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**Barriers and Facilitators to Infant Feeding among
Low-Income African American Women**

A dissertation submitted in partial fulfillment of the requirements for the Doctor of Philosophy at
Virginia Commonwealth University

by

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December, 2014

Acknowledgement

Dedicated to the memory of my father and mother

Seven words. "I think you should do a PhD". I can still see my father giving me that advice one afternoon from my living room couch. After he passed away, I thought, "Now is the time". There was a precedent in my family: both my uncle Jayme and my cousin Silvia Regina had obtained law degrees late in life.

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Abstract

BARRIERS AND FACILITATORS TO INFANT FEEDING AMONG LOW-INCOME AFRICAN AMERICAN WOMEN

By Cecilia Eykyn Barbosa, Ph.D., M.P.H., M.C.P.

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University

Virginia Commonwealth University, 2014

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Objective The purpose of the mixed methods study was to compare barriers and facilitators encountered by low-income African American women who engaged in different infant feeding practices. Methods Using the positive deviance approach and modified Integrated Model as theoretical frameworks, the research began with a qualitative study that informed a survey examining intention, skills, and environmental factors differentiating women's infant feeding practices. Results Twenty-eight and 190 low-income African American adult women participated in focus groups or interviews and a survey, respectively. In the qualitative study, positive deviants, who breastfed for at least four months, seemed to have stronger breastfeeding intentions, self-efficacy and breastfeeding support than other women. In the final multinomial

multiple logistic regression, for a one unit increase in the PBC scale of the revised Breastfeeding Attrition Prediction Tool, there was a 50% (OR 1.5[1.3-1.7]) and an 18% (OR 1.18 [1.03-1.3]) increase in the odds of breastfeeding at least three months (positive deviance) compared to only formula-feeding and breastfeeding for less than three months, respectively. Women who did not smoke postpartum were 4.3 [1.5-12.3] and 5.6 [2.1-15.1] times as likely to be positive deviants; women who had C-sections were 3.6 [1.3-9.6] and 2.9 [1.0-7.8] times as likely to be positive deviants compared to only formula-feeding and breastfeeding for less than three months, respectively. Women who ranked WIC full breastfeeding packages as most valuable were 14.9 [4.8-45.5] and 16.1 [5.3-50.0] times as likely to be positive deviants compared to only formula-feeding and breastfeeding for less than three months, respectively. Discussion High breastfeeding self-efficacy was associated with positive deviance, although the qualitative study findings suggested that general self-efficacy may also influence breastfeeding success. The likelihood of not smoking being associated with longer duration of breastfeeding is consistent with previous research. The C-section results may reflect a longer length of hospital stay leading to increased mastery of breastfeeding prior to discharge. Analysis of participants' valuation of WIC infant feeding incentives led to the suggestion that WIC incentives be re-examined. Further exploration of these findings and subsequent interventions may lead to improved breastfeeding rates among low-income African American women.

LITERATURE REVIEW

This research project advances scholarly knowledge on infant feeding among low-income African American women. The impetus for this study was the establishment, by the Mayor of the City of Richmond, of the Mayor's Breastfeeding Commission, charged with "increasing the number of women in the City of Richmond who breastfeed their children" (Dwight C. Jones, personal communication, July 8, 2011). As the Commission began its work, its leaders recognized the need for a more thorough understanding of reasons for the low breastfeeding rates among low-income women, and in particular African American women. They also wished to hear directly from those women who have recently made infant feeding decisions. This wish coincided with a need expressed by the Surgeon General's Call to Action that "new research is needed to identify barriers to and supports for breastfeeding among populations with low rates of breastfeeding" (United States Department of Health and Human Services [USDHHS], 2011, p.32). As Asiodu (2011) has remarked: "It is important for us to understand and describe qualitatively the perceptions and experiences of African American women about breastfeeding as their rates are low and their voices are absent in much of the lactation literature" (p. 545).

Due to the persistently low rates of breastfeeding among low-income African American women during the past decades, this study aims to identify and understand the factors that impede or facilitate infant feeding practices of low-income African American women, and specifically what factors differentiate those women who breastfeed the longest. The research also contributes to the theoretical understanding of the roles of intention, skills, and environmental

factors in the different infant feeding patterns of low-income African American women. By examining environmental factors as comprising breastfeeding and formula-feeding incentives and disincentives at multiple levels of influence, this research takes a uniquely comprehensive approach to understanding the infant feeding practices of low-income African American women. The research begins with a qualitative study exploring the specific barriers and facilitators experienced by low-income African American women who engage in different infant feeding practices and is followed by a quantitative study examining the intention, skills, and environmental factors that differentiate women's infant feeding practices.

Public Health Significance

In the United States, over three-fourths (79.2%) of mothers breastfed their babies in 2011 (CDC, 2012a). By six months, nearly one-half (49.4%) were still breastfeeding and by twelve months, one-fourth (26.7%) breastfed their infants (CDC, 2012a). So while most mothers initiate breastfeeding, fewer reach the targets recommended by the World Health Organization (WHO), American Academy of Pediatrics (AAP) and the major relevant US health care provider associations to breastfeed for at least one year¹ and to breastfeed exclusively for the first six months (WHO, 2003; AAP, 2012; American Academy of Family Physicians, 2008).
Supplementation begins early: In 2011, by 2 days, nearly one-fifth (19.5%) of women who had initiated breastfeeding had already supplemented their milk with formula (CDC, 2012a).
Exclusive breastfeeding rates are therefore very low: in 2011, 57.3% of infants exclusively breastfed at 7 days, 40.7% of infants were breastfed exclusively through three months, and through six months a mere 18.8% of infants were breastfed exclusively (CDC, 2012a).

¹ The WHO recommends breastfeeding for at least two years (WHO, 2003).

These rates mask the wide disparities that persist (CDC, 2010b) despite rising breastfeeding rates since the 1970s (Wolf, 2003). Women who are poor, less educated, unmarried, under 20 years of age, black and recipients of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)² had the lowest rates of breastfeeding by six months (CDC, 2012a). In 2007, only 58.1% of black, non-Hispanic mothers initiated breastfeeding compared to 83.0% of Asian or Pacific Islanders, 80.6% of Hispanics and 76.2% of White, non-Hispanics. Disparities in duration of breastfeeding are equally disturbing: only 27.5% of black non-Hispanic mothers breastfed at six months compared to 58.6% of Asian, 46.0% of Hispanic and 44.7% of White non-Hispanic mothers (CDC, 2012a). Similarly, about 35% of mothers who were under 185% of the poverty level breastfed their infants at six months compared to 54% of infants in families living at 350% or greater of the poverty level (CDC, 2012a). Some of the disparities disappear within low-income populations while others remain. In a study of Maryland WIC participants, African American and White mothers had similar breastfeeding initiation rates (65% and 61% respectively) in contrast with Hispanic mothers (91%); similarly, Hispanic mothers breastfed for an average of 5 months compared to 3 months for White and 3.5 months for African American mothers. These patterns held even after adjusting for maternal age, education, parity, and employment status (Hurley, Black, Papas, & Quigg, 2008). In a national study, racial and ethnic disparities remained even after controlling for individual socioeconomic variables and a composite measure of the quality of maternity care, suggesting that other unmeasured factors are involved (Belanoff, McManus, Carle, McCormick, & Subramanian, 2012). A study based on a large postpartum survey in California in 1994 - 1995

² The WIC program was established in 1974 to provide nutritional supplements to low-income and nutritionally at-risk pregnant and postpartum women and infants and children up to age five.

found that only Latinas had a significantly different level of intention to breastfeed; no other racial or ethnic differences in breastfeeding intention were detected (Braveman, Cubbin, Marchi, Egerter, & Chavez, 2001). Instead, this study found a significant association between maternal education and breastfeeding intention.

In Richmond City, the site of this research, the only data on breastfeeding rates are from the WIC program. About two-thirds of births in Richmond City are to WIC participants (Virginia Department of Health (VDH), 2012a; VDH, 2012b) compared to one half of all infants nationally (Jensen & Labbok, 2011). However, about 85% of black births in Richmond City are to WIC participants (VDH, 2012a; VDH, 2012b). In 2010, 85.6% of infants receiving WIC services were receiving only formula, compared to 73.3% nationally. Similarly, only 4.3% were classified as “fully breastfed” compared to 10.3% nationally (United States Department of Agriculture/Food and Nutrition Services, 2010).

Global and National Infant Feeding Policies and Recommendations

Global and national breastfeeding policies in the past thirty years provide a backdrop against which to understand breastfeeding trends and patterns. Since 1981, member states of the World Health Organization (WHO) and UNICEF have developed and promoted the International Code of Marketing of Breast-Milk Substitutes (1981) which established limits for the promotion of breast-milk substitutes, including the free distribution of formula to families. In 1990, the landmark Innocenti Declaration (1990), signed by 30 countries, set goals to establish breastfeeding friendly practices in health facilities, workplaces, and marketing. In addition, it recommended that governments create national breastfeeding committees – the establishment of the US Breastfeeding Committee came in response to this call. The *10 Steps to Successful Breastfeeding Joint Statement* by WHO and UNICEF was promulgated in 1989 and then

repackaged as the Baby-Friendly Hospital Initiative (BFHI) of 1992. This initiative consisted of the establishment of ten criteria (known as the 10 Steps), that are evidence-based practices to increase breastfeeding initiation and duration, for hospitals and birthing centers to adopt. An independent accreditation body designates hospitals and birthing centers that have successfully implemented all 10 steps as Baby-Friendly (BFHI, 2014). The 2003 Global Strategy for Infant and Young Child Feeding reaffirmed the Innocenti Declaration and also called for governments to develop a comprehensive policy on breastfeeding; promote exclusive breastfeeding for six months and continuing breastfeeding for at least two years; enact effective policies to curb marketing of formula; and develop policies for breastfeeding in exceptional conditions (see Table 1 for a chronology of major global breastfeeding policies).

In the United States, breastfeeding milestones include the USDHHS' *Blueprint for Action on Breastfeeding* in 2000, the establishment of the US Breastfeeding Committee in 2003, and the Surgeon General's Call to Action to Support Breastfeeding in 2011. Legislative changes through the Affordable Care Act require health insurers to cover "breastfeeding support, counseling and equipment for the duration of breastfeeding" (U.S. Centers for Medicare and Medicaid Services, 2013) and employers to provide lactation rooms and break times for hourly paid workers during the child's first year (U.S. Breastfeeding Committee, 2013b). Forty-five states have also enacted legislation that allows women to breastfeed in any public or private location (National Conference on State Legislatures, 2013). Finally, the Joint Commission on Health Care, which accredits hospitals, established a performance measure on exclusive breastfeeding (Perinatal Care Core Measure on Exclusive Breast Milk Feeding); this measure became mandatory in all hospitals with at least 1,100 births annually effective January 1, 2014 (U. S. Breastfeeding Committee, 2013a).

In 2010, the Healthy People 2020 breastfeeding objectives and targets were established for the nation and appear in Table 2 (U.S. Breastfeeding Committee, 2010). The Maternal, Infant and Child Health (MICH)-21 objectives reiterate the Healthy People 2010 objectives, but with more ambitious targets: 25.5% of infants exclusively breastfed at six months and 34.1% breastfeeding at one year (U.S. Breastfeeding Committee, 2010). MICH-22 through MICH-24 are new and reflect:

- The importance of the birth facility and the success of the Baby Friendly Hospital Initiative in helping the mother initiate breastfeeding (MICH-23);
- The detrimental effect on successful breastfeeding if formula is offered within the first two days of life (MICH-24); and
- The important role of employers in creating conditions for women to continue breastfeeding successfully (U.S. Breastfeeding Committee, 2010).

The latest AAP Statement on Breastfeeding (2012) reaffirms its original 2005 recommendation to exclusively breastfeed for six months, but also clearly defines breastfeeding as a public health issue and not merely a lifestyle choice. The implication of this statement is that there are compelling individual and societal benefits to breastfeeding and risks to formula-feeding; infant feeding is not simply a matter of choosing between two sources of nutrition but rather about making a decision about the infant and mother's health (Eidelman, 2012).

