF: NS
Professional support			
Bunik et al. (28)	*N* = 341; 88% Hispanic (mostly Mexican), 6% black	RN support Daily telephone call from bilingual RN (day of discharge through 14 d PP)	BF 3 mo: 49 vs. 54% BF 6 mo: 28 vs. 37% Sick infant visit, 1 mo: 25 vs. 36%#
Grossman et al.(29)	*N* = 97; 54% black	RN support Hospital visits: 4 RN visits (30–45 min) Telephone support: 4 RN PP calls	BF 3 mo: 35 vs. 48% BF 6 mo: 14 vs. 27%
Bonuck et al. (30,31)	*N* = 304; 57% Hispanic, 36% black	LC support Home visits: 2 prenatal, 1 PP Telephone support as needed Nursing bra provided. Breast pumps provided as needed.	BF through 20 wk: 53 vs. 39%* >50% BM, 1 wk: 69 vs. 37%*** >50% BM, through 9 wk: 46 vs. 33%* EBF: NS at any time point
Petrova et al. (32)	*N* = 104; 88% Hispanic (mostly Mexican), 6% black	LC support Home visits: 2 prenatal Hospital visit/call: 1 Telephone support: 2 calls	BF 3 mo: 78 vs. 63% EBF 1 wk: 46 vs. 29% EBF 1 mo: 30 vs. 24% EBF 3 mo: 14 vs. 11%
Breastfeeding team (peer counselor + professional)			
Pugh et al. (33)	*N* = 41; 93% black	RN + PC team Hospital visits: daily Home visits: 3 (in first month PP) PC telephone support through 6 mo PP	BF 6 mo: 45 vs. 35% EBF 3 mo: 45 vs. 25% EBF 6 mo: 40 vs. 15%
Pugh et al. (34)	*N* = 328; 87% black	RN + PC team Hospital visits: daily Home visits: 3 (in first month PP) PC telephone support through 6 mo Unlimited RN contact via pager	BF 6 wk (OR: 1.72, 95% CI: 1.1–2.8; *P* = 0.03) BF 12 wk (OR: 1.58, 95% CI: 1.0–2.49; *P* = 0.05)

(Continued)

Table 1. *(Continued)*

Study	Study Population	Intervention	Outcomes (I vs. C)
Breastfeeding Team (peer counselor and professional)			
Wambach et al. (35)	*N* = 289; teen mothers, 61% black	LC + PC team Prenatal group classes: 2 PC hospital visits: 1 Telephone support by LC or peer counselor: 5 calls through 4 wk PP Breast pump as needed Study groups: 1. Intervention 2. Attention control 3. Usual care	Unadjusted analyses (1 vs. 2 vs. 3) Initiation: 79 vs. 66 vs. 63%* Median BF duration: 177 vs. 42 vs. 61 d*** EBF 3 wk: 31 vs. 30 vs. 18%
Breastfeeding-specific clinic appointment			
Serwint et al. (36)	*N* = 159; nulliparous, pregnant women, 91% black	Pediatric clinic: prenatal appointment to discuss BF Providers: pediatric residents who had received 3 h of additional BF training	Response rate: 68% attended appointment Initiation: 42 vs. 31% BF 1 mo: 19 vs. 14% Planned FF, but BF: 45 vs. 14%*
Hopkinson et al. (37)	*N* = 522; 100% Hispanic mixed feeders (mostly Mexican)	Breastfeeding clinic: at hospital discharge, appointment card provided to attend BF clinic at 3–7 d PP Providers: PC with IBCLC supervision	Response rate: Clinic visit by 1 wk PP: 35% Clinic visit by 3 wk PP: 56% Clinic visit/telephone call, 3 wk PP: 80% BF outcomes at 4 wk PP: EBF: 17 vs. 10%* Water given: 20 vs. 41%** Tea given: 16 vs. 28%** Ounces formula/d: 12 vs. 14*
Group prenatal counseling			
Kistin et al. (38)	*N* = 159; 100% black	Prenatal BF education: 1. Group class (50–80 min) 2. Individual session (15–30 min) 3. Controls (no additional BF education) Providers: midwives	BF Initiation: Group class (OR: 5.2, 95% CI: 2.9–9.3; *P* = 0.006) Any intervention (OR: 4.3, 95% CI: 2.6–7.0; *P* = 0.004) Individual session: NS Controls: reference group Planned FF, but BF (1 vs. 2 vs. 3): 21 vs. 38 vs. 8%*** BF 12 wk (1 vs. 2 vs. 3) 15 vs. 4 vs. 4%*
Ickovics et al. (39)	*N* = 1047; 78% black, 13% Hispanic	Group prenatal care model: I: Group prenatal care (20-h contact time) C: Individual (2-h contact time) Providers: usual clinic staff	BF initiation: 67 vs. 55% (OR: 1.73, (95% CI: 1.28–2.35; *P* = 0.001)
Wolfberg et al. (40)	*N* = 59; 86% black	BF class for fathers I: Dads prenatal BF class (2 h) C: Dads prenatal infant care class (2 h) Same black male instructor for both classes	BF initiation: 74 vs. 41%* BF 1 mo: 38 vs. 35% BF 2 mo: 35 vs. 19%

(Continued)

Table 1. (*Continued*)

Study	Study Population	Intervention	Outcomes (I vs. C)
Enhanced Breastfeeding Programs			
Frank et al. (41)	N = 343; 65% black, 19% Hispanic	1: Research-funded discharge bag (contains BF promotional materials) 2: Research counseling: perinatal visit + 8 telephone calls 3: Research bags + research counseling 4. Controls: standard bag (sterile water, nipples, formula company pamphlets) + standard limited counseling	EBF duration: (1 + 3) vs. 4: 60 vs. 42 d** (1-tailed log rank test) Infant rehospitalization, 4 mo 2 vs. 3: 14 vs. 1%*
Caulfield et al. (42), Gross et al. (43)	N = 242; 100% black	WIC clinic-based intervention: 1: Peer counselor contact: 3 prenatal visits + weekly contact through 16 wk 2: BF promotion video/pamphlets 3: PC + video/pamphlets 4: Controls	BF initiation: 1 vs. 2 vs. 3 vs. 4: 62 vs. 50 vs. 52 vs. 26%* 1 vs. 4 (OR: 3.8, 95% CI: 1.4–10.2; $P < 0.05$)* BF termination 4 mo: 1: OR: 0.2, 95% CI: 0.1–0.4* 2: OR: 0.3, 95% CI: 0.1–0.8* 3: OR: 0.3, 95% CI: 0.1–0.6* 4: Reference

[1] *$P < 0.05$; **$P < 0.01$; ***$P < 0.001$; #$P = 0.05$. BF, breastfeeding; BM, breast milk; C, control; EBF, exclusive breastfeeding; FF, formula feeding; I, intervention; IBCLC, International Board Certified Lactation Consultant; LC, lactation consultant; PC, peer counseling; PP, postpartum; RN, registered nurse; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children.

(26), a specialized PC intervention targeting overweight and obese women was compared with usual care. The fourth PC trial was conducted by Merewood et al. (27) among predominantly black women who chose to breastfeed their otherwise healthy, premature infants in the neonatal intensive care unit of a Baby-Friendly hospital in Boston, Massachusetts.

The impact of PC on breastfeeding initiation was evaluated in 3 studies (6,25,26) that recruited women who were considering breastfeeding. In 2 of these studies (6,25), considerable increases in breastfeeding initiation rates were observed (91 vs. 77% ($P < 0.05$), and 91 vs. 76% ($P < 0.05$), respectively). At the time of the third PC study by this group (26), breastfeeding initiation was nearly universal (97 vs. 99%).

In the study by Merewood et al. (27), the rate of any breastfeeding at 12 wk PP was considerably higher in the intervention group than in controls (OR: 2.81, 95% CI: 1.11–7.14; $P = 0.03$). In the studies by Chapman et al. (6,26) and Anderson et al. (25), the rates of any breastfeeding at 3 mo PP were higher in the intervention (vs. control) groups, but this difference did not reach statistical significance.

Improvements in either exclusive breastfeeding rates or in the percentage of feedings derived from breast milk were observed in 2 PC studies, along with improvements in health outcomes. Anderson et al. (25) demonstrated that their PC intervention (vs. control) produced a great improvement in exclusive breastfeeding rates at 3 mo PP (27 vs. 3%, $P < 0.05$), along with a considerable reduction in infant diarrhea at 3 mo (18 vs. 38%, $P < 0.05$), and a considerable increase in lactational amenorrhea in their intervention (vs. control) group. In the PC trial targeting overweight/obese women (26), significantly more women in the intervention group gave ≥50% of feedings as breast milk at 2 wk PP than the control group. This may account for the large decrease in the rate of infant rehospitalization in the intervention (vs. control) group (8 vs. 22%, $P < 0.05$). The other PC trials (6,27) were not designed to promote exclusive breastfeeding and did not observe improvements in exclusive breastfeeding rates.

In combination, these studies indicate that PC can improve breastfeeding initiation, duration, exclusivity, and select infant health outcomes. These studies may underestimate the true effect of breastfeeding PC due to the relatively high level of breastfeeding support provided to the control groups at each of these Baby-Friendly institutions.

Professional support

We identified 4 randomized trials evaluating breastfeeding interventions delivered by health care professionals, with 2 using nurses (28,29) and 2 providing LC support (30–32) (Table 1). In Denver, Colorado, Bunik et al. (28) tested an intervention among a Mexican-American population, consisting of daily telephone calls from a bilingual nurse from the date of hospital discharge through PP day 14. In contrast, Grossman et al. (29) evaluated an intervention providing both in-person and telephone support from a nurse (4 hospital visits and 4 telephone calls) to predominantly black mothers from Columbus, Ohio.

Regardless of whether telephone support was provided alone (28) or in combination with in-person support (29), neither intervention resulted in improvements in the rates of any breastfeeding at 3 or 6 mo PP. However, Bunik

et al. demonstrated that daily telephone support (vs. controls) resulted in lower rates of health care use for sick infant visits by 1 mo of life (25 vs. 36%, $P = 0.05$) (28).

Bonuck et al. (30,31) evaluated an intervention in which LCs provided a multiethnic sample of Bronx, New York, women with 3 visits (2 prenatal plus 1 PP), along with bilingual telephone support as needed. Petrova et al. (32) evaluated a somewhat less intensive LC intervention (3 visits + 2 telephone calls) targeting a predominantly Mexican-American population in New Brunswick, New Jersey.

The intervention tested by Bonuck et al. (31) yielded impressive results with significantly higher rates of any breastfeeding through 20 wk PP, with the exception of week 18 (53 vs. 39%, $P < 0.05$) and greater breastfeeding intensity (defined as more than half of feedings derived from breast milk in this study) through 9 wk (46 vs. 33%, $P < 0.05$) in the intervention (vs. control) group. Petrova et al. (32) evaluated exclusive breastfeeding rates through 3 mo PP and found improved rates in their intervention group; however, the difference did not reach statistical significance. The difference in the magnitude of the results between these 2 LC interventions may be attributable to the fact that the Bonuck et al. study used bilingual staff, whereas Petrova et al. relied on a translating service when needed. In addition, Bonuck et [illegible] breastfeeding intensity (based on the percent[illegible]derived from breast milk) compared with the [illegible]ent of exclusive breastfeeding used by Petrova et al.

Breastfeeding interventions delivered by nurses appear to be less successful than similar interventions delivered by LCs. However, the 2 studies evaluating LC interventions yielded different results. It is possible that the more successful LC interventions (31) were partially due to an increased acceptance of health messages delivered by the bilingual LCs who had built a strong rapport with their clients.

Breastfeeding team. Three publications were identified that evaluated a breastfeeding team in which a PC and a professional work together to provide breastfeeding support. Pugh et al. (33) conducted a pilot study in 2002 that paired a nurse and a PC to form a breastfeeding team who provided breastfeeding education and support to a low-income, predominantly black population. Based on the encouraging, but not statistically significant, results of the pilot study, they conducted a larger study (34), with the intervention consisting of daily in-hospital visits and 3 PP home visits from the team, PC telephone support through 6 mo PP, and unlimited access to a nurse via pager.

In adjusted analyses, this intervention yielded a considerable improvement in the rate of any breastfeeding at 6 wk vs. controls (OR: 1.7, 95% CI: 1.1–2.8; $P = 0.03$) with marginally significant improvements in the rate of any breastfeeding at 12 wk (OR: 1.6, 95% CI: 1.0–2.5; $P = 0.05$). The results of this study should be interpreted with caution because the breastfeeding team collected breastfeeding outcome data from the intervention group, thus introducing the potential for bias.

Wambach et al. (35) evaluated the impact of a breastfeeding team composed of an LC and a peer counselor on the breastfeeding outcomes of black adolescents residing in the Midwestern United States. This intervention consisted of 2 prenatal group classes, 1 PC hospital visit, 5 PP telephone calls by the peer counselor or LC, and provision of breast pumps as needed. In this study, the intervention group was compared with an attention control group (taught prenatal and childbirth material by an advanced practice nurse + peer counselor) and a usual care group (controls). The main effect of this intervention was a significant, nearly 3-fold increase in the median duration of any breastfeeding among the intervention compared with the attention control and usual care groups (177 vs. 42 vs. 61 d, respectively; $P < 0.001$). Bivariate analyses showed a significant difference between the groups regarding breastfeeding initiation rate (79 vs. 66 vs. 63%, respectively; $P < 0.05$) for the intervention, attention control, and usual care groups. However, when adjusting for factors such as breastfeeding knowledge, intentions, and social support, the group effect was not significant. There were no noteworthy differences in exclusive breastfeeding rates at 3 wk. The large effect on the duration of any breastfeeding may be partially attributed to the social support created in this teen clinic. The concept of the breastfeeding team clearly has potential and needs to be further evaluated.

Breastfeeding-specific clinic appointment. We identified 2 studies that randomized women to receive an additional clinic appointment focused on breastfeeding. Serwint et al. (36) assigned pregnant, nulliparous, predominantly black women to receive a mailed appointment card to attend a prenatal pediatric clinic appointment that focused on breastfeeding. The clinic was staffed by pediatric residents who had received 3 h of additional breastfeeding training. The response rate for the clinic appointment was 68%. This study was underpowered because enrollment was curtailed when prenatal pediatric clinic appointments became the standard of care. This likely contributed to the nonsignificant difference in breastfeeding initiation and duration rates between the study groups. However, the intervention successfully affected breastfeeding decisions. Among breastfeeding mothers, 45% of those in the intervention group had not planned to breastfeed, but changed their minds and decided to breastfeed compared with 14% of controls ($P < 0.05$).

In another randomized trial, Hopkinson et al. (37) randomly assigned Hispanic mixed feeders to receive a breastfeeding clinic appointment card at hospital discharge. The clinic was staffed by peer counselors working under the supervision of an LC. Phone consults were offered to women who could not attend the clinic. The intervention clinic was well attended, with 80% of the intervention group having a clinic appointment or telephone consult by 3 wk PP. At 4 wk PP, the intervention group had a significantly higher rate of exclusive breastfeeding than controls (based on 24-h recall). This increase in exclusive breastfeeding was achieved

by substantial reductions in the provision of water, tea, and formula.

The concept of additional clinic appointments designed to promote breastfeeding appears promising. Further research is needed to better understand the optimal timing of the clinic appointment (prenatal vs. PP), as well as the effect for specific target populations (i.e., mixed feeders vs. those exclusively breastfeeding; primiparae vs. multiparae).