Benefits and Risks of Infant Feeding Practices

The benefit of breastfeeding or breast milk over any other type of infant feeding is well established in the literature (USDHHS, 2011; AAP, 2012). Human milk has evolved to meet the needs of the human infant; its striking difference to cow's milk reflects the evolutionary difference between the two species (Goldman, 2012). Its composition changes as the infant

matures to meet the infant's evolving immunological, biological, and developmental needs. Also, because the infant's immunological system develops slowly, the mother's milk supplies the young infant with needed immunological substances, allowing the baby to focus its energy on developing other vital body parts (Goldman, 2012).

About \$13 billion could be saved annually in pediatric costs in the US if 90% of infants breastfed exclusively for six months (Bartick & Reinhold, 2010) and \$18.3 billion (with a lower CI bound of \$5.1 billion) in potentially preventable maternal health costs, primarily due to the high value of life prior to age 70 years (Bartick, Stuebe, Schwarz, Luongo, Reinhold, & Foster, 2013). These calculations were based on an extensive systematic review in 2007 by the Agency for Healthcare Research and Quality (AHRQ) of studies conducted in developed countries.

According to the review, a history of breastfeeding is associated with lower risk in the child for ear and respiratory infections, atopic dermatitis, gastroenteritis, types 1 and 2 diabetes, asthma, childhood obesity, childhood leukemia, necrotizing enterocolitis, and sudden infant death syndrome (Ip, Chung, Raman, Trikalinos, & Lau, 2009). Benefits to the mother include a lower risk for type 2 diabetes, and breast and ovarian cancer. Several studies also report an association between maternal postpartum depression and no or early termination of breastfeeding, although it is not possible to tell which behavior or condition precedes the other or whether they are concurrent (Ip et al., 2009).

The AAP's latest policy statement on breastfeeding (2012) updated the work of the AHRQ (Ip et al., 2009) and summarized the relationship between breastfeeding and health outcomes for the child. For example, there is a dose response relationship between breastfeeding and otitis media: AAP (2012) reported a 23% lower risk of otitis media among children receiving any amount of breast milk as compared to formula and a 77% lower risk for recurrent otitis

media for infants who breastfed exclusively for at least six months compared to those who breastfed between four and six months. A systematic review on the optimal duration of breastfeeding found lower childhood morbidity from gastrointestinal infections and longer maternal amenorrhea and faster postpartum weight loss after exclusive breastfeeding for six months compared to exclusive breastfeeding for three to four months followed by mixed feeding (breast milk and formula) (Kramer & Kakuma, 2012).

In most infant feeding studies, formula-feeding is presented as the norm and breastfeeding as a benefit (McNiel, Labbok, & Abrahams, 2010). Reversing this relationship views exclusive breastfeeding for six months as the norm and formula-feeding as a risk. McNiel et al. recalculated the odds ratios presented in the AHRQ systematic review (Ip et al., 2009) reflecting formula as a risk. For example, they report that infants are twice as likely to have increased occurrence of otitis media when any formula is introduced during the first three to six months (95% CI [1.40, 2.78]) as compared to exclusive breastfeeding for at least three months (McNiel et al., 2010). The other risk of formula is related to the many ways it can be prepared. A systematic review of mothers' experiences with formula-feeding reported common problems of improper preparation of formula, for example over-concentrating or diluting infant formula, introducing solids in the bottle, and substituting with cow's milk or another non-formula milk (Lakshman, Ogilvie, & Ong, 2009). These problems can result in obesity, failure to thrive, or hypernatraemic dehydration (Renfrew, Ansell, & Macleod, 2003). This issue has not been studied extensively but the health implications are potentially significant, in particular given the greater use of formula by lower income families (Renfrew et al., 2003).

There is evidence of cognitive effects of breastfeeding as compared to feeding infants formula: Higher intelligence scores and teacher ratings were observed among breastfed infants,

with higher effects among those breastfed exclusively for at least three months (AAP, 2012). The most persuasive study to date is a cluster-randomized trial conducted in Belarus that randomized hospitals to the Baby-Friendly Hospital Initiative (that resulted in substantial increases in exclusive breastfeeding) or a control group. Follow-up testing at 6.5 years showed significant increases in verbal IQ scores (+7.5, 95% CI [+0.8 to +14.3]) among children in the experimental as compared to the control groups. The researchers report that the mechanism of this effect remains unknown: they cannot tell whether this increase is due to breast milk or to the increased physical and social interaction from breastfeeding (Kramer et al., 2008).

Research does not support the popular belief of an improved maternal-infant relationship (comprising both maternal bonding as well as infant attachment) from breastfeeding, in spite of a theoretical basis for such a benefit when compared with bottle-feeding (Jansen, de Weerth, & Riksen-Walraven, 2008). However, it is possible that limitations of research methods as well as modern breastfeeding practices, such as insufficient duration and frequency of breastfeeding, do not allow for such attachment or bonding to be observed (Jansen et al., 2008). In spite of this lack of evidence, maternal-infant bonding is the most important benefit of breastfeeding cited by low-income and teenage mothers, as reported in a review of qualitative studies (MacGregor & Hughes, 2010).

Much is written about the benefits of breastfeeding; a less explored area is the cost of breastfeeding. Noonan and Rippeyoung (2011) report on the incompatibility of breastfeeding with work in the United States and that “women who breastfed for longer than 6 months experienced more earnings loss than women who breastfed for less than 6 months or not at all” (p. 325). If a woman must or chooses to return to work, she may find it difficult to maintain breastfeeding if the environment is unsupportive of breastfeeding. Thus, she may have to stay at

home and lose income but breastfeed longer or return to work and wean earlier. Other women, typically those at higher income or professional levels, may choose to take leave, reduce work hours, or quit work so that they can continue breastfeeding.

Lastly, there are methodological problems that challenge infant feeding research. First, it is unethical to randomize research subjects to breastfeeding or non-breastfeeding groups, shorter or longer duration breastfeeding, or exclusive or non-exclusive groups (Ip et al., 2009). Also, adjusting for confounders has been inconsistent (Ip et al., 2009). Another problem rendering comparisons difficult are differing definitions of breastfeeding – for example, many studies do not differentiate between feeding human milk at the breast (breastfeeding) and with a bottle (feeding of breast milk) (AAP, 2012); thus it is unknown whether mode of delivery influences the benefits of breast milk. One study that has made this distinction found that infants fed from bottles, regardless of milk source, have less self-regulation of ingestion than infants fed from the breast (Li, Fein, & Grummer-Strawn, 2010). In spite of these limitations, there has been much important research examining the factors contributing to infant feeding intention and practices.

Factors Contributing to Infant Feeding Intentions and Practices

The method of infant feeding is a personal decision made by the mother, sometimes together with significant influential people such as the infant's father or grandmother and in the context of institutional and societal supports and barriers (Kaufman, Deenadayalan, & Karpati, 2009). Even if a mother intends to breastfeed, she may face obstacles that render it difficult to convert intention into a sustained practice. When the WHO, AAP and other organizations recommend exclusive breastfeeding for six months, they are recommending that women (and their families) sustain a newly learned behavior for six months typically under stressful and changing conditions (e.g. a new baby, returning to work) while maintaining a healthy lifestyle

devoted entirely to another human being. The behavior of infant feeding is unique as it is not a bilaterally reversible decision: A mother can at any time switch from breastfeeding to formula-feeding but switching from formula to breastfeeding is difficult if not, in some cases, impossible. Regularly supplementing with infant formula results in diminished supply of mother's milk due to decreased demand from the child, so that the child becomes increasingly dependent on formula.

Reasons mothers cite for limiting or terminating breastfeeding illuminate some of the challenges they face and tend to vary according to the age of the infant. In a study of self-reported reasons for cessation of breastfeeding, about half of mothers cited insufficient milk, regardless of the time of weaning (Li, Fein, Chen, & Grummer-Strawn, 2008). Problems due to the technical aspects of breastfeeding predominate during the first two months, and, beginning with the third month, mothers report that self-weaning becomes more important. Between the third and fifth month, one out of five mothers cited not finding pumping worth the effort, not wanting to pump or breastfeed at work, and wanting someone else to feed the baby as factors influencing cessation (Li et al., 2008).

Similarly, in the Richmond City WIC program in 2012, the most frequent reasons given for stopping breastfeeding included perceived insufficient milk (50.6% of all reasons); technical problems related to the nipple, such as poor latching, inverted or clogged nipples, and infection (10.0%); and pain (9.2%). While insufficient milk was a problem perceived by many mothers throughout infancy, the technical breastfeeding problems were concentrated in the baby's first few weeks. Among African American women, 30% of the reasons given for stopping breastfeeding during the first week were due to pain and problems related to the nipple. Another common reason women stop breastfeeding was work; however this reason predominated after

the infant's first month (17.6% of reasons among African American women after the first month) (VDH, 2012c).

In a study of breastfeeding disincentives among low-income mothers, Racine, Frick, Guthrie, & Strobino (2009) reported statistically significant hazard ratios for breastfeeding cessation (in order of strength), controlling for demographic factors as follows: working full-time (with lower hazard ratios for working part-time), participation in WIC, no postpartum doctor's visit, father not living with the mother and infant, smoking in the household, doctor not encouraging breastfeeding, and depressive symptoms. Graduation from high school was a protective factor. Dennis (2002) also found that smoking influences a mother's decision to breastfeed and breastfeeding duration. Also, cessation of smoking has been found to significantly increase breastfeeding duration (Higgins T. et al., 2010). While smoking is not a contraindication for breastfeeding, medical professional associations recommend that mothers be strongly discouraged from smoking (AAP, 2012).

According to the CDC, social and behavioral factors that contribute to breastfeeding include "social and cultural norms, social support, guidance and support from healthcare providers, work environment, and the media" (CDC, 2010b, para. 11). The Surgeon General's Call to Action (USDHHS, 2011) cites lack of knowledge; lactation problems; poor family and social support; social norms; embarrassment of breastfeeding in public; and employment, child care, and health services barriers as factors limiting breastfeeding. The next sections discuss in more detail the influence on infant feeding practices of intention; knowledge and attitudes; skills, self-efficacy, confidence and commitment; social support; health care; work; WIC; and community. This is followed by a discussion of factors specifically affecting African American women.

Intention

The Infant Feeding Practices Study II (IFPS II), a national longitudinal survey on infant feeding practices from a consumer opinion panel of women from the third trimester of pregnancy through twelve months postpartum that was conducted in 2005-6, found that 81.4% of women intended to breastfeed during pregnancy and 84.7% actually initiated breastfeeding (CDC, 2009a). This close relationship between intention and initiation is not replicated with duration of breastfeeding and varies according to length of breastfeeding. According to the IFPS II, 23% of women who breastfed less than three months, 40% of women who breastfed for 3 - 5 months, and 75% of women who breastfed at least 9 months said that they breastfed as long as they wanted (CDC, 2009a). Similarly, in a longitudinal study of 602 primiparas, 93% of women who weaned their babies during the first four weeks breastfed their infants less than they intended. On average, this group of women breastfed 15 weeks less than intended (Avery, Duckett, Dodgson, Savik, & Henly, 1998). In contrast, the women who weaned their babies after 26 weeks breastfed an average of 19 weeks longer than intended. In a retrospective cohort study of mother-infant dyads discharged from an inner-city academic community hospital, the largest discrepancy between intention and actual behavior occurred among women who intended to exclusively breastfeed: Only 40% were doing so at hospital discharge (Hundalani, Irigoyen, Braitman, Matam, & Mandakovic-Falconi, 2013).

Knowledge and Attitudes

Attitudes toward formula or breastfeeding are important in influencing intention and practice: In a national survey of WIC mothers, those who agreed the most with benefits of breastfeeding were also twice as likely to breastfeed (McCann, Baydar, & Williams, 2007). In a national sample (IFPS II), 46.9% of pregnant women somewhat or strongly agreed that “babies

should be exclusively breastfed during the first six months” (CDC, 2009a). In this sample, 49.8% of babies aged six months were fed any breast milk within the past seven days but only 4.3% of infants were exclusively breastfeeding at six months. These data support the concept that women with strong positive breastfeeding attitudes are able to initiate and continue breastfeeding, but that exclusive breastfeeding for six months is an elusive goal for many women.