Group prenatal education. We identified 3 publications evaluating the impact of a group prenatal counseling format on breastfeeding outcomes, with each study assessing a different intervention (Table 1). In 1990, Kistin et al. (38) evaluated the impact of midwives providing either a group prenatal breastfeeding class (50–80 min), individual breastfeeding education sessions (15–30 min), or standard care (no additional breastfeeding education) among black women in Chicago, Illinois. Building on the group education concept, Ickovics et al. (39) evaluated the impact of the group prenatal care model on breastfeeding initiation. In their study, predominantly black (78%) and Hispanic (13%) women from New Haven, Connecticut, and Atlanta, Georgia, were randomly assigned to receive all their prenatal care either in a group setting (20 h of contact time) or during individual appointments (2 h of contact time). Using a unique approach, Wolfberg et al. (40) evaluated a breastfeeding class targeting the male partners of pregnant, predominantly black women. This 2-h intervention consisted of an informal, interactive breastfeeding class taught by a black father in which men learned the benefits of breastfeeding, ways to support their partners' decision to breastfeed, and strategies to deal with those who may not be supportive of breastfeeding.

Each of these studies demonstrated a significant improvement in breastfeeding initiation rates in the intervention group. Of the 2 studies (38,40) evaluating the impact of the intervention on PP breastfeeding rates, only Kistin et al. (38) demonstrated a significant improvement. Kistin et al. observed higher rates of any breastfeeding at 12 wk among women receiving the group class compared with the individual session and controls ($P < 0.05$). Additionally, similar to the findings of Serwint et al. (36), the individual session (vs. control and classes) resulted in a significant increase in breastfeeding initiation among women who had planned to formula feed (38 vs. 8 vs. 21%, respectively; $P < 0.001$). None of these studies evaluated breastfeeding exclusivity.

These studies demonstrate that group prenatal education can have a significant impact on breastfeeding initiation. Further research is needed to determine whether extending groups into the PP period or developing groups for other family support members (i.e., Hispanic grandmothers) would have a significant impact on breastfeeding duration or exclusivity.

Enhanced breastfeeding programs. We identified 2 studies that evaluated the effectiveness of program add-ons on breastfeeding outcomes. Frank et al. (41) evaluated a combination of hospital-based interventions (research discharge bags vs. research counseling) versus both (research bags + research counseling) versus standard care (commercial discharge packs and limited breastfeeding counseling)) among predominantly minority women (65% black, 19% Hispanic). Although there were no important differences in breastfeeding duration between groups, there was a considerably longer duration of exclusive breastfeeding (which was defined as providing only breast milk for the previous 24 h, but did allow formula less than once per week) among women receiving the research bags (either alone or in combination with the research counseling [$P < 0.01$, 1-tailed log rank test]) versus those not receiving research bags. Infants receiving the research bags + research counseling were significantly less likely to be rehospitalized by 4 mo of age ($P < 0.05$, 2 sided test) compared with those receiving research counseling only. The results of this study should be evaluated in light of the use of a nonstandard definition of exclusive breastfeeding.

Caulfield et al. (42) and Gross et al. (43) describe the results of a WIC intervention in which similar WIC clinics serving black women were randomized to offer enhanced breastfeeding services (PC vs. breastfeeding video/pamphlets in the waiting room vs. both interventions combined vs. standard WIC care). Adjusted analyses demonstrate that attendance in the clinic offering only PC services was significantly associated with an increased breastfeeding initiation rate (42). Among women who initiated breastfeeding, the risk of breastfeeding termination by 4 mo PP was significantly lower in all the intervention clinics compared with the control clinic ($P < 0.05$) (43).

These studies demonstrate that enhanced hospital practices and WIC-based services can have a considerable impact on breastfeeding outcomes and serve as part of the impetus for both the widespread adoption of PC within the WIC program and breastfeeding promotion campaigns.

Conclusions

This critical review identified several interventions that successfully improved breastfeeding outcomes among minority women in the United States, including PC, breastfeeding teams (a peer counselor working with a health professional), group prenatal classes, breastfeeding-specific clinic appointments, and hospital/WIC policy change. Breastfeeding interventions provided by nurses working alone were generally less effective than the other types of interventions. This may highlight the need for a more diverse health care workforce who develops a better rapport with minority women (8).

The efforts needed to minimize the disparities in breastfeeding outcomes in the United States will likely require a multifaceted effort, involving several types of interventions evaluated in this critical review. Breastfeeding PC has been demonstrated to be an effective intervention (44) and is being scaled-up through widespread use of breastfeeding peer counselors in the WIC program. Similarly, many U.S. hospitals are working toward Baby-Friendly certification, which would prohibit distribution of free formula and formula promotional materials, including discharge bags.

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Further research is needed to provide an in-depth evaluation of some of the more promising interventions. For example, we need to determine the optimal timing and amount of PC services and evaluate how PC services can be best tailored to meet the needs of teens, obese women, and specific ethnic groups. Both ongoing prenatal classes and the group prenatal care model show potential for improving breastfeeding initiation, and further research should evaluate the impact of the PP continuation of these groups on breastfeeding duration and exclusivity. The scheduling of a medical appointment that completely focuses on breastfeeding appears effective in improving breastfeeding outcomes, possibly because it reflects the endorsement of breastfeeding by the medical community. Similarly, a single prenatal breastfeeding class specifically targeting male partners effectively increased breastfeeding initiation. Further research is needed to evaluate both the impact of classes targeting other family members (i.e., Hispanic grandmothers) and the degree to which ongoing (vs. one-time) classes can improve breastfeeding duration and exclusivity.

Our critical review identified key research gaps that should be addressed. The first is in regard to the definition of exclusive breastfeeding. Although most of the included studies used the WHO definition of exclusive breastfeeding (3), few clearly indicated the timeframe within which exclusive breastfeeding was assessed. For example, some categorized women as exclusively breastfeeding using the strictest definition (i.e., if the child had not received anything except breast milk, allowing for medications and vitamin/mineral drops since birth). Others evaluated exclusive breastfeeding based on a single 24-h recall. Obviously, the latter would overestimate the true incidence of exclusive breastfeeding. These discrepancies make it difficult to compare exclusive breastfeeding outcomes among studies. Where possible, it is recommended that researchers clarify the timeframe of the exclusive breastfeeding assessment or to assess it in multiple timeframes (i.e., since birth, in the past month, week, or day).

Another research gap is that there were no published randomized trials evaluating interventions targeting Native Americans or Asians. Native Americans have high rates of breastfeeding initiation, but breastfeeding continuation and exclusivity decrease more rapidly than in most other ethnic groups (except blacks) (2). Similarly, Asians have high rates of breastfeeding initiation, but unfortunately have the highest rates of formula supplementation of breast-fed infants at 6 and 12 mo (2). Qualitative research in this area would be useful to better understand the decision-making process resulting in formula supplementation.

To provide justification for the scale-up of effective breastfeeding interventions, it is essential to assess not only breastfeeding outcomes, but also health care use and program costs. Significant decreases in infant morbidity/rehospitalization were reported in 6 of the randomized trials included in this review (25,26,28,30,33,41). It is not known whether these data were collected in other studies. Where possible, future studies should strive to collect data on infant rehospitalization and morbidity to capture the full effect of the tested interventions. Data on intervention costs were presented in relatively few studies (33,39). Although cost-benefit analyses have been conducted that evaluated breastfeeding (45), more work is needed in this area to allow the allocation of limited health care resources to the most effective interventions. Future collaborations with health economists will provide valuable cost-benefit analyses, which can help to determine the most cost-effective means of improving breastfeeding outcomes.

Acknowledgments

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Literature Cited

1. Gartner LM, Morton J, Lawrence RA, Naylor AJ, O'Hare D, Schanler RJ, Eidelman AI. Breastfeeding and the use of human milk. Pediatrics. 2005;115:496–506.
2. Centers for Disease Control and Prevention. Provisional breastfeeding rates by sociodemographic factors, among children born in 2007 (percent +/− half 95% confidence interval). Available from: http://www.cdc.gov/breastfeeding/data/NIS_data/2007/socio-demographic_any.htm.
3. World Health Organization. Infant and young child nutrition: global strategy on infant and young child feeding, vol. A55. Geneva, Switzerland: World Health Organization; 2002.
4. Centers for Disease Control and Prevention. Provisional formula supplementation of breast milk rates by socio-demographic factors, among children born in 2007. Available from: http://www.cdc.gov/breastfeeding/data/NIS_data/2007/socio-demographic_formula.htm.
5. Chapman DJ, Perez-Escamilla R. US national breastfeeding monitoring and surveillance: current status and recommendations. J Hum Lact. 2009;25:139–50.
6. Chapman DJ, Damio G, Young S, Perez-Escamilla R. Effectiveness of breastfeeding peer counseling in a low-income, predominantly Latina population: a randomized controlled trial. Arch Pediatr Adolesc Med. 2004;158:897–902.
7. Kaufman L, Deenadayalan S, Karpati A. Breastfeeding ambivalence among low-income African American and Puerto Rican women in north and central Brooklyn. Matern Child Health J. 2010;14:696–704.
8. Cricco-Lizza R. The milk of human kindness: environmental and human interactions in a WIC clinic that influence infant-feeding decisions of Black women. Qual Health Res. 2005;15:525–38.
9. Nommsen-Rivers LA, Chantry CJ, Cohen RJ, Dewey KG. Comfort with the idea of formula feeding helps explain ethnic disparity in breastfeeding intentions among expectant first-time mothers. Breastfeed Med. 2010;5:25–33.
10. Beal AC, Kuhlthau K, Perrin JM. Breastfeeding advice given to African American and white women by physicians and WIC counselors. Public Health Rep. 2003;118:368–76.
11. Evans K, Labbok M, Abrahams SW: WIC and breastfeeding support services: does the mix of services offered vary with race and ethnicity? Breastfeed Med. Epub 2011 Mar 31
12. Cricco-Lizza R. Black non-Hispanic mothers' perceptions about the promotion of infant-feeding methods by nurses and physicians. J Obstet Gynecol Neonatal Nurs. 2006;35:173–80.
13. Ip S, Chung M, Raman G, Chew P, Magula N, DeVine D, Trikalinos T, Lau J. Breastfeeding and maternal and infant health outcomes in developed countries. Evid Rep Technol Assess (Full Rep). 2007;(153):1–186.
14. Hauck FR, Thompson JM, Tanabe KO, Moon RY, Vennemann MM. Breastfeeding and reduced risk of sudden infant death syndrome: a meta-analysis. Pediatrics. 2011;128:103–10.
15. Quigley MA, Cumberland P, Cowden JM, Rodrigues LC. How protective is breast feeding against diarrhoeal disease in infants in 1990s England? A case-control study. Arch Dis Child. 2006;91:245–50.

AN Advances in Nutrition An International Review Journal

16. Akinbami LJ, Moorman JE, Liu X. Asthma prevalence, health care use, and mortality: United States, 2005–2009. Natl Health Stat Report. 2011; (32):1–14.
17. Beckles GL, Zhu J, Moonesinghe R. Diabetes - United States, 2004 and 2008. MMWR Surveill Summ. 2011;60(Suppl):90–3.
18. Iwane MK, Edwards KM, Szilagyi PG, Walker FJ, Griffin MR, Weinberg GA, Coulen C, Poehling KA, Shone LP, Balter S, et al. Population-based surveillance for hospitalizations associated with respiratory syncytial virus, influenza virus, and parainfluenza viruses among young children. Pediatrics. 2004;113:1758–64.
19. Kitsantas P, Gaffney KF. Racial/ethnic disparities in infant mortality. J Perinat Med. 2010;38:87–94.
20. Moorman JE, Zahran H, Truman BI, Molla MT. Current asthma prevalence - United States, 2006–2008. MMWR Surveill Summ. 2011;60: (Suppl:84–6.
21. Moss BG, Yeaton WH. Young children's weight trajectories and associated risk factors: results from the Early Childhood Longitudinal Study-Birth Cohort. Am J Health Promot. 2011;25:190–8.
22. Singleton RJ, Wirsing EA, Haberling DL, Christensen KY, Paddock CD, Hilinski JA, Stoll BJ, Holman RC. Risk factors for lower respiratory tract infection death among infants in the United States, 1999–2004. Pediatrics. 2009;124:e768–76.
23. Shaw TE, Currie GP, Koudelka CW, Simpson EL. Eczema prevalence in the United States: data from the 2003 National Survey of Children's Health. J Invest Dermatol. 2011;131:67–73.
24. Shealy KR, Li R, Benton-Davis S, Grummer-Strawn LM. The CDC Guide to Breastfeeding Interventions. Atlanta: US Department of Health and Human Services, Centers for Disease Control and Prevention, 2005.
25. Anderson AK, Damio G, Young S, Chapman DJ, Perez-Escamilla R. A randomized trial assessing the efficacy of peer counseling on exclusive breastfeeding in a predominantly Latina low-income community. Arch Pediatr Adolesc Med. 2005;159:836–41.
26. Chapman D, Morel K, Bermudez-Millan A, Young S, Damio G, Kyer N, Perez-Escamilla R. Breastfeeding Education and Support Trial for Obese Women: Effects of a specialized peer counseling intervention on breastfeeding and health outcomes. J Hum Lact. 2011;27:75–76.
27. Merewood A, Chamberlain LB, Cook JT, Philipp BL, Malone K, Bauchner H. The effect of peer counselors on breastfeeding rates in the neonatal intensive care unit: results of a randomized controlled trial. Arch Pediatr Adolesc Med. 2006;160:681–5.
28. Bunik M, Shobe P, O'Connor ME, Beaty B, Langendoerfer S, Crane L, Kempe A. Are 2 weeks of daily breastfeeding support insufficient to overcome the influences of formula? Acad Pediatr. 2010;10:21–8.
29. Grossman LK, Harter C, Sachs L, Kay A. The effect of postpartum lactation counseling on the duration of breast-feeding in low-income women. Am J Dis Child. 1990;144:471–4.
30. Bonuck KA, Freeman K, Trombley M. Randomized controlled trial of a prenatal and postnatal lactation consultant intervention on infant health care use. Arch Pediatr Adolesc Med. 2006;160:953–60.
31. Bonuck KA, Trombley M, Freeman K, McKee D. Randomized, controlled trial of a prenatal and postnatal lactation consultant intervention on duration and intensity of breastfeeding up to 12 months. Pediatrics. 2005;116:1413–26.
32. Petrova A, Ayers C, Stechna S, Gerling JA, Mehta R. Effectiveness of exclusive breastfeeding promotion in low-income mothers: a randomized controlled study. Breastfeed Med. 2009;4:63–9.
33. Pugh LC, Milligan RA, Frick KD, Spatz D, Bronner Y. Breastfeeding duration, costs, and benefits of a support program for low-income breastfeeding women. Birth. 2002;29:95–100.
34. Pugh LC, Serwint JR, Frick KD, Nanda JP, Sharps PW, Spatz DL, Milligan RA. A randomized controlled community-based trial to improve breastfeeding rates among urban low-income mothers. Acad Pediatr. 2010;10:14–20.
35. Wambach KA, Aaronson L, Breedlove G, Domian EW, Rojjanasrirat W, Yeh HW. A randomized controlled trial of breastfeeding support and education for adolescent mothers. West J Nurs Res. 2011;33: 486–505.
36. Serwint JR, Wilson ME, Vogelhut JW, Repke JT, Seidel HM. A randomized controlled trial of prenatal pediatric visits for urban, low-income families. Pediatrics. 1996;98:1069–75.
37. Hopkinson J, Konefal Gallagher M. Assignment to a hospital-based breastfeeding clinic and exclusive breastfeeding among immigrant Hispanic mothers: a randomized, controlled trial. J Hum Lact. 2009;25: 287–96.
38. Kistin N, Benton D, Rao S, Sullivan M. Breast-feeding rates among black urban low-income women: effect of prenatal education. Pediatrics. 1990;86:741–6.
39. Ickovics JR, Kershaw TS, Westdahl C, Magriples U, Massey Z, Reynolds H, Rising SS. Group prenatal care and perinatal outcomes: a randomized controlled trial. Obstet Gynecol. 2007;110:330–9.
40. Wolfberg AJ, Michels KB, Shields W, O'Campo P, Bronner Y, Bienstock J. Dads as breastfeeding advocates: results from a randomized controlled trial of an educational intervention. Am J Obstet Gynecol. 2004;191:708–12.
41. Frank DA, Wirtz SJ, Sorenson JR, Heeren T. Commercial discharge packs and breast-feeding counseling: effects on infant-feeding practices in a randomized trial. Pediatrics. 1987;80:845–54.
42. Caulfield LE, Gross SM, Bentley ME, Bronner Y, Kessler L, Jensen J, Weathers B, Paige DM. WIC-based interventions to promote breastfeeding among African-American Women in Baltimore: effects on breastfeeding initiation and continuation. J Hum Lact. 1998;14: 15–22.
43. Gross SM, Caulfield LE, Bentley ME, Bronner Y, Kessler L, Jensen J, Paige VM. Counseling and motivational videotapes increase duration of breast-feeding in African-American WIC participants who initiate breast-feeding. J Am Diet Assoc. 1998;98:143–8.
44. Chapman DJ, Morel K, Anderson AK, Damio G, Perez-Escamilla R. Breastfeeding peer counseling: from efficacy through scale-up. J Hum Lact. 2010;26:314–26.
45. Bartick M, Reinhold A. The burden of suboptimal breastfeeding in the United States: a pediatric cost analysis. Pediatrics. 2010;125: e1048–56.