Conversely, according to the same national survey, 28.3% of pregnant women somewhat or strongly agreed that, “infant formula was as good as breast milk”. Among women who did not breastfeed at all (27.6% of infants had not had any breast milk), the most common (“somewhat” or “very” important) reasons for not breastfeeding included that formula was at least as good as breast milk (64.8%). The next most important reasons for not breastfeeding were inconvenience (53.0%), the mother wanting someone else to feed the baby (45.9%), and the mother needing to leave the baby hours at a time (39.4%) (CDC, 2009a). These latter reasons are related to breastfeeding not fitting into the mother’s lifestyle.

Incorrect knowledge and pervasive myths about breastfeeding are common among the general public, mothers, low-income mothers and health care professionals (USDHHS, 2011). One such myth is that many mothers do not have sufficient milk to feed their babies whereas in fact this is biologically very rare (Riordan & Wambach, 2010). Among WIC mothers, McCann et al. (2007) found that breastfeeding mothers who were worried about insufficient milk started formula earlier and breastfed for less time.

Skills, Self-Efficacy, Confidence and Commitment

A perception of insufficient milk may be related to a lack of self-confidence in the ability to breastfeed, especially among disadvantaged women (MacGregor & Hughes, 2010). Mothers scoring higher on a Breast Self-Efficacy Scale (BSES), demonstrating greater knowledge of and

confidence in breastfeeding, were more likely to exclusively breastfeed at six weeks (Dennis & Faux, 1999) and at four months (Blyth, Creedy, Dennis, Moyle, Pratt, & De Vries, 2002). Conversely, a lack of self-efficacy can lead to early weaning. In a review of the breastfeeding literature on breastfeeding initiation and duration, Dennis (2002) found that “most mothers wean before the recommended 6-months postpartum because of perceived difficulties with breastfeeding rather than due to maternal choice” (p. 12). Dennis (1999) stated that an expectant mother who observes someone breastfeeding successfully is much more likely to have the confidence to breastfeed.

Avery, Zimmermann, Underwood, and Magnus (2009) offered, on the basis of a series of focus groups on infant feeding, that “confidence and commitment interact to support self-efficacy” (p. 146) – they termed this concept “confident commitment.” When comparing mothers who primarily breastfed with those who principally formula-fed their babies, the breastfeeding mothers more often expressed confidence in the process of breastfeeding and their ability to breastfeed and commitment to overcome obstacles to make breastfeeding work. In contrast, formula-feeding mothers showed confidence in formula-feeding and lack of confidence in breastfeeding and tended to give up easily when breastfeeding difficulties arose. Nommsen-Rivers, Chantry, Cohen and Dewey (2010) found that “formula-feeding comfort” was the strongest predictor of non-intention to breastfeed in a population of first time pregnant women in California where the other measured variables were comfort with breastfeeding, breastfeeding self-efficacy, and exposure to breastfeeding. In studies focusing on African American women, those who had more confidence in their ability to breastfeed (self-efficacy) were more likely to intend to breastfeed (Robinson & VandeVusse, 2011) and subsequently breastfed longer and more exclusively (McCarter-Spaulding & Gore, 2009). African American women who breastfed

successfully were reported to gain a sense of self-worth and self-fulfillment from breastfeeding (Furman, Banks & North, 2013).

Social Support

Feeding practices and customs may be heavily influenced by the grandmother, father, or other caregivers (Pak-Gorstein, Haq, & Graham, 2009). In particular, the father exerts an important influence on the mother in three areas: deciding to breastfeed or formula-feed, help at the first feeding, and duration of breastfeeding (Bar-Yam & Darby, 1997). Arora, McJunkin, Wehrer and Kuhn (2000) found that the most significant reason mothers began using formula was the mother's perception of the father's attitude. Support from family and friends can be both a facilitator and a barrier; either way they can be a strong influence on the mother's decision to initiate or continue breastfeeding (USDHHS, 2011). Mothers' ambivalence toward feeding methods reflects the mixed messages women receive from family and friends, health professionals, institutions, and society (Kaufman et al., 2009).

Support for breastfeeding can come from many sources, both professional and lay. At the professional level, International Board Certified Lactation Consultants (IBCLCs) are the highest level of health professionals dedicated uniquely to breastfeeding. At the lay level, La Leche League (LLL) leaders help mothers with breastfeeding. There is a dearth of either type of support: In 2011, there were only 2.67 and 0.99 IBCLCs and LLL leaders per 1,000 live births, respectively (CDC, 2012). In one study, family members, the baby's father and lactation consultants' positive advice about breastfeeding exerted a significant influence on the mother's intention to breastfeed, whereas advice by the school, doctors, nurses, friends and WIC nutritionists had no such effect (Humphreys, Thompson, & Miner, 1998). Hurley et al. (2008)

suggest that the higher rates of breastfeeding among Hispanic mothers may be due to strong and supportive community role models who have personal experience with breastfeeding.

Health Care

More than twenty years after the establishment of the Baby Friendly Hospital Initiative, 220 hospitals in the US are considered Baby Friendly (BFHI USA, 2014). Only 9.5% of all births occur in Baby Friendly hospitals (BFHI USA, 2014) in spite of its association with improved rates of breastfeeding initiation, exclusivity and duration in many cultural settings (Semenic, Childerhose, Lauziere, & Groleau, 2012). One practice in particular is still exceedingly common: 70% of facilities in a recent survey reported giving out free formula samples to mothers (CDC, 2008a). Other practices that negatively impact breastfeeding include physicians' discomfort and poor knowledge and attitudes toward breastfeeding (USDHHS, 2011). A study of the relationship between delivery type and breastfeeding initiation and duration showed a lower likelihood of breastfeeding at four weeks among women with induced vaginal deliveries and at six months among women with emergency cesarean sections and induced vaginal deliveries as compared with women with spontaneous vaginal deliveries (adjusted odds ratios) but no difference among women with planned cesarean deliveries (Ahluwalia, Li, & Morrow, 2012).

Breastfeeding instruction has been found to be positively associated with breastfeeding initiation and duration. In a study of black mothers, those who initiated breastfeeding were more likely to have had hospital staff help them learn how to breastfeed compared to black mothers who did not breastfeed (Ma & Magnus, 2011). Racine et al. (2009) reported finding “no receipt of breastfeeding instruction at the pediatric office” (p. 241) as a significant variable predicting breastfeeding cessation among low-income women.

Work

The prospect of returning to work is a significant barrier to initiating or continuing to breastfeed, especially for women with no paid maternity leave, poor support at work, and those with hourly wages or with less flexible jobs (USDHHS, 2011). Several studies have found a positive relationship between delaying return to work and breastfeeding duration (Kools, Thijs, Kester, & de Vries, 2006). A review of length of maternity leave and breastfeeding found consistently longer breastfeeding duration with longer maternity leaves (Stahelin, Berteau, & Stutz, 2007). Guendelman, Kosa, Pearl, Graham, Goodman and Kharrazi (2009) found that women who returned to work within six weeks of delivery were four times less likely (OR: 4.49, 95% CI [2.04-9.90]) to have established breastfeeding than women who had not yet returned to work at the time of the survey interview (mean of 4.5 months); the odds ratio for women returning to work within 6 to 12 weeks was 2.42 (95% CI [1.28-4.56]). The authors also found that having a manager position, autonomous position, or flexible work schedule was associated with longer breastfeeding duration. In the US, only 25% of employers accommodate breastfeeding employees, creating challenging conditions for mothers to exclusively breastfeed their infants (Grummer-Strawn & Shealy, 2009).

WIC

The WIC program has the potential to strongly influence low-income women's views on infant feeding as the WIC program distributes for free more than half of all formula sold in the U.S. (Prell, 2004). WIC programs in each state conduct a sole-source bid for formula; once the winner is selected, the formula company offers rebates to the state government for every can of formula distributed (Jensen & Labbok, 2011). Formula companies raise the market price of formula to offset the reduced governmental rates, which in turn raises the perceived value of the

free formula received from WIC. To promote breastfeeding, the WIC program implemented the Best Start social marketing approach and the Loving Support™ Program. Also, beginning in August 2009, the WIC packages for mothers and children were reconfigured to promote breastfeeding: WIC programs are required to offer participants a choice of new full breastfeeding, partial breastfeeding, and full formula-feeding packages (Wilde, Wolf, Fernandez, & Collins, 2011). However, an evaluation of the new policy found no significant change in the initiation or intensity of breastfeeding and a very small increase in duration after implementation as compared to before the policy change³. There was an increase in the percentage of mothers selecting both the full breastfeeding and full formula packages during the infants' first month and a decline in the proportion of women receiving partial breastfeeding packages. However, as of the second month, the percentage of women selecting full breastfeeding packages remained stable before and after implementation (Wilde et al., 2011). Jensen and Labbok (2011) state that the market value of the new formula package is still higher than the breastfeeding package and may provide an incentive for clients to choose formula over breastfeeding.

The WIC program's free distribution of formula, together with the promotion of breastfeeding, continues to send mixed public health messages to low-income women (Kaufman et al., 2009). These mixed public messages are described in detail by Cricco-Lizza (2005). In her ethnographic study of eleven African American women enrolled in WIC, she recounted the familiarity with and custom of obtaining WIC vouchers for formula. However, despite the receipt of messages promoting breastfeeding from WIC staff, for the most part, these women did not perceive WIC as a source for breastfeeding support when they encountered problems. While

³ The evaluation was of a national random sample of 17 local WIC agencies.

some women had intensive encounters with WIC staff that positively transformed their breastfeeding experiences, she also told of missed opportunities both for seeking and providing breastfeeding advice from WIC at critical times.

Community

Community norms, attitudes and support for breastfeeding have varied over the years. In a 1999 national survey of public attitudes (CDC's HealthStyles survey), 14% of respondents agreed that infant formula was as good as breast milk; this percentage rose to 28% in 2005 and, during the last survey, in 2013, dropped to 20% (CDC, 2013). Formula-feeding is an acceptable norm in the US, possibly resulting from widespread exposure to and increased advertising of formula, in direct opposition to the WHO's *International Code of Marketing of Breast-Milk Substitutes* (USDHHS, 2011).

It is also not generally culturally acceptable to breastfeed in a public place, making it difficult for women to integrate breastfeeding into their daily lives (Kaufman et al., 2009). In 2007, according to the HealthStyles survey, nearly one in four respondents disagreed that women should have a right to breastfeed in public places (CDC, 2013). This is also related to the view of breasts as sexual objects, leading to the practice of concealing breastfeeding from others (USDHHS, 2011). Bentley, Dee and Jensen (2003) discuss the media's sexualization of breasts and its impact on breastfeeding, as well as men and women's perception of breasts as sexual. Breastfeeding as a topic is also little discussed with the general public: Only one in five respondents reported seeing, hearing or reading anything recently in the media on breastfeeding (CDC, 2013).

African American Women

Factors that influence all women to intend to, initiate or continue breastfeeding are also common among African American women. As a result of an integrative literature review, Spencer and Grassley (2013) reported several positive and negative factors affecting African American women's intention to breastfeed as well as the initiation and duration of breastfeeding; these factors seem no different from those of all women. Positive factors that influence intention include social support, older mother, higher income, higher educational attainment, attending prenatal courses, and perceived benefits of breastfeeding. Negative factors include pain, fears of insufficient milk, maternal reluctance, embarrassment of breastfeeding in public, and complexity of breastfeeding. Initiation and duration of breastfeeding are influenced by intrinsic motivation, a family member or friend who breastfed, social support from family and friends, support from health care providers, confidence in breastfeeding and breastfeeding self-efficacy. Negative factors include perception of insufficient milk, embarrassment with breastfeeding in public and at home, comfort and trust in formula, and difficulties with breastfeeding. Adding to this list, Alexander, O'Riordan and Furman (2010) found support of the father, self-assessed breastfeeding knowledge, and being primiparous to be significantly and positively associated with intent to breastfeed, after adjusting for demographic and psychosocial factors.