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Factors Related to Breastfeeding Discontinuation Between Hospital Discharge and 2 Weeks Postpartum

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ABSTRACT

Although breastfeeding is known to be beneficial to both mother and infant, many women encounter barriers to breastfeeding, even after successful breastfeeding initiation, which may put them at greater risk for early cessation of breastfeeding. The objectives of this study were to conduct a secondary analysis of data from a longitudinal study of postpartum depression to (a) examine factors related to very early discontinuation of breastfeeding (at 2 weeks postpartum) following hospital discharge and (b) identify women's reasons for very early cessation of breastfeeding. The results of this study support findings from previous research. Having a perceived support system, whether it is personal or professional, may have an effect on both the initiation and duration of breastfeeding. Educating expectant and new mothers, especially women who encounter multiple barriers and are at risk for very early cessation of breastfeeding, of the benefits of breastfeeding and supporting them in developing efficient techniques and problem-solving skills can help increase the duration of breastfeeding.

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Keywords: breastfeeding initiation, early breastfeeding discontinuation, lactation, lactation support

Exclusive breastfeeding for the first 6 months of life is the best nutrition for infants (American Academy of Pediatrics [AAP], 2005). Since the 1980s, both the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) have promoted breastfeeding by highlighting benefits and proposing initiatives to increase breastfeeding rates on an international level (Walker, 2007). WHO (2008) recommends exclusively breastfeeding infants for the first 6 months of life and continuing with supplements of safe, appropriate foods for up to 2 years. Nationally, AAP (2005) and the U.S. Department of Health and Human Services (2010) have promoted breastfeeding as the optimal feeding choice.

Despite the growing body of knowledge on breastfeeding benefits and efforts of several national and international groups, only 60% of women in the United States exclusively breastfeed for the first month, and only 51% of women continue to breastfeed at 3 months (Hannula, Kaunonen, & Tarkka, 2008; *Healthy People 2010*, 2000). In a national sample from Canada, 90.3% of women initiated breastfeeding and 51.7% were exclusively breastfeeding at 3 months, but only 14.7% were breastfeeding at 6 months (Chalmers et al., 2009).

Furthermore, breastfeeding disparities extend across racial, socioeconomic, and educational lines, affecting both breastfeeding initiation and duration (Chalmers et al., 2009; Chin, Myers, & Magnus, 2008; Kelly, Watt, & Nazroo, 2006; Kiernan & Pickett, 2006; McCann, Baydar, & Williams, 2007). Although breastfeeding is encouraged, it is often not maintained. The objective of this study was to identify the rate and reasons for very early cessation of breastfeeding (at 2 weeks postpartum) following hospital discharge. Data were collected from a secondary analysis of results from a prospective, population-based study conducted by Kothari (2006) in Kalamazoo County, located in southwest Michigan.

LITERATURE REVIEW

Breastmilk is a well-balanced nutrient that can adapt to the needs of the infant; it contains all needed nutrients for up to 6 months and promotes physical and emotional well-being (Zareai, O'Brien, & Fallon, 2007). As a temperature-controlled nutrient, breastmilk contains antibodies, enzymes, and cytokines that stimulate infants' immune systems. According to Hale (2007) and Venter, Clayton, and Dean (2008), there is evidence of prebiotics in breastmilk to aid in the development of microflora and contribute to a strong immune system. Breastmilk aids in preventing gastrointestinal and respiratory infections, reducing the risk of obesity, reducing the risk of developing otitis media, and improving cardiovascular health. Additionally, breastmilk is associated with fewer allergies, fewer urinary tract infections, and fewer cases of diabetes later in life (AAP, 2005; Camurdan et al., 2007; Hale, 2007; Venter et al., 2008).

Breastfeeding also provides benefits to the mother. Mothers who breastfeed are at a reduced risk for developing postmenopausal breast cancer, have higher bone density after menopause, experience a more timely and efficient return of the uterus to its prepregnancy state, and experience reduced bleeding and increased weight loss in the postpartum period (Hale, 2007; Persad & Mensinger, 2007). Breastfeeding mothers report reduced stress levels, which may be caused by increased prolactin levels (Camurdan et al., 2007; Hale, 2007; Persad & Mensinger, 2007). According to AAP (2005), women who breastfeed have an increased length of time between pregnancies, a decreased risk of ovarian cancer, and a decreased risk of postmenopausal hip fractures.

Variables Influencing the Decision to Breastfeed

Although breastfeeding is beneficial to infant and mother, other factors are involved in the decision to breastfeed. In a study by Persad and Mensinger (2007), breastfeeding intent strongly correlated with breastfeeding initiation, indicating that women who decide to breastfeed during early pregnancy are likely to initiate lactation after birth. Brodribb, Fallon, Hegney, and O'Brien (2007) reported that the women in their study decided whether or not to breastfeed before or in early pregnancy, and their decisions were based on baby- or mother-centered factors. The baby-centered factor most frequently reported was concern for infant health. Mother-centered factors included either a preference to bottle-feed for convenience or a dislike of breastfeeding because of the reasons that included inconvenience, social barriers, or work-related barriers (Brodribb et al., 2007). Sociocultural, environmental, and personal factors are influential in a woman's decision to breastfeed. If a woman perceives breastfeeding is the social norm, she may be more inclined to breastfeed.

Throughout the literature, a recurring factor that influences a woman's decision to breastfeed is the presence of a support system, whether it is personal or professional (Johnston & Esposito, 2007; Persad & Mensinger, 2007; Taveras et al., 2003). In fact, support systems may be a greater influence than socioeconomic status; if a woman views breastfeeding positively, and has support from her partner, she will be more likely to breastfeed (Persad & Mensinger, 2007). Additionally, the presence of professional support strongly correlates with both breastfeeding initiation (Persad & Mensinger, 2007) and increased duration of breastfeeding (Taveras et al., 2003). Professional support may include support from postpartum nurses during early hospitalization, lactation consultants, physicians (Johnston & Esposito, 2007), and clinicians, such as pediatricians and community lactation consultants outside the hospital (Taveras et al., 2003). Healthcare workers during the immediate postpartum period, especially nurses and lactation consultants, play an integral role in assisting the mother to initiate breastfeeding. Education formally presented through individualized, interactional techniques rather than independent and informal means (such as pamphlets or other reading materials) usually yields better results (McInnes & Chambers, 2008; Persad & Mensinger, 2007; Swanson & Power, 2005). Clinicians who are in contact with the mother and infant can affect the duration of breastfeeding by providing positive support, problem solving, and continued patient education. Because of the influence they have, it is important that

A recurring factor that influences a woman's decision to breastfeed is the presence of a support system, whether it is personal or professional.

clinicians have adequate knowledge and skills for educating and supporting women to increase the duration of breastfeeding (Taveras et al., 2003).

Race may also be a factor in initiation and duration of breastfeeding. Chin et al. (2008) found that, among the participants in their study, women of non-White racial backgrounds had lower initiation rates than White women. Additionally, the duration of breastfeeding among non-White women was shorter than among White women. Black women had both lower initiation and duration rates than White women regardless of other demographic and socioeconomic variables. Although several possible explanations may explain this disparity, one reason is thought to be the early introduction of solid foods as a cultural norm (Chin et al., 2008). Conversely, Black women in the United Kingdom who recently immigrated from either the Caribbean or Africa were more likely to breastfeed at 3 months postpartum than White women (Kelly et al., 2006). The same was true of Indian and Bangladeshi mothers at 3 months, with the highest rate of breastfeeding in Black Caribbean women (Kelly et al., 2006).

Women of higher educational status also have higher rates of breastfeeding. In the study by Chin et al. (2008), women who graduated from high school were 70% more likely to breastfeed than those who did not; women who attended college were four times more likely to breastfeed than women who graduated from high school. A relationship between race and education could not be determined. In a national study of Canadian mothers, Chalmers et al. (2009) found women who were educated, older, had incomes above the low-income cutoff level, and had vaginal births were most likely to breastfeed.

Marital status also affects breastfeeding initiation and duration. Compared to unmarried women, married women have higher rates of breastfeeding, especially among Black women. Married Black women are twice as likely to breastfeed as unmarried Black women (Chin et al., 2008; Thulier & Mercer, 2009).

Early Cessation of Breastfeeding

The intention to initiate breastfeeding does not necessarily indicate the mother will exclusively breastfeed for the recommended 6 months. In the study by Chalmers et al. (2009), breastfeeding intention (90.0%) and initiation (90.3%) were high, but their sample supplemented very early (21% in the first week and 25.2% in the second week). Breastfeeding women encounter challenges that may contribute to discontinuation. Several demographic characteristics have been associated with breastfeeding duration (Kiernan & Pickett, 2006; Thulier & Mercer, 2009). An increasing trend for babies to be born to cohabiting and unmarried parents or to single women (Kiernan & Pickett, 2006) suggests many women may not have the support of a spouse or partner. Single women are at greater risk for early breastfeeding cessation. In a study by Kiernan and Pickett (2006), a greater degree of parental bonding with the infant of married parents was found to be associated with increased duration of breastfeeding. The father's opinion is often taken into account by the mother in her decision to breastfeed. Women who are both unmarried and parenting alone may not have a support system that helps sustain breastfeeding (Johnston & Esposito, 2007; Kiernan & Pickett, 2006). Unmarried women are also less likely to quit smoking during pregnancy (Kiernan & Pickett, 2006). Women who smoke have shorter duration of breastfeeding, encounter more difficulties during breastfeeding, and may be more likely to develop depression, which can contribute to breastfeeding difficulties (Kiernan & Pickett, 2006).

Women of lower socioeconomic status are also less likely to breastfeed (Chalmers et al., 2009) and to continue breastfeeding (Thulier & Mercer, 2009). According to McCann et al. (2007), less than 50% of women enrolled in a Women, Infants, and Children (WIC) program initiate breastfeeding, and less than 25% of those women are breastfeeding their infants at 6 months postpartum. Of the women enrolled in McCann et al.'s study, non-Hispanic Black mothers were less likely than Hispanic or White mothers to breastfeed. Some of the mothers understood the health benefits of breastfeeding, and many who initiated breastfeeding viewed breastfeeding as easier than bottle-feeding. Additionally, they successfully used pumping methods when they returned to work or school. Only half of the women enrolled in WIC who initiated breastfeeding continued to do so at 3 months.

Reasons for Breastfeeding Cessation

Although breastfeeding disparities exist, women across all cultures and socioeconomic status often encounter difficulties that lead to early breastfeeding cessation. Early breastfeeding cessation is commonly influenced by inadequate milk supply, latching difficulties, and painful breasts or clogged milk ducts (Avery, Zimmermann, Underwood, & Magnus, 2009; McInnes & Chambers, 2008; Thulier & Mercer, 2009). Fears of inadequate milk supply, painful breasts, and latching difficulties can be addressed through patient education (Hannula et al., 2008; Swanson & Power, 2005). Women who participated in a study by McCann et al. (2007) reported concerns about

insufficient milk supply, painful breasts during feeding, sexuality issues, maternal smoking, contraception, negative self-image, and embarrassment from public breastfeeding as reasons for early cessation.

Returning to work presents a social factor that may influence women's decision to discontinue breastfeeding. In fact, maternal employment is often linked to premature weaning due to barriers found in the work environment. According to Johnston and Esposito (2007), employed women who return to work after giving birth must cope with the "ecosystem" of the work environment, which includes attitudes of coworkers, length of maternity leave, length of working shifts, and hourly wages or salary. In their study, the researchers found that women who were employed had a 9% lower rate of breastfeeding at 6 months postpartum than women who were unemployed. Johnston and Esposito also found that supportive work environments increase breastfeeding duration. Before returning to work, the employed women in their study felt it was necessary to meet with their managers to discuss breastfeeding. Women who were offered longer maternity leave were more likely to maintain breastfeeding upon their return to work and reported having an easier transition that combined both their breastfeeding needs and work obligations. Moreover, women with higher wages and flexible work schedules were more likely to have longer duration of breastfeeding than women with lower wages and inflexible schedules. Johnston and Esposito's findings are supported by the results of a qualitative study that indicate women who are confident in their ability and committed to breastfeeding are most likely to be successful in their breastfeeding endeavors (Avery et al., 2009).

In summary, research findings demonstrate that breastfeeding is the best feeding option for both mother and infant. However, women often encounter barriers to breastfeeding, even after successful breastfeeding initiation, which may put them at greater risk for early cessation of breastfeeding. The purpose of our study was to conduct a secondary analysis of data from a prospective survey (Kothari, 2006) to (a) examine factors related to very early discontinuation of breastfeeding (at 2 weeks postpartum) following hospital discharge and (b) identify women's reasons for very early cessation of breastfeeding.

METHODS

For our descriptive study, we performed a secondary analysis of data from a prospective survey study conducted by Kothari (2006). The data from the original study were collected by telephone interviews with participants at 2 to 4 weeks postpartum, eliciting answers to survey questions; additional data were abstracted from participants' prenatal medical records. The original data were collected from October 2002 to May 2003.

Women who are confident in their ability and committed to breastfeeding are most likely to be successful in their breastfeeding endeavors.

Sample

The study sample for the original study was drawn from Kalamazoo County, which is located in southwest Michigan and includes both urban and rural communities and has a population of approximately 238,603 (Kothari, 2006). The original study sample was a population-based cohort of women who were recruited from two hospitals during their postpartum stay. Neither hospital had received the Baby-Friendly designation, which recognizes hospitals that support optimal breastfeeding care as outlined by the WHO and UNICEF (2009); however, both hospitals had lactation consultants available before and after discharge. Compared to the county's maternal population, the study sample contained a larger proportion of women covered by private insurance and a lower proportion of infants born with a low or very low birth weight. Private insurance covered 62.8% of the participants, and 37.2% were covered by Medicaid. Among the study sample, 87% of the women began prenatal care in the first trimester. Only 9% of the women gave birth to either low- or very-low-birth-weight infants. The average maternal age of the women in the study was 27.5 years, and 78.6 % of the women were White, 18.1% were Black, 1.8% were Hispanic, and 1.2% were Asian.

In total, 332 women were included in the original study and represented the population of Kalamazoo County in southwest Michigan (Kothari, 2006). The initial enrollment took place in the postpartum unit of each hospital before discharge. Study subjects were recruited Monday through Friday during the weeks of study enrollment; all women meeting eligibility criteria (residency in the county) were approached. Of the 483 women approached, 332 consented to participate in the study. Women refusing study participation cited lack of time to participate as the primary reason. Of the 332 women, 15 women were dropped from the study because eight women quit and seven women were unreachable. The intent to conduct phone interviews at 2 weeks postpartum proved difficult. Most women were contacted between 2 and 3 weeks postpartum; a few could not be reached until

5 weeks postpartum. Because the study reported here focused on breastfeeding, the subsample analyzed for this study were women who were breastfeeding upon hospital discharge ($n = 239$). At the 2-week postpartum interview, 209 women continued to breastfeed, whereas 30 women had discontinued breastfeeding.