While the literature review reinforces common factors that cut across racial groups in the US, some studies highlight differences among racial groups. Several of these studies specifically examine racial differences among low-income populations. For example, in a nationally representative year-long longitudinal survey conducted in 1994 among WIC participants on infant feeding attitudes and practices, African American mothers scored highest (indicating agreement) on statements about barriers to breastfeeding and lowest on statements of benefits as

compared to White and Hispanic mothers (McCann et al., 2007). In a study of Maryland WIC participants, 40% of African American mothers who decided not to breastfeed (n=100) said it was due to fear of breastfeeding difficulty or pain. The top reasons for cessation of breastfeeding among African American mothers were breast discomfort or pain (23%), not enough milk (19.5%) and need to return to work (19.5%). Rates for breast discomfort or pain and not enough milk were not significantly different from those of Whites but were different from those of Hispanics. However, the percent needing to return to work was significantly higher for African Americans as compared to Whites and Hispanics (Hurley et al., 2008). Another comparative study, this time focusing on factors influencing feeding decisions, found African Americans to be twice as likely to express comfort with formula-feeding as compared to non-African Americans; this variable explained 37% of the difference in breastfeeding intention between the two groups (Nommsen-Rivers et al., 2010).

Some studies have shown that racial and ethnic disparities in breastfeeding were not a major factor among low-income women accessing the same health care resources; instead disparities appeared to be related to differences in health care practices (Robbins, Thomas, Torcato, Lisi, & Robbins, 2011). Supporting this finding, a study conducted in North Carolina reported less availability of effective breastfeeding services in the WIC programs serving mostly African American populations compared to those serving predominantly Hispanic and White populations (Evans, Lobbok, & Abrahams, 2011).

Qualitative studies can shed light on the complexity of infant feeding and the range of experiences for low-income African American women. Cricco-Lizza (2005) describes the stressful, sleep-deprived, difficult lives of having multiple children, jobs with irregular hours, illnesses, and transportation problems. Other women are described as fearing their milk would be

dangerous for their babies due to their unhealthy diets and lifestyles (Kaufman et al., 2009). A factor in several studies is embarrassment or disgust of breastfeeding in front of others, even family members (Cricco-Lizza, 2005; Guttman & Zimmerman, 2000; Kaufman et al., 2009; Robinson & VandeVusse, 2011) and fear of isolation or being the only one to care for the baby (Furman et al., 2013). Alexander, Dowling and Furman (2010) contrast expectant mothers' good knowledge of breastfeeding benefits with multiple misconceptions about the experience of breastfeeding (e.g. pain) by mothers and fathers. Major barriers reported by these authors include work, milk supply, and lifestyle issues (diet, smoking, lack of freedom). In a focus group study of barriers and facilitators to breastfeeding among African American women who breastfed, participants and community representatives identified a lack of family, peer, healthcare and employer supports as barriers to breastfeeding (Kulka et al., 2011). Some of these factors are not measured in quantitative studies and therefore their frequency has not been confirmed.

Theoretical Models

The major theoretical model guiding this research is the integrated model (IM). In developing the model, Fishbein (2000) used the key variables involved in predicting or understanding behavior in the major behavioral theories of the time (Fishbein & Cappella, 2006). As explained by Fishbein and Yzer (2003), the IM combines elements of the health belief model (HBM), the theory of reasoned action (TRA), and social cognitive theory (SCT). The IM model provides a framework for studying what happens between an intention to behave and the actual behavior. As explained by Fishbein and Yzer (2003), “any given behavior is most likely to occur if one has a strong intention to perform the behavior, if a person has the necessary skills and abilities required to perform the behavior, and if there are no environmental constraints preventing behavioral performance” (p. 166). Conversely, this model can be applied to situations

where the strong intention is thwarted by lack of skills or significant environmental constraints and results in less than the intended behavior. This study further expands the intention to behavior link of the IM by incorporating individual net-benefit maximization theory and the ecological model and compares groups using the positive deviance approach. In the discussion below, the terms “barriers” and “facilitators” are used interchangeably with the terms “disincentives” and “incentives”, respectively. The latter two terms are most commonly used in the economics literature.

Health Behavior Theories

In conceptualizing this study, three other theories commonly used in health behavior research were considered: HBM, SCT, and the theory of planned behavior (TPB). While not formally adopted for this study, elements of each are recognizable in the selected theoretical approach. The HBM is used primarily to explain, predict or promote behaviors to prevent, identify, or control illness (Champion & Skinner, 2008). A main construct is the threat of disease, which is composed of perceived severity of and perceived susceptibility to the disease. While new research is reframing the infant feeding practice as a risk of formula-feeding versus a benefit of breastfeeding, the concept is not yet widely adopted. Applying HBM to breastfeeding is problematic due to the motivators women have for breastfeeding – including maternal-infant bonding (MacGregor & Hughes, 2010) – that are unrelated to the main construct: threat of disease. Barriers and benefits are additional constructs that can serve to motivate or deter the desired action and can be found in the IM as environmental constraints (barriers) and precursors to intention (benefits). This construct, as well as cues to action and self-efficacy, may be valuable in the study of infant feeding.

SCT describes human behavior as a product of the individual, behavioral and environmental influences. The concept of self-efficacy is central to SCT and affects how barriers and facilitators are perceived (Bandura, 2004). Bandura has described perceived self-efficacy as “concerned with people's judgments of their capabilities to execute given levels of performance” (Bandura, 1984). For example, a person with low self-efficacy could perceive the barriers as insurmountable whereas someone with high self-efficacy would pay scant attention to the barriers. In turn, barriers and facilitators can affect self-efficacy. For example, an expectant mother who observes someone breastfeeding successfully is much more likely to have the confidence to breastfeed (Dennis, 1999). Self-efficacy is a key variable in the IM model. Fishbein and Cappella (2006) recognize this variable as similar to perceived behavioral control from the TPB.

According to the TPB, “performance of a behavior is a joint function of intentions and perceived behavioral control” (Ajzen, 1991, p. 185), where perceived behavioral control, similar to Bandura’s concept of self-efficacy, is defined as an individual’s “perceived ease or difficulty of performing the behavior” (Ajzen, 1991, p. 188). Perceived behavioral control becomes especially important in behaviors with low volitional control; in the case of a behavior with high volitional control, intention alone would be expected to predict behavior (Ajzen, 1991). The perceived behavioral control construct may help to understand the gap between intended and actual duration of breastfeeding among mothers who wean their babies early.

The major constructs of the TPB that predict behavioral intention include perceived behavioral control, the individual’s attitude toward the behavior, and subjective norms of the behavior. Ajzen (1991) defines these latter two constructs, which form the basis for the TRA, as “the degree to which a person has a favorable or unfavorable evaluation or appraisal of the

behavior” (p. 188) and “the perceived social pressure to perform or not to perform the behavior” (p. 188), respectively. These constructs in turn are influenced by an “underlying foundation of beliefs about the behavior” (Ajzen, 1991, p. 206). In Avery et al.’s (1998) study applying TPB to infant feeding, perceived behavioral control explained 25% of the variance in intention, and attitude toward breastfeeding and bottle-feeding explained 5.8% and 4.5% of the variance, respectively. This is consistent with findings in another study where the authors applied TPB to develop a tool to predict early breastfeeding attrition (Dick et al., 2002): The final tool included measures of breastfeeding attitudes (positive and negative), subjective norms, and perceived behavioral control. Of note is that both studies dropped the subjective norms construct, although another study of 236 women indicated that this construct may be an important predictor of intention among African American women (Bai, Wunderlich & Fly, 2011); in contrast, the major predictor of intention was attitude among White mothers and perceived behavioral control for Latina mothers.

While the TPB offers a framework for understanding infant feeding behaviors, the disconnect between intended and actual breastfeeding duration among women who wean their infants early begs the question: Why is it that so many women seem to have low volitional control over duration of breastfeeding? What external factors may influence this? The integrated model (IM) begins to address this question.

The IM expands the relationship between intention and behavior (Fishbein & Yzer, 2003). By incorporating environmental constraints and skills between intention and behavior, the IM helps explain why someone with a strong intention to breastfeed for a year, for example, quits before that time (Fishbein, Hennessy, Yzer, and Douglas, 2003). However, the authors recognize that the strength of the model is in explaining the antecedents to intention and that its

weakness lies in adequately explaining when intention does not lead to behavior. The authors state:

Unfortunately, this aspect of the IM (i.e. the prediction of behaviour from intentions, skills and abilities, and environmental constraints) is considerably less well developed (and more correlational) than is the part of the model that deals with the determinants of intention. In fact, it seems reasonable to ask at this point whether a 'new' theory is needed to explain why some people do, and some people do not, act on their intentions. The search for systematic predictors of behaviour change given the pre-existing intentions to change should continue (Fishbein et al., 2003, pp. 16 - 17).

To help answer this call, economic and ecological theories help to clarify the meaning of the IM variable, environmental constraints.

Economic Theory

The individual net-benefit maximization theory (INBM), an economic theory, is based on the assumption that people initiate or continue a behavior where the real or perceived benefit outweighs the real or perceived cost, where benefits and costs are both monetary and non-monetary (Racine et al., 2009). This theory could help explain why some mothers receiving WIC services prefer formula to breastfeeding: The perceived benefits of formula (free, convenient, social influences) (Jensen, 2012) outweigh the perceived costs (risk of formula) (McNiel et al., 2010).

One application of the INBM theory (Racine et al., 2009) is a study⁴ that depicts a model of multiple incentives and disincentives to continue breastfeeding. Racine et al.'s (2009) study focuses solely on measuring breastfeeding disincentives, although the authors recommend that future studies examine incentives as well as disincentives to breastfeeding. While the INBM framework helps understand breastfeeding incentives and disincentives, Racine et al.'s framework excludes a number of incentives and disincentives to formula-feeding. It could be argued that incentives and disincentives to formula-feeding and breastfeeding are mirror images of each other (for example, distribution of free formula can be considered a breastfeeding disincentive and a formula-feeding incentive), but by focusing only on breastfeeding, important formula-feeding factors, such as comfort with formula-feeding, may be omitted. For example, among WIC participants, incentives to formula-feed may include the perception of greater market value of formula packages as compared to breastfeeding packages (Jensen & Labbok, 2011), the provision of free formula (Jensen, 2012; Racine et al., 2009), and comfort level with formula (Nommsen-Rivers et al., 2010). The disincentives for the use of formula include the market cost of formula: Since the WIC program, as a supplementary food program, does not provide the full amount of formula needed by the infant, the non-breastfeeding mother must buy the rest of the needed formula. Other incentives and disincentives may be the availability and accessibility of formula and the awareness of the risks of formula. The present study therefore expands on Racine et al.'s study by explicitly articulating both formula and breastfeeding incentives and disincentives in the INBM framework.

⁴ The results of this study are summarized in an earlier section, “factors contributing to infant feeding intentions and practices”, that can be found on pp. 11 – 12 in the literature review.

Few studies have explored or quantified factors influencing both breastfeeding and formula-feeding. Most research seems to focus on impediments and promoters of breastfeeding. This may be due, in part, because questions of two major national surveys, Pregnancy Risk Assessment Monitoring System (PRAMS) and the Infant Feeding Practices Survey II (IFPS II), primarily include questions on breastfeeding barriers and supports. A question in PRAMS on reasons a mother did not breastfeed her new baby does not include a single choice related to formula as a facilitator; instead all possible answers relate to breastfeeding barriers (CDC, 2008b). For example, “I didn’t like breastfeeding” is an option, but not “I felt more comfortable giving my baby formula”. Similarly, all choices for stopping breastfeeding related to breastfeeding barriers; there was no mention, for example, of the ease of formula-feeding. In the IPFS II (CDC, 2009a), out of the 19 possible reasons why a mother did not breastfeed her baby, only one related to formula (“I believe that formula is as good as breastfeeding or that formula is better”). Moreover, only a few studies have looked at facilitators or barriers to formula-feeding (e.g. Avery & Magnus, 2011; Nommsen-Rivers et al., 2010; Avery et al., 2009). Broadening the conceptualization of the environmental constraints variable in the IM to environmental factors that include both facilitators and constraints of formula and breastfeeding incorporates the individual net-benefit maximization theory. A further step is to apply the levels of the ecological model, so as to comprehensively examine the influence of barriers (disincentives) and facilitators (incentives) of both breastfeeding and formula-feeding at the multiple levels of the ecological model.