Procedure

The institutional review boards at both hospitals approved the original study, and approval from our university's institutional review board was obtained for the secondary analysis. Subjects had been recruited in the immediate postpartum period and were interviewed by phone at 2 weeks postpartum. In addition to being screened for depression, subjects were questioned regarding the following issues: prenatal, postpartum, and pediatric care; breastfeeding or bottle-feeding preference; maternal smoking habits during both the prenatal and postpartum periods; infant sleeping behaviors; family planning in the postpartum period; history of depression (both personal and familial); perceived support from society, partner, family, and health-care providers; and experience with childhood or adulthood abuse. Additionally, medical and prenatal records were reviewed to obtain the following information: obstetrical data; dates of birth for mother and infant; maternal race; marital status; insurance information; number of previous pregnancies and births; initiation of prenatal care; infant's birth weight; infant's gender; and maternal psychosocial risk factors such as history of mental illness and substance abuse, teen pregnancy, and history of physical or sexual abuse.

Data Analysis

Statistical comparisons were made between groups on categorical variables and calculated using Pearson's chi-square test; comparisons for interval level variables were computed using student *t*-tests and analysis of variance (ANOVA). An alpha level of .05 was determined a priori. Multivariate analyses were conducted using binary logistic regression. All variables with $p < .05$ in the bivariate analysis were included in the model. Variables were entered into the model stepwise, with entry criterion of .05 and removal criterion of .10. Statistical analyses were conducted using SPSS 16.0.1 computer software.

RESULTS

Among the total original study sample of 317 women, 239 (75.3%) initiated breastfeeding prior to hospital discharge. At 2 weeks postpartum, 30 (12.5%) of the 239 women who initiated breastfeeding in the hospital had stopped breastfeeding. The first research question asked what factors were associated with very early breastfeeding cessation. To address this question, women who had initiated breastfeeding but had stopped by 2 weeks postpartum were compared with women who continued to breastfeed.

Data analysis revealed several significant factors associated with very early breastfeeding discontinuation (see Table 1). When demographic variables were considered, race or ethnicity ($\chi^2 = 4.331$, $p = .037$) emerged as a factor in breastfeeding cessation: Some women from racial or ethnic minorities (Black and Hispanic) stopped breastfeeding in greater proportions than White women. Women who had Medicaid insurance had significantly higher rates of breastfeeding cessation than women with private insurance ($\chi^2 = 16.074$, $p = .000$). In addition, women who were younger than 30 years old had a greater rate of breastfeeding cessation than women in older age groups ($\chi^2 = 6.725$, $p = .010$). Marital status was also a significant factor in breastfeeding cessation. Women who were single stopped breastfeeding at a greater rate than women who were married ($\chi^2 = 15.630$, $p = .000$). Women who did not identify having a partner stopped breastfeeding at a greater rate than women who had partners ($\chi^2 = 12.107$, $p = .001$). Women who started prenatal care in the first trimester were more likely to continue breastfeeding, whereas women who initiated prenatal care in later trimesters had a greater rate of breastfeeding cessation at 2 weeks postpartum ($\chi^2 = 10.271$, $p = 0.001$). For the following

TABLE 1
Factors Associated With Very Early Breastfeeding Discontinuation

Variable	Discontinued Breastfeeding ($n = 30$)	Continued Breastfeeding ($n = 209$)	p
First child	63.3%	49.8%	*ns*
Ethnic minority	30.0%	14.8%	.037
Medicaid	50.0%	17.7%	< .001
Maternal age < 30 years old	80.0%	55.0%	0.010
Single	56.7%	22.5%	< .001
Does not have a partner, postpartum	35.0%	9.0%	.001
Prenatal care after first trimester	30.0%	9.6%	.001
No family planning	39.3%	16.4%	*ns*
Depression in family	57.1%	36.5%	*ns*
Childhood trauma	13.0%	10.9%	*ns*
Domestic violence	6.7%	14.4%	*ns*

variables, no significant differences emerged between women who stopped breastfeeding and women who continued to breastfeed at 2 weeks postpartum: history of domestic violence ($\chi^2 = 1.337$, $p = 0.248$); number of pregnancies ($\chi^2 = 0.471$, $p = 0.493$); gender of the baby ($\chi^2 = 0.815$, $p = 0.367$); history of previous obstetrical loss ($\chi^2 = 0.001$, $p = 0.974$); history of depression ($\chi^2 = 0.089$, $p = 0.765$) or premenstrual syndrome ($\chi^2 = 0.485$, $p = 0.486$); and perceived helpfulness of the family ($\chi^2 = 0.620$, $p = 0.431$) or partner ($\chi^2 = 0.143$, $p = 0.706$).

Because several factors were associated with early breastfeeding cessation (belonging to a racial or ethnic minority, having Medicaid insurance, being younger than 30 years old, being single and without a partner, and seeking prenatal care after the first trimester), logistic regression analysis was run, with breastfeeding continuation or cessation at 2 weeks postpartum as the outcome variable (see Table 2). When all relevant factors were taken into account, not having private insurance (being on Medicaid) and not having a partner increased the odds of discontinuing breastfeeding by a factor greater than 3 (AOR = 3.19, CI = 1.17–9.09, $p = 0.030$ for Medicaid; AOR = 3.48, CI = 1.12–10.81, $p = 0.031$ for no partner).

The second research question asked what reasons women reported for very early cessation of breastfeeding. The most frequent reasons given for breastfeeding cessation in this sample were the breastmilk either did not come in or dried up ($n = 7$, 23%), the mother perceived her baby preferred the bottle ($n = 7$, 23%), and sore breasts or nipples ($n = 5$, 17%; see Table 3).

TABLE 3
Reasons Reported for Early Breastfeeding Discontinuation

Reason	*n*	%
Milk did not come in / Milk dried up	7	23%
Perceived that baby prefers the bottle	7	23%
Sore breasts or nipples / Too painful	5	17%
Mother did not prefer nursing/pumping	3	10%
Baby has condition / Baby is a poor nurser	2	7%
Mother returned to work	2	7%
Hospital/neonatal intensive care unit used bottle	1	3%
Infection	1	3%
Convenience	1	3%
Mother overwhelmed	1	3%
Mother on medication	1	3%
Total	31	100%

DISCUSSION

Because many factors influence whether or not a woman decides to breastfeed, the duration of breastfeeding widely varies from the recommended 6 months of exclusive breastfeeding, as advised by the WHO (2008) and AAP (2005). Many barriers to breastfeeding may be biological, social, demographic, or psychological in origin (Thulier & Mercer, 2009). Some women encounter multiple barriers that place them at even greater risk for very early breastfeeding cessation. The purpose of our study was to determine factors associated with very early cessation of breastfeeding (at 2 weeks postpartum). Identifying these factors allows health-care providers and prenatal educators to better anticipate breastfeeding barriers and help mothers prepare for successful breastfeeding.

Factors Associated With Breastfeeding Duration

As found in our study and in previous studies, racial or ethnic status is one of numerous significant factors associated with breastfeeding duration rates. In our study's sample, Black and Hispanic women had lower rates of breastfeeding continuation at 2 weeks postpartum than White women. Similarly, in a study sample of women in Louisiana, Chin et al. (2008) found that Black women had lower rates of breastfeeding at 3 months postpartum than White women, even when varied levels of socioeconomic status were considered. Kelly et al. (2006)

TABLE 2
Factors Associated With Very Early Breastfeeding Discontinuation, Adjusted Odds Ratios

Variable	Discontinued Breastfeeding ($n = 30$)	Continued Breastfeeding ($n = 209$)	Odds Ratio, Exp (B)	95% Confidence Interval	*p*
Ethnic minority	30.0%	14.8%	*		
Medicaid	50.0%	17.7%	3.19	(1.17–9.09)	.030
Maternal age < 30 years old	80.0%	55.0%	*		
Single	56.7%	22.5%	*		
Does not have a partner, postpartum	35.0%	9.0%	3.48	(1.12–10.81)	.031
Prenatal care after first trimester	30.0%	9.6%	*		

Note. *Removed from model, stepwise method.

also examined the association between race or ethnicity and breastfeeding rates; however, in their study, they found that Black women who had recently immigrated to the United Kingdom had higher rates of breastfeeding than White women. Chin et al. also reported that Black women who recently immigrated to the United States were more than four times more likely to breastfeed than White women. The findings from these studies and our study suggest the need to address the effect of not only racial or ethnic status but also cultural assimilation on breastfeeding duration.