Ecological Model

McLeroy’s ecological model of health behavior identifies five levels of influence on behavior: intrapersonal factors, interpersonal processes and primary groups, institutional factors,

community factors, and public policy (McLeroy, Bibeau, Steckler & Glanz, 1988). McLeroy's theory supports interaction between the levels: For example, marketing of formula (institutional factor) may influence a father's favorable attitude toward the mother's use of formula (interpersonal factor). The theory also highlights the limited control a mother can have over her behavior when institutional factors, such as work and hospital policies, do not support individual decisions. Perez-Escamilla (2012) calls for the application of the social-ecological model in formative research on different population groups so as to influence "key forces" – family and friends, healthcare providers, employers, formula industry, and legislators. The present study incorporates barriers and facilitators at each level of the ecological model, from intrapersonal to community factors, so as to help identify modifiable key forces that may be effective in promoting breastfeeding. Assessment of mothers' awareness of legislation affecting infant feeding (public policy) was beyond the scope of this study.

Positive Deviant Inquiry

Positive deviant inquiry, while not a theory, is an approach used extensively in public health (Positive Deviance Initiative, 2012) that examines individuals who practice a beneficial behavior in spite of sharing qualities that would typically characterize these people as high risk for an unhealthy behavior (Marsh, Schroeder, Dearden, Sternin, & Sternin, 2004; Ma & Magnus, 2011). Although typically a qualitative approach (Marsh et al., 2004), a recent quantitative application examined the factors associated with breastfeeding initiation among WIC recipients with less than a high school education and found that the black mothers who initiated breastfeeding within this group (positive deviant group) were more likely to have had hospital staff help them learn how to breastfeed compared to black mothers who did not breastfeed (Ma & Magnus, 2011). The authors acknowledge the limitations of examining only measured factors

and recommend a qualitative study of the characteristics of positive deviants among WIC breastfeeding participants.

Theoretical Integration

This study proposes a modified IM theory to help explain why some women breastfeed for a longer time period while others do not breastfeed or breastfeed for a shorter duration. The proposed modified IM incorporates the economic INBM theory at multiple levels of the ecological model between the intention and actual infant feeding behavior (see Figure 1). Environmental facilitators and constraints are defined as a combination of incentives and disincentives of breastfeeding versus incentives and disincentives of formula-feeding. Incorporated into each quadrant of environmental constraints in Figure 1, are the levels of the ecological model. For example, within the quadrant entitled “breastfeeding incentives” are intrapersonal, interpersonal, institutional, community and policy level breastfeeding incentives.

While Fishbein proposed skills and abilities as a predictor of behavior, I have broadened skills and abilities to include self-efficacy so that a high degree of self-efficacy combined with breastfeeding skills, a high degree of intention, and few environmental constraints or presence of environmental facilitators would be predictive of breastfeeding. Due to their similarities and overlap, the concepts of skills and self-efficacy are discussed together.

In both the qualitative and quantitative studies, a positive deviant group of women who breastfed for a longer duration are identified and compared with two other groups: those who did not breastfeed and those who breastfed for a short duration. Particular attention is given to differentiating factors that may have contributed to the positive deviant group’s success.

RESEARCH QUESTIONS AND STUDY OVERVIEW

This study aimed to identify and understand the factors that impede or facilitate infant feeding practices of low-income African American women, and specifically what factors differentiate the most successful (positive deviant) women within this group. The research also contributes to the theoretical understanding of infant feeding: The modified IM is an expansion of the concept of environmental constraints as interfering with intentions to practice a behavior. By examining environmental factors as comprising breastfeeding and formula-feeding incentives and disincentives at multiple levels of influence, this research took a uniquely comprehensive approach to understanding the infant feeding practices of low-income African American women. The study began with a qualitative study to understand the specific barriers and facilitators faced by low-income African American women who have different infant feeding practices and was followed by a quantitative study that explored the intention, environmental factors, and skills that differentiate women's infant feeding practices.

The following research questions (RQs) were addressed:

RQ1: What are the qualitative differences in infant feeding barriers and facilitators among low-income African American women who engage in different infant feeding practices?

RQ2: What are quantitative differences in intention, skills, and environmental factors among low-income African American women who engage in different infant feeding practices?

RQ3: What is the relative influence of each of intention, skills, and environmental factors on infant feeding practices among low-income African American women?

The research began with focus groups to identify barriers and facilitators of infant feeding practices. The results of these focus groups informed the content of the survey questionnaire, the purpose of which was to assess the type and relative magnitude of factors that influenced and resulted in different infant feeding practices in the target population. The research was conducted within the pragmatic paradigm in that the outcome of the research drove the method selection. According to Creswell (2007), pragmatism is not restricted by a particular philosophy. Instead, researchers select the most appropriate methods required to reach a given outcome. As Creswell (2007) points out, in the pragmatic worldview, “the important aspect of research is the problem being studied and the questions asked about this problem” (pp. 22 - 23). The problem raised by the Mayor and the Breastfeeding Commission was how to increase breastfeeding rates, especially among low-income African American women. This problem led to inquiries on the barriers and facilitators to infant feeding that these women face. Answering these questions requires both qualitative and quantitative methods; the qualitative to listen to the voices of women who have recently fed their infants, and the quantitative to determine prevalence and magnitude of factors influencing infant feeding outcomes. The qualitative and quantitative methods were analyzed separately first, but also informed each other: findings from the quantitative section helped elucidate results from the qualitative research and vice versa. Therefore, the final discussion reflects the combined analyses of the quantitative and qualitative portions of the research.

The selected mixed methodology followed the sequential qualitative – quantitative data analysis strategy, in which a qualitative study is followed by and informs a quantitative study (Tashakkori & Teddlie, 1998). This study fits Tashakkori and Teddlie’s (1998) description of a “typology development” study, in which individuals are first grouped and then quantitatively

compared. According to the authors, quantitative analysis to compare groups can include univariate or multivariate analysis of variance or covariance, discriminant function analysis, or logistic regression to identify variables that distinguish the groups. The study was approved by the Virginia Commonwealth University's (VCU) and the Virginia Department of Health's Institutional Review Boards (IRBs).

The study population was primiparous low-income US-born adult non-Hispanic/Latina African American mothers in Richmond City, Virginia. The Mayor of Richmond's establishment of the Mayor's Breastfeeding Commission drove the selection of Richmond as the geographical area. Low-income African American women were further selected due to their very low breastfeeding rates and poor infant health outcomes.

The positive deviant group was compared to the other two groups in both the qualitative and quantitative analyses. In both cases, the expanded IM, incorporating the ecological and INBM theories, provided the framework for the analysis. The positive deviant group in the qualitative study was defined as the women who breastfed for at least four months; due to low numbers of women recruited in this group, in the quantitative survey, the positive deviant group was redefined as the women who breastfed for at least three months. The comparison groups were those women who only fed their babies formula or who breastfed for three months or less (focus groups) or less than three months (survey).

RESEARCH QUESTION 1: METHODS AND RESULTS

Qualitative methods allow the researcher to listen directly to the women making infant feeding decisions and hear about the barriers and facilitators they experienced (Creswell, 2007). They allow the researchers to understand the complexity and multiple realities of the women's lives, and the circumstances and context of the behavior. In a qualitative approach, research questions and methods continuously evolve based on the researchers' new learning from participants (Creswell, 2007). This rich material, together with information from the literature and other sources, and followed by quantitative methods to measure the relative importance of factors, can provide a sound basis upon which to develop local interventions and expand understanding of barriers and facilitators in this population.

Methods

Participants

Study participants included twenty-eight adult non-Hispanic/Latina African American mothers of children who were recipients of public assistance. Although only women whose oldest child was less than two years old were to be included in the study, some mothers who attended the focus groups had older children. However, the focus of the interview was on the child under two years of age. Other inclusion criteria were Richmond City residents and English speaking. Exclusion criteria included moderate to severe cognitive impairment or hearing or language difficulties, and medical contraindications for breastfeeding. Women with medical reasons not to breastfeed were excluded since this portion of the study was focused on barriers

and facilitators to non-medical infant feeding decisions and practices. Pregnant women were neither excluded nor included in the study: If a woman made an unsolicited statement during recruitment that she was pregnant, she was excluded from the study as the approved IRB research design excluded pregnant women from the study. However, due to the private and potentially changing condition of pregnancy, the focus group screening tool for mothers did not include a question about pregnancy.

Nine focus groups were scheduled in Richmond, Virginia from November 2012 through May 2013. Of the nine scheduled focus groups, seven had three to five participants each (total of 25 participants). The focus groups lasted from 42 to 87 minutes. As only one to two participants attended the two remaining scheduled focus groups, the participants were interviewed using the focus group guide. There were 2 interviews: The first with one participant and the second with two participants. The interviews lasted for 23 minutes and 42 minutes for one and two participants, respectively. The total number of participants in the focus groups and interviews was 28 women.

Women in the focus groups and interviews were grouped according to their infant feeding practice. There were two focus groups and one interview of women who had only formula-fed their babies ($n = 9$), three focus groups and one interview of women who had breastfed for three months or less ($n = 13$), and two focus groups of women who breastfed for at least four months ($n = 6$).

The mean age of all participants was 23.6 ($SD = 4.6$) years. Nearly one third (32%) of participants were employed full or part-time and 71% had annual household incomes of less than \$10,000. Over half (57%) were high school graduates. Characteristics of the qualitative study participants by infant feeding practice are summarized in Table 3.

Women who breastfed for four or more months. The mean age of women who breastfed for at least four months was 24.8 ($SD = 3.9$) years. Of the six participants, half were never married; two (33.3%) were a member of an unmarried couple; and one (16.7%) was married. Only one (16.7%) participant had not completed high school; four (66.7%) had completed two to four years of technical school or college, and one (16.7%) had at least a college degree. Five of the six were either full- or part-time students. Half were employed full- or part-time. Two participants (33.3%) reported an annual household of less than \$10,000 and half had annual household incomes of \$20,000 - \$50,000 (one participant did not report her income).

Women who breastfed for three months or less. The average age of this group of women was 23.6 ($SD = 5.9$) years. Of the thirteen participants, five (38.5%) were never married and an equal number were members of unmarried couples. Three (23.1%) participants were married. Two (15.4%) had reached high school but not received a degree. Three (23.1%) had a high school degree and six (46.2%) had less than two years of college or technical school. One (7.7%) participant had a college degree. Three (23.1%) participants were students. As for income, ten (76.9%) participants had annual household incomes of less than \$10,000. Ten participants (76.9%) were unemployed.

Women who exclusively formula-fed. The average age of women who only formula-fed was 22.9 ($SD = 3.1$) years. Of the nine participants, all but one (88.9%) were unmarried and one (11.1%) was a member of an unmarried couple. Six (66.7%) participants had less than a high school education; the remainder had less than two years of college or technical school. None were students. Eight (88.9%) women were unemployed or full-time homemakers; the same number had annual household incomes of less than \$10,000.

Recruitment

Study participants were recruited from WIC clinics as well as the two main early childhood home visiting programs in Richmond: CHIP and Healthy Families. All of these programs serve low-income pregnant and postpartum women and their children. Flyers were also posted in libraries in predominantly low-income neighborhoods and Family Resource Centers in public housing complexes to target new mothers who may not have been enrolled in these programs. Research team members spoke to program staff about the study, placed flyers in all the recruitment sites, and distributed flyers in WIC clinic waiting rooms. If a mother was interested, a research team member screened the potential participant for eligibility as well as placement in the appropriate focus group. One participant was placed, based on screening, in the group of women who had breastfed for three months or less but during the focus group she mentioned that she gave formula to her three-month old baby during the day and at night she still breastfed. However, no changes were made to her group assignment.

The focus groups were conducted in public libraries that were accessible and on days and at times that seemed most convenient for participants. When participants expressed difficulty in reaching the site, the research assistant provided transportation to and from the site. Childcare was not provided although some participants brought their children. Each participant received a stipend of \$30 and a meal. Consenting of study participants occurred right before each of the focus groups. One potential participant decided not to participate in the focus group while she was being consented.

Participants were informed that the focus groups would be recorded and if they chose not to be recorded, the research team would only take notes but not tape record the focus group.

However, none of the participants declined to be taped. Following the focus groups, the research

assistant sent the recordings to the transcriptionist. All identifiable data, recordings and transcripts were kept in a locked cabinet and/or in a password-protected electronic drive. As transcriptions were received, they were entered into a password-protected computer and database. All data were accessible only to research team members. The original recordings will be destroyed once the study has been completed.

Research Design

To compare and contrast the barriers and facilitators of mothers with different infant feeding practices, at least two focus groups were conducted for each of three groups of mothers: mothers who breastfed for at least four months (positive deviant group); mothers who breastfed for three months or less; and mothers who only formula-fed their infants. This segmentation was expected to provide sufficient contrast among groups to begin to understand the differences and similarities in barriers and facilitators in mothers having distinct infant feeding experiences. This research is exploratory so an exact comparison among groups was not possible – among other factors, the women may have differed in their occupation, access to governmental programs, and family life. Although the intention was to balance the numbers of mothers who worked full-time with those who stayed at home or worked part-time, this was logistically difficult to achieve due to prioritizing focus group locations accessible to participants and the low number of participants recruited.

Research questions and theory guided the development of the focus group questions. They were also reviewed by former residents of the target neighborhoods and people who have worked extensively with low-income African American women in Richmond. Focus group guiding questions included queries on mothers' knowledge and attitudes of infant feeding, infant feeding intentions and experiences, barriers and facilitators to infant feeding according to levels

in McLeroy's ecological model (McLeroy et al., 1988), and participants' recommendations to facilitate exclusive breastfeeding (see Table 4). Focus group questions were designed to elicit views and discussion around barriers and facilitators to both infant and formula-feeding at different ecological levels. As recommended by Krueger and Casey (2000), the focus group began with opening questions, followed by introductory, transition, key and ending questions. The opening question asked participants to share one thing about being a new mother and about the baby. The introductory questions asked the women to first imagine and describe a woman feeding her child formula and then do the same for a breastfeeding mother; questions were asked about the imaginary mothers. Transition questions asked about participants' intentions with and decisions around feeding their own babies. Key questions asked about participants' personal experiences barriers and facilitators encountered when feeding their babies with formula or breast milk. The questions aimed at eliciting both incentives and disincentives of breastfeeding and formula-feeding, as appropriate. Ending questions asked participants' views on strategies to improve local breastfeeding rates.

Two researchers attended each focus group, one to moderate and the other to take field notes and ask additional questions for clarification if needed. The moderator was an African American female who is native to Richmond City and a past participant of the Richmond Healthy Start program. The doctoral candidate, who took field notes, is a White female of European and Latin American origin who has worked extensively with the Healthy Start program in Richmond. During the focus group, the field-note taker documented on a reporting form the seating arrangements, notable quotes, key points, and obvious non-verbal behaviors that indicated strong feelings about a topic such as vigorous head nods. The researcher was careful to avoid interpretation of ambiguous non-verbal signals (Krueger, 1998).

Data Analysis

Data were analyzed according to Creswell's (2007) data analysis spiral, described as a process of moving through concentric circles of organizing and managing the information; reading and reflecting on the data; describing, classifying and interpreting it; and finally visualizing and representing it. Once the recordings were transcribed, two researchers read and reflected on the transcription and field notes and made annotations (memoing). The next step involved segmenting and classifying the data into pre-defined categories, corresponding to the levels in McLeroy's ecological model and a classification derived from the INBM theory. Data segments from each of the three classes of focus groups were categorized into one or more of twenty-eight categories: seven levels and sub-levels by either breastfeeding or formula-feeding incentives or disincentives. The ecological model categories were intrapersonal, interpersonal, institutional, and community. There were four institutional sub-levels: hospital, health care providers, WIC, and work. In total, there were eighty-four worksheets in which to classify data segments (3 focus group classes, 7 ecological model and 4 INBM categories).

Using these pre-established categories, the researchers individually reviewed the text and audiotape of each focus group and assigned data segments to one or more categories. Listening to the audiotapes gave the researchers additional insight into the speakers' meanings. Tone of voice, emphasis, laughter, pauses, or other expressions could clarify the meaning of the written text. The researchers then met to compare segment assignments for each focus group and came to consensus on the selected assignments. Once the researchers finalized the spreadsheets, they proceeded to develop themes for each worksheet and overall themes for type of infant feeding group and ecological level. For example, themes were developed for the formula-feeding group at the interpersonal level, reflecting the predominant breastfeeding or formula-feeding influences

at that level. The researchers met to discuss and reach consensus on the themes for each group and at each level. The researchers reviewed the first draft of the findings for consistency with the themes.

Results

The following analysis seeks to identify and understand the barriers and facilitators among the women in the three groups. Results are presented in accordance with the constructs of the modified IM: intention, skills and self-efficacy, and environmental factors. However, for better flow, the first level of environmental factors, intrapersonal, is presented prior to skills and self-efficacy. With the exception of intention, the major themes for the three infant feeding groups are summarized at the end of each section. In addition, Table 5 summarizes the major themes for each of the three infant feeding groups and Table 6 summarizes the participants' recommendations for increasing exclusive breastfeeding rates.

Intention and Practice

Women who breastfed for at least four months. All six women who breastfed for at least four months had intended to breastfeed while they were pregnant. Five of the six participants intended to breastfeed for six months to one year. Four of them never supplemented with formula, one started supplementing at two days and the other at six months. The median duration of breastfeeding of three of the participants was six months. The rest of the participants had not yet stopped breastfeeding at the time of the focus groups.

Women who breastfed for three months or less. The group of thirteen women who breastfed for three months or less had a median duration of breastfeeding of one month. They varied in their prenatal infant feeding intentions, from those who had intended to formula-feed (“I thought I was gonna give her bottles, I ain’t thought about breastfeeding”) to those who were

ambivalent (“I wanted to try it [breastfeeding], but I just wanted the bottle. I want to try it so I could say that I tried it”) to one who intended to do so for an unspecified long time (“I was planning on going the whole way [with breastfeeding].” “Until they drive?” “Yeah.”). All of them supplemented with formula, beginning from the age of two days to three months. Below is another example of a mother’s ambivalent breastfeeding intentions.

[When I was pregnant] I thought I was going to do pretty well [with breastfeeding]. I didn’t really expect me to breastfeed as long as I did because I thought – I kind of knew it was going to be hard. It wasn’t going to be easy...[When I was pregnant, I planned to] breastfeed....Umm, I planned to do it for like maybe a couple of months.

Women who only formula-fed. Almost all of the nine women who only formula-fed their babies had intended to do so while they were pregnant. Only one woman intended to breastfeed and another was ambivalent (“fifty-fifty”).

Intrapersonal – Infant Feeding Attitudes

Women who breastfed for at least four months. Women who breastfed for at least four months valued breastfeeding and described its benefits over formula-feeding, using terms like “healthier”, “saves more money” “closer to the baby”, “don’t have to worry about making bottles”, and “you can just open your bra”. One mother summarized the benefits:

The milk is warm, anytime, anywhere. You don’t have to really prep anything outside of making sure you know if you’re in public,...you’re not exposed to anybody else...or really too offensive to anybody else....It’s already the right combination of things for your baby, so you don’t have to worry about your child being allergic to your breast milk, you know, because you already make what the baby needs, and your body already knows what your baby needs and is...able to take in and you don’t have as many challenges as

far as like colic, and...trying to find the right size nipple, because hey, you got them, you know? And it just... seems to be something that I guess I wish more people would really do, because you're made for your child and your child is made for you...so it's not you trying to make something happen, it just will happen naturally if you let it.

This group of women cited numerous problems with formula: “gassy”, “constipated”, “puking all the time”, “price”, “more difficult”, “cumbersome”, “child gets sick”, “you run out”. For those who gave their babies formula, it was not an easy experience: they felt guilty feeding it to their infants. Two women described their initial negative feelings and the eventual adaptation of both mother and infant.

I never really wanted to give him formula, for real....The fact that I had to give him formula [was difficult]. Cause I really wanted him to stay on breast milk but I couldn't so I had to do what I had to do but it wasn't really hard or easy, just the water in the bottle and the formula and that's that...I just looked at it as if he was eating, I guess.

It was just hard emotionally for me with my daughter just because I felt bad [giving formula] ...cause I guess I had set up in my head that I wanted to do it [breastfeed] for a year....I just was sad about it cause I wanted to really do it and I was like, “Man I can't do it anymore”...I was just like, “She gotta eat this nasty stuff”...There was time when I tasted it [breast milk] just because it had got on my hand ...and it was like sweet and then I ended up tasting the formula and it just was like, terrible. Oh my gosh, it tasted awful and I was like “Eww” ...I called the doctor and was like, “Do I have to give this to her like is there something else, like do y'all have something different?” -- and they were like, no this what it is and I'm like, “Okay”. But ...the first day she really didn't like it

and I thought she wasn't gonna eat and then the next day she just took it cause I guess it was what she had so she figured she had better eat it, but I got over it.

Women who breastfed for three months or less. The women who breastfed for three months or less were knowledgeable about breastfeeding, in particular the benefits (healthy and smart baby, mother's weight loss, free), and had initiated breastfeeding successfully. Several had enjoyed breastfeeding, expressed the desire to breastfeed their next child and regretted the early weaning. "That bond [from breastfeeding]....Me and my baby, like, waking up when she wake up, because my baby did not cry until like two months old....That's how my baby was."

A characteristic of this group is that they had many positive and negative comments about both breastfeeding and formula-feeding. Some expressed openness to both forms of feeding, not feeling strongly one way or the other. They recognized the benefits of breastfeeding: health ("don't get sick as easy", "good stuff coming from your body"), intelligence ("It make the baby smart"), cost, convenience ("you just snap the boobie in they mouth"), and bonding ("like I said the nutrition that comes from it and the extra bonding for me. And then – my first child, so I want the best for my son anyway"). However, they experienced pain and low milk supply ("he would latch, he would do everything he had to do....I produced for the first two days and after that, the water works shut off.") and avoided breastfeeding in public ("You don't want to be out in public doing it, you just want to be in the comfort of your home, where you feel comfortable.... I guess it's just like a striptease outside a little bit, if you ask me"). One woman clearly expressed conflicting thoughts: "I wasn't comfortable thinking of a little person just sitting there sucking on my breast all day.... No, but I did want to [breastfeed]. I wanted to for the benefits of the breastfeeding." Some found breastfeeding time-consuming, contradicting the opinions of other women. "It's [breastfeeding] time-consuming...like, when you get the formula

depending on if it's already liquid or solid, you can just put it in the bottle, shake it up, and here to go. But when you breastfeed it takes more time.”) However another mother stated: “it was convenient for the breast milk....You ain't got to get up, make a bottle, heat up water, clean bottles... You can just get up, whip your boob out...”

Some women who breastfed for three months or less distrusted the quality of their own milk as compared to formula, due to smoking, drugs, medication, infectious diseases (e.g. HIV/AIDS), eating habits (e.g. “spicy” or unhealthy foods), or hormones. These women expressed concern that their milk would be unhealthy for the baby. For example, the participants in the following exchange were concerned about the impact of smoking on the quality of their milk and the potential impact on the baby.

[Participant 1]: Shoot, every time I smoke a cigarette, I put her on the bottle. I just don't want to take no chances.

[Participant 2]: Yeah, that's why I be scared, because there's a lot of toxins in it.

[Participant 1]: But I just can't quit smoking cigarettes.

Related to this was the unwillingness or inability of some women to give up their customary habits, for example, smoking and unhealthy foods. The first woman quoted below was unwilling to stop eating unhealthy foods. In the second quote, the woman attributed her unhealthy habits to stress related to single parenting.

Well I can say what made me really stop [breastfeeding] was, I really wanted to eat, you know, normally like I used to, so I just started eating a lot and that really kind of drew me away from, you know, feeding my baby, you know, from the breast. Because I like...greasy, greasy food instead of, you know, baked foods and stuff like that.

I was eating unhealthy and smoking cigarettes because I was just stressed out... No help.... It was like I was a single mom, parent, getting up early in the morning, you know, things like that, bathing, cleaning, you know, taking care of both of us. It's tiring and it just stresses you out.

Some found formula-feeding easy and convenient, but disliked some aspects of formula, including its poor effect on their babies' gastrointestinal systems ("The gas, bowel movements, throwing up...when she was on the breast milk, she weren't throwing up, then I put her on the formula, she started throwing up.") This mother expressed ambivalence and so prepared herself either way: "I guess you could say I was in the middle because like I said, before I had a baby I was already undecided so I was ready either way it went." In fact, a few women were ambivalent around both breast and formula-feeding and proposed "powder breast milk" to help women breastfeed.

[Participant 1]: ...at least take our breast milk and make it powdery or something.

[Participant 2]: Yeah, that be something different...a powdered formula that's ... that's close to a breast milk...they got the powder, I got the water, so I just put it in together with that and the baby will still think that, OK, well I'm still drinking my momma's breast milk.

Women who only formula-fed. In general, the women who only formula-fed were knowledgeable about the benefits of breastfeeding. Some had observed friends who had breastfed and noted how they had lost weight, overcome pain, and adjusted to the baby on her nipple. However, they had many doubts and unanswered questions about breastfeeding.

The perceived pain of breastfeeding was a predominant barrier to breastfeeding. Below, in response to a question about what would have made it easier to choose to breastfeed, three participants echo each other's conviction that breastfeeding is painful:

[Participant 1]: If it didn't hurt.

[Participant 2]: If it didn't hurt.

[Participant 3]: If it ain't hurt.

As with the breastfeeding women who weaned early, some of these women distrusted the quality of their milk due to possible toxins in their bodies, as described below.

But at the same time any medication, ... you can be on bipolar medicine, you could be on blood pressure medicine, you could be on anything and it can affect your baby, see, that, that's what they finally realized so because all that is in your bloodstreams and in your body, everything, your baby getting that milk out your body so whatever you have in your body, your baby is getting in their body. So it's not just nicotine or whatever the case is, it's everything basically, so then you just can't say nicotine, don't smoke or don't do this, because anything could go there.

Some women expressed discomfort with having a baby at the breast. While one woman elaborated that this discomfort was due to not wanting to have the baby with her everywhere, two women described the discomfort as fear of sexual arousal with breastfeeding.

[Participant 1]: Yeah, cause I know...when the baby latch on and you can feel the sucking, I know it feels like, you know what I'm saying, like ooh, ooh...You, you feel them sucking on your breast ...it feels, I mean, I don't know how it feels cause I never did it, but I know it feel, like I wouldn't try it, but I'm just saying like, I know it feel, like, funny, you know what I'm saying, like...

[Participant 2]: It brings like you know, sexual things...and so you don't want the baby sucking...(laughter) getting aroused ...(laughter).

Another barrier that was frequently reiterated was the inconvenience of breastfeeding. This also took on several forms, from unwillingness to give up a lifestyle (e.g. smoking, clubbing), dependence of the baby on the mother, and the inconvenience of breastfeeding in public.

Sure. I felt great giving it [formula] to him ...cause I looked at it like, What am I giving up...other than, I smoke outside, I don't smoke around my kids, so what am I giving up? I don't have to give up anything if I use formula. The only thing I have to give up for real is gas once a month to get to the grocery store.

You know it's time for your baby to eat, what are you gonna do? Leave the club...to go home to pump? No. That formula is right there, all you gotta do is give instructions.

But even if my immediate family did breastfeed or I was breastfed, that was not my cup of tea because, like I said, I didn't feel comfortable, and I would have to take my baby everywhere, and that's something that was not my cup of tea.

The privacy [is what I don't like about breastfeeding, besides pain]. Like I said you can be anywhere and your baby can be hungry and you have to just stop and feed your baby ... you know, it's too much for breastfeeding.

Some women were assertive about their decision to formula-feed. They felt strongly about women's rights to choose formula-feeding and not be coerced into breastfeeding.

[Participant 1]: “I wouldn’t want to change it [to make it easier for women to breastfeed]...I mean, cause people have their own opinion ... that’s not something that you could ask anybody because everybody have their own opinion of how they want to do things.”

[Participant 2]: Yeah, you can’t just like coerce, you know what I’m saying, some – on somebody they don’t want to do.

[Participant 1]: Cause that could be more stress on them.

[Participant 2]: Like, “Oh my God, I just gotta breastfeed my baby, I don’t want to do it but I got to do it.” Like they don’t have a choice.

So I mean, but, regardless of who, who give you opinions, at the end of the day it’s your opinion of how you think that you can be better off doing, because can’t nobody make you or tell you what to do with your child, you gotta be comfortable with what you’re doing.

Interestingly, this group of women did not mention the price of formula as a barrier to formula-feeding. Instead they mentioned the inconvenience of formula preparation, the process of trial and error to find the formula best suited for the baby, gastrointestinal health problems, and supplementing early with solid foods to satisfy the baby. However, none of these problems had deterred them from formula-feeding.

Summary of themes: intrapersonal level – attitudes. Women who breastfed for at least four months discussed valuing breastfeeding and disliking formula. Women who breastfed for three months or less commented both positively and negatively about breastfeeding and formula, several expressing ambivalence toward both infant feeding methods. Some expressed distrust of

their own milk and were unwilling to abandon unhealthy behaviors. Nearly all the women who only formula-fed were aware of the benefits of breastfeeding but major barriers were perceived pain of breastfeeding, distrust of breast milk, and fear of attachment to the nipple. Some women were quite assertive about their decision to formula-feed their baby. Although women recognized several problems with formula, they were not sufficient to convince them to breastfeed.

Skills and Self-Efficacy

Women who breastfed for at least four months. Some of the women who breastfed for at least four months encountered the same or similar barriers as the ones who formula-fed or breastfed for less time. However, they persisted and surmounted the obstacles, particularly those they encountered early. One example is a participant's response to pain during the early days of breastfeeding. She stated: "it's [the pain's] not that long. It's really painful, but, if you can get through those few days you'll be A-okay". In this case, the mother showed persistence and determination to continue breastfeeding in spite of the short-lived pain and was later rewarded as the pain disappeared. Some searched for information to learn more about breastfeeding: "...but the things that would really be helpful like that sometimes you have to go and find out on your own or research on your own". In the case below, the mother was resourceful in turning around her diminishing milk supply. "I started stressing, and stress interferes with your whatever....My milk ...stopped coming in, so I had to start taking the vitamins and taking the warm showers, ...but it started coming back, so I was happy with that."

Once the women mastered breastfeeding, they found it easy to breastfeed and fit into their lifestyle.

At first, I didn't feel very comfortable with it, it was hard, especially with engorgement and like the milk actually coming in, and trying to get him to latch. So it was difficult at

first...when I had to go out in public, like I was ...nervous to ... even think about trying.
But now, ...I'll cover myself and feed him where I'm going or ...go in another room.

At night, when I'm trying to sleep, you don't have to wake up in the morning...I just turn to the side, pull him in, and that's it...you go back to sleep together.

At least in the beginning, these women seemed to prioritize breastfeeding, planning their days around assuring breastfeeding success. Planning takes on many forms – the common element being the process of anticipating the next few hours and garnering the resources to meet the baby's needs during that time. As one participant stated, successful breastfeeding is contingent on the ability and commitment to plan.

You have to kind of be a planner...you have to think about what you're doing and then you have to know, if I need to empty my breast before I leave, then I need to go ahead and try to pump. If not, ...you're going to run the chance of being full...they [the breasts] remind you and they start leaking and you're like, "Oh my gosh"....So sometimes that [pumping] can be a little inconvenient if you're not with your child...I think it's just making sure you plan ahead for when you're not gonna be around your baby and you're not gonna nurse....But outside of that...it [breastfeeding] just doesn't seem as difficult to me....

She also described how she planned to breastfeed on a long road trip.

Well, I've been on a long car trip before...and that's tough, ...especially if you're not in a safe place to pull over or somethingYou try to get to a safe place, a rest stop or go to ...some restaurant or something where you can pull over, be safe, and then...nurse

them....What I really like to do... is at least have something pumped, so that...either somebody in the car can...feed them... or I can easily... pull over.

Another mother described how she looked for and took advantage of any opportunity to express her milk when she returned to work. She developed a system, adhered to it, and felt accomplished.

I would just wake up in the morning, pump while I fed him...you know, and then on lunch break, pump again, and then by the time three-thirty, I'd get off, pick him up, and you know, feed him, pump again, and in the night before I'd put him to bed, pump one more time while I feed him....So that actually worked out pretty good too.

Breastfeeding in public presented a singular challenge. Unlike the women in the other groups, these women asserted their need to breastfeed wherever and whenever the child was hungry. They were not deterred by other people's opinions; indeed, some sought to change them. Below are two women's experiences.

I have done it in the mall and grocery shopping...You couldn't really tell what I was doing, though, so that made it a little bit better.

Especially when it comes to your child, I don't think no one's supposed to care about what other people think anyways. Like, when I was breastfeeding I was in Regency, and somebody walk past and was like, "Will you look at that?" "Yeah, will you look at it, I'm feeding my son, he's going to eat. Now will you keep walking?"...If somebody sees someone breastfeeding, they should just look and keep it moving...think, "Well, she got to do what she got to do, she got to feed the baby," and that just be that.

I've never been in a situation where I felt embarrassed or felt like I needed to stop feeding my child because someone else said something. So you just have to kind of have, I guess, a thick skin, or have to have the kind of courage to say, "Look, my child's hungry, you feed your child, I'm feeding mine."

As time went on and their lives became busier due to work and other obligations, the attention to breastfeeding became less feasible, and some began supplementing with formula or weaning entirely. Some women faced challenges they found insurmountable. One woman's early supplementation and pumping led to a diminishing milk supply and ultimately complete weaning. She sought but did not receive helpful information from her doctor, had competing demands on her time, and became impatient. She turned to formula as the more reliable alternative.

Yeah, he learned to latch on good. He learned to latch on good and at the time I was just in the house, weren't really going nowhere so it was like I fed him all the time, mouth to breast. It was like when I started going places, I would have to pump and for some reason it would do different if it was him than the pump. So it was like I could get him to drink more than what I could actually pump. And it got to the point where after a while I wasn't in the house a lot so that's actually how he became drinking formula at the same time or like if I had something to do or my mom would watch him and ...when I pumped I couldn't get a lot of milk. So it was like that was the only other option I had, like, okay, eat WIC.

Personal characteristics of these women were compatible with high levels of general self-efficacy, not only breastfeeding self-efficacy. They included assertiveness, self-reliance, autodidacticism, foresight, critical thinking, confidence, resourcefulness, and control over their

environment. They planned to assure their children would be breastfed or fed breast milk. They sought knowledge, not waiting for others to teach them, and made use of resources. Several mothers had problems when they first started breastfeeding, but persisted and learned how to overcome the barriers. Faced with a hostile or unsupportive environment towards breastfeeding, they developed a ‘thick skin’ and asserted their rights to breastfeed in public.

Women who breastfed for three months or less. The women who breastfed for three months or less varied in their level of self-efficacy, from the woman who directed hospital staff to follow her birthing plan (including bringing the baby to her on demand and not giving her baby a pacifier) to the woman who was easily dissuaded by her grandmother’s painful experience. In this last case, the woman took the initiative to learn about mothering by reading and asking family members about breastfeeding but she was influenced by her family’s experience.

I stayed reading, you know, books on the pregnancy by me having my first child, but my mother had six kids so she breastfed one time but the rest of them was formula and I asked my grandma, “Did you breastfeed?”...She breastfed but it hurt, it’s like kind of scaring me. So I just went along with the formula. I tried to breastfeed but afterwards I just took the formula.

Ultimately, these women did not have the conditions to continue to breastfeed for very long: common reasons were nipple pain and low milk supply. Both of these reasons originate, for the most part, from mistaken infant feeding practices, such as early supplementation with formula, poor positioning, scheduled feeds or infrequent milk removal (Riordan & Wambach, 2010). They had enough knowledge and skills to initiate breastfeeding, but not enough to sustain this behavior. When a mother received advice that supported formula-feeding, especially from a

source of authority, she tended to turn to formula. Consider this mother who had intended to breastfeed for eight months, experienced nipple pain, and was dissuaded by her doctor.

I wanted him to be breastfed and see if I could try to go a long way... But I couldn't do it, I couldn't go past that three months ...because my nipples getting sore, my nipples getting red, so my doctor said, "I prefer for you to bottle-feed".

Another mother feared she was not breastfeeding correctly and that her son was not feeding appropriately. She did not mention seeking any resources for help. Instead, when she encountered difficulties, she decided to use formula.

I used to pump...they told me to make sure my nipple was kind of hard and stuff at the end...make sure he latch on, but...I just didn't know if he was latching on right? I guess that's what made my breast sore...but it was all confusing to me, but I kept on doing this, and he was getting a little bit of milk....Then he would let go and just cry like I'm not doing it right....So that what made me go ahead and give him the bottle at three months.

The group of women who breastfed for less than three months did not display consistent personal characteristics but rather were defined by a multitude of different views and experiences and ambivalence. They had the skills to initiate breastfeeding but did not have the conditions to continue the behavior.

Women who exclusively formula-fed. Women who only formula-fed expressed insecurity and fear about breastfeeding. This insecurity or fear took on several forms. One was the fear of the unknown as this participant articulates well: "Being insecure and scared...I fear change. I didn't want to do something that I knew was different."

Another type of insecurity was the fear that breastfeeding would fail and the baby would be left hungry. Some women felt their breast milk was not a reliable source of nutrition for their

baby. One woman described observing how a friend's breastfed infant seemed hungry all the time. Here, two participants talked about the worry of not having food for the baby.

And I agree with her, like with the fear...I didn't know if the baby was gonna latch. I didn't know if I had enough...if I was gonna accumulate enough breast milk to be able to pump and dump so I wouldn't have to use the can....I wouldn't want to tell the WIC that I'm gonna [breastfeed], because milk in my neighborhood is seventeen dollars at both stores for a can, and I wouldn't want to tell WIC that I'm ... gonna breastfeed and my son don't latch onto it, you know, so that's why...but that was my fear.

I mean, it [formula-feeding] beats, well, having a lot of stress, basically. You have a little stress but it's not much as wondering if your child's gonna latch on this day, or what you want to do, cause what if your child don't latch on for like two days? Which is of course, you have to call your doctor, do all this about with the formula and make all these appointments with the WIC office because nine out of ten it's not 'til the next day that you can get in. So you would have to buy the formula.

Formula was seen as having many attractive qualities. One perceived quality was its ease and convenience of preparation. Three participants completed each other's thoughts as they described how easy it was.

[Participant 1] "You just pour in the water in the bottle"...

[Participant 2] "Just put the formula in the bottle..."

[Participant 3] "Swish it up."

Formula-feeding was comfortable, traditional and familiar.

It [formula-feeding] was something I was comfortable with doing because I have other nieces and a nephew and it was – they had, were bottle fed so it was something I was familiar with. I was comfortable. I was in my zone.

Summary of themes: skills/self-efficacy. Women who breastfed for at least four months were determined to breastfeed successfully. They described a high level of self-efficacy, including resourcefulness, the ability to plan, and assertiveness. While they encountered similar barriers to breastfeeding as other women, these intrapersonal characteristics seemed to help them overcome many obstacles. The women who breastfed for three months or less varied in their level of breastfeeding self-efficacy. They had successfully initiated breastfeeding but did not have the knowledge, skills, or support to sustain the behavior. The women who only formula-fed expressed fear and insecurity around breastfeeding: fear of the unknown and fear of their baby's hunger. They viewed formula-feeding as more convenient, familiar and compatible with their lifestyles as compared to breastfeeding.

Environmental Factor: Interpersonal

In this section, I examine how interpersonal relationships influenced infant feeding practices in each of the three groups. The breastfeeding groups were similar in that their social network of family and friends provided them with conflicting infant feeding advice. Some family members or friends recommended formula; others wanted them to breastfeed. Those who supported the women played a number of roles: encouraging, being positive, advising (e.g. importance of breastfeeding), applauding, coaching, giving tips, helping with baby, giving them pumps, sharing stories, and following-up.

In addition to close family members and friends, women described larger networks, some formal and some informal, that provided support or influenced their decisions. These included a

mother's room at a work site where mothers would congregate to share stories and support each other. Another mother described her group of friends who were pregnant at the same time and provided an informal support network – all but one decided to breastfeed.

Women who breastfed for at least four months. The women who breastfed for at least four months received strong support to breastfeed from many different sources. Some mentioned close family members such as the baby's father and their mother; others credited co-workers, friends, and other family members with supporting them. The baby was also mentioned as encouraging breastfeeding. However, they also received pressure to formula-feed. In the instance below, a mother described how her fiancé helped the baby latch on and provided ongoing encouragement that counteracted her mother's pressure to formula-feed.

Because it was him [my fiancé] and the lactation specialist, and they both were like trying to help like him latch...and he would rub his cheeks up and come latch on, and like he was just there to like, you know, be positive...because in one ear I have him, and in the other ear I have my mom, like “You should just formula-feed, just give him formula, it would be so much easier.” So...like, and he just kept you know pushing me to do the, the breastfeeding...so it was good for him to be there, you know, to – with the positive influence, because it was something that I really wanted to do...If he wasn't there, I probably would've, you know, listened to my mom and initiated the formula...!cause it was hard at times.

Several women related how they resisted negative influences and asserted their will to breastfeed. One woman stated: “...some of my family even frowned upon me because I breastfed, I was like, “It's none of your business,”. Another said: “Oh, it didn't matter to me what they,

what they [my family] thought about it [not favoring breastfeeding]... Because, I mean, cause it's healthier for him, so it doesn't matter to me.”

Interestingly, there were several instances of family members' views of breastfeeding changing as a result of the mother's breastfeeding. For example, women described family members becoming accustomed to the breastfeeding or educating themselves about it and then supporting her. This type of influence, from breastfeeding mother to family, was not observed in the other breastfeeding group. An example is how a participant changed her family members' negative attitudes toward breastfeeding:

Well we were chilling in the living room and ...I just pulled my breast out. She [my sister] said I traumatized her for life, but you know they end up getting used to it after a while... Like I started covering up a little more when my daddy came around but, yeah, they just came used to it.

Another participant described how the baby's father's attitude changed.

My kid's daddy didn't want me to breastfeed because the privacy and being out in public....That was his only reason but then he figured out what was going on....He became more educated. He was just worried about me having my breast exposed and being in public. He didn't like that too much, but then he got more educated about what breastfeeding really is, so then he was cool with it.

A variation of this concept is the following example of a mother's response to her mother's pressure to formula-feed. She was not swayed by her mother's views; instead she wished that her mother would change her opinion and support her instead. This quote demonstrates the breastfeeding mother's independence of thought and her determination to follow her beliefs in spite her mother's advice.

My mom, she really wanted me to formula-feed, she did not want me to breastfeed ... If it's your choice and it's something that you want to do, I feel like they should be accepting of that [breastfeeding] rather than trying to discourage you from doing it.

The women in this group were exposed to both encouragement and discouragement to breastfeed. As becomes evident in the next section, a difference between the breastfeeding groups appeared to be in how the women responded to the pressure not to breastfeed or to formula-feed.

Women who breastfed for three months or less. The women who breastfed for three months or less also received mixed advice and support to breastfeed or formula-feed. There were several examples of supportive family members and friends, such as aunts, church sisters, and the baby's dad. However, negative influences were also substantial. Their responses to the influences were more varied than in the previous group, with some asserting their desire to breastfeed in spite of contrary family influences while others were influenced by other people's negative breastfeeding experiences or advice.

At my mother's house...every event I went to when I was breastfeeding my son, I did not like breastfeeding there because all you hear is, "Why you breastfeeding the baby right here? Don't nobody want to look at that." Turn your head...I was at my family house, so I was thinking my family shouldn't been saying stuff like that.

See, my momma was like, I breastfed my – she breastfed my brother and he – she was like, "I only did it for this certain amount, cause that mess was hurting me, that boy was a big baby and he was greedy," and I was like, well, hey.

Some of the women reported families that left the decision up to them and offered to support them in their decisions. “They was fine with whatever I did as long as if I sent the baby to them or with them, as long as I packed up enough or had pumped up enough milk to send with them.” Some women wished they had received more encouragement and support to continue breastfeeding or to break unhealthy habits, like smoking.

[Participant 1]: I wish it would have lasted a little longer, too, and I wish I would have had positive people around me, you know, to keep me, you know, going....They would have done everything. Put in good word, ...keep me happy, you know, instead of all depressed and stuff...Right. Having someone to talk to.

[Participant 2]: Yeah, I can agree with that one, too.

Among the women who breastfed for three months or less, a few said the fathers felt useless when the mothers breastfed, and consequently were frustrated by their inability to help the breastfeeding mother. In contrast, they thought fathers felt more useful giving the baby a bottle.

They [the dads] want to feed they baby....They like to do that, because they want to bond just like how a mother bond when they breastfeeding...they want to bond, or when the baby cry, they don't want to have to come to you for you to fix it, they want to be able to fix it on they own...that was my baby daddy problem, all right. He used to get mad.

One mother, who breastfed for three months or less, stopped breastfeeding so that the father could be more involved. In another case, a father, to assist the mother, began giving the baby formula, starting a path toward weaning.

Women who exclusively formula-fed. Some women in the formula-feeding group described receiving encouragement to breastfeed and formula-feed from family and friends.

However, they ultimately decided to formula-feed. Some interpersonal influences included having observed younger family members formula-feeding and knowing they could get more help with formula-feeding. One said, "I always was in a family of bottle-feeding" and described how she prepared bottles as a child for younger siblings.

My immediate family, they always was on formula...I know about kids. I was making bottles at the age of five. I have six siblings, so it's nothing you can tell me about breastfeeding or formula...That's why I feel the way I feel about formula....Because I helped my mom a lot with my brothers and sisters, and I was making bottles since I was five.

Similar to the women who breastfed for three months or less, women in this group mentioned one of the attractions of formula-feeding was how easily others helped with formula-feeding the baby, as compared to breastfeeding.

But if I wanted somebody to watch my child, you know, being that she was on formula, all I got to do is, you know, give them the nursery baby water and have the can of formula, and then being that they know how to make bottles, shoot, go ahead, you know, that's easier for me.

One reason a mother decided to only formula-feed was because the father's family, with whom she lived, overwhelmingly supported formula and wanted to care for the baby.

They [maternal side of family] were supportive [of breastfeeding]...I mean, yeah, [the baby's father's side was supportive of formula] only because they wanted to be able to take her out more often and stuff...and I didn't have the money nor the equipment to freeze and everything like I wanted to, so that's what made me switch over [decided to

formula-feed] because I was just like, I'm not up for it, because I was living with them ...so that made it harder on me, personally.

Summary of themes: interpersonal level. Women in both breastfeeding groups experienced influences from close family and friends that were both favorable and unfavorable to breastfeeding and formula-feeding. Those who breastfed longer tended to ignore or convert the negative influences whereas those who breastfed for a shorter period demonstrated a less consistent pattern of behavior. Some of the women who breastfed for three months or less described their families as neutral, providing support to the mother, regardless of her decision. However, women in this breastfeeding group wished that they had received more support to breastfeed. Women in the formula-feeding group also received mixed advice, but ultimately decided to formula-feed. Some attributed their comfort with formula to family traditions.

Fathers were mentioned by women in all three groups. Instances of fathers who were supportive of breastfeeding were mentioned by some women who breastfed the longest but in the other two groups, a predominant theme was that fathers were more helpful with formula-feeding.

Environmental Factor: Institutional Level - Prenatal Healthcare Providers

Women who breastfed. Both groups of breastfeeding women, those who breastfed for three months or less and those who breastfed for at least four months, had similar experiences with prenatal healthcare providers. For this reason, the two groups are presented together.

When asked about doctors, the predominant theme among breastfeeding mothers was the doctors' prenatal promotion