In our study sample, insurance status was another significant factor associated with breastfeeding duration. Women who had Medicaid insurance were more likely to discontinue breastfeeding soon after hospital discharge than women with private insurance. Our study's finding is consistent with results from previous research. In one study, women who had Medicaid insurance and were enrolled in WIC programs were less likely to breastfeed (Chin et al., 2008). In another study, more than 50% of women enrolled in WIC initiated breastfeeding, yet only 25% of those women continued breastfeeding at 6 months (McCann et al., 2007). Hospitals where the Baby-Friendly Hospital Initiative was implemented had increased breastfeeding rates regardless of the socioeconomic status of women. Women above the poverty line as well as lower income women on Medicaid both experienced increased rates of breastfeeding, especially if interventions were implemented early in the postpartum period (Murray, Ricketts, & Dellaport, 2007). In Canada, women who reported incomes above the low-income cutoff had higher breastfeeding rates than women below the cutoff (Chalmers et al., 2009). In our study, women who had Medicaid insurance were more than three times more likely to stop breastfeeding by 2 weeks postpartum than women who had other insurance when all factors were considered.

Findings from our study also suggest maternal age is associated with breastfeeding duration. With increased age, there is often an increase in the level of education; both factors are associated with higher breastfeeding rates (Chalmers et al., 2009; Chin et al., 2008). In a qualitative study, women with more confidence in the process of breastfeeding and commitment to breastfeeding were more likely to continue breastfeeding in spite of difficulties (Avery et al., 2009). Older and more educated women are more likely to be confident because they have more life experience and have the opportunity to gain more knowledge. In our study, although the results indicated maternal age is associated with breastfeeding duration, when other factors were considered, age was not significantly associated with early breastfeeding cessation among the study's participants.

Consistent with the literature, our study's results suggest single women without a partner are less likely to continue breastfeeding than married women and women with a partner. When all factors were considered, women who did not have a partner were more than three times more likely to cease breastfeeding at 2 weeks postpartum than women who had partners. As indicated in previous research, the presence of a support system, whether personal or professional, is one of the strongest influencing factors for women choosing to initiate and to continue breastfeeding (Hannula et al., 2008; Johnston & Esposito, 2007; Kiernan & Pickett, 2006; McInnes & Chambers, 2008; Swanson & Power, 2005). Research findings also suggest that an important influencing variable in the decision to breastfeed includes a woman's personal feelings, which are strongly influenced by the beliefs and attitudes of the support system surrounding her (Hannula et al., 2008; Johnston & Esposito, 2007; Kiernan & Pickett, 2006). Thus, in her decision to initiate and continue breastfeeding, a woman often considers her partner's opinion as well as the perceived breastfeeding culture of her personal support system.

In our study, when all factors were considered, entry into prenatal care in general was not significant regarding breastfeeding duration. However, study results revealed that prenatal care delayed until after the first trimester, in particular, was associated with early cessation of breastfeeding among the study's sample. Evidence in the literature suggests prenatal care positively influences breastfeeding continuation. Semenic, Loiselle, and Gottlieb (2008) found that women who receive prenatal care and attend prenatal educational classes are more likely to have breastfeeding duration levels closer to the recommendation by the WHO and AAP than women who do not receive prenatal care. However, it is important to note that the women in Seminic et al.'s study were considered members of a socioeconomic class that likely afforded them advantages that helped promote their breastfeeding decisions. They may have had a support system consisting of partners and families who positively viewed breastfeeding; they were educated; and they were employed, with adequate maternity leave benefits. Women with higher socioeconomic advantages may not face the same barriers to breastfeeding duration as women with a lower socioeconomic status. In their study, Rosen, Krueger, Carney, and Graham (2008) found that prenatal care that includes breastfeeding education increases

breastfeeding duration and is associated with women breastfeeding exclusively for a longer period. Their finding suggests that early prenatal care that includes breastfeeding education and support for breastfeeding may promote breastfeeding continuation.

Few studies have demonstrated the relationship of domestic violence and breastfeeding initiation or duration. This study found no statistically significant differences in breastfeeding cessation among women who had experienced domestic violence compared to those who had not. According to a study by Lau and Chan (2007), women who are victims of domestic violence have a decreased likelihood to initiate breastfeeding. Their finding was thought to be related to control issues by the partner. If a woman is abused, she may be less likely to attend prenatal appointments and, therefore, may receive little, if any, breastfeeding education during pregnancy. Another possible explanation for women in abusive relationships not breastfeeding is the partner's jealousy of the infant (Lau & Chan, 2007). Jealousy may be exacerbated if the partner views breasts as sexual objects. Our study did not distinguish whether domestic abuse was committed by the current partner or by a previous partner; it may be that only abuse from a current partner affects a woman's choice on whether or not to initiate and continue breastfeeding.

Women's Reasons for Early Breastfeeding Cessation

Our study found no single reason that women give for very early breastfeeding cessation. Rather, women may report various reasons for early cessation. Other studies have found similar results. According to Gatti (2008), perceived insufficient milk supply is a global issue that women report for early discontinuation and is one of the leading reasons for cessation in the first 4 weeks postpartum. Kirkland and Fein (2003) found the following four leading reasons women often report for breastfeeding discontinuation: breast discomfort (including nipple pain); perceived insufficient milk supply; a negative family or health-care support system; or conflicts with other activities, such as employment. It is recommended that interventions for these women be supportive and educational in nature. If a woman has individualized breastfeeding education, she may be able to avoid perceived insufficient milk supply or painful breasts (Gatti, 2008; Persad & Mensinger, 2007). Additionally, support from health-care providers and prenatal educators for troubleshooting breastfeeding techniques can also help women overcome these barriers (Persad & Mensinger, 2007). Social support from family and coworkers is also beneficial (Johnston & Esposito, 2007; Kirkland & Fein, 2003).

STUDY LIMITATIONS

Our study had several limitations that should be considered. The primary limitation was that the study was a secondary analysis of a dataset whose main purpose was not breastfeeding. Because of the design of the original survey, not all factors pertaining to very early breastfeeding cessation could be considered. Our group of interest (women who initiated breastfeeding but discontinued within 2 weeks postpartum) was small, limiting statistical power. Last, the data were collected by self-report in phone interviews, so accuracy could not be verified.

IMPLICATIONS FOR PRACTICE

Many factors may be related to very early breastfeeding cessation. Women encounter barriers to breastfeeding across all socioeconomic, racial, marital, and demographic lines. However, the findings in our study indicate that the key contributors to early breastfeeding cessation are poverty (as indicated by Medicaid insurance coverage) and being alone (as indicated by not having a partner during the postpartum period).

We recommend perinatal educators and other members of the health-care team identify at-risk women and intervene with appropriate, individualized interventions to promote breastfeeding. Perinatal educators may be in a unique position to assist women between hospital discharge and 2 weeks postpartum. During this time, women may not be in contact with nurses or physicians, but may look to perinatal educators for support because of the information and skills educators provided during perinatal education classes. Intervening early with a woman who is having difficulty breastfeeding may prevent breastfeeding discontinuation. Common reasons for breastfeeding discontinuation can be anticipated and interventions can be quickly initiated. Professional support from prenatal educators, nurses, and other practitioners can educate women about the benefits of breastfeeding and provide the support they need to become confident and committed to breastfeeding continuation (Avery et al., 2009).

Additionally, interventions can be aimed at populations who may be less likely to initiate breastfeeding and more likely to cease breastfeeding early (e.g., women who have Medicaid insurance or do not have a partner). Women who have low levels of education and are young, single, and part of a minority group need additional attention and support to initiate and maintain breastfeeding to benefit both mother and child (Thulier & Mercer, 2009).

REFERENCES

American Academy of Pediatrics. (2005). Policy statement: Organizational principles to guide and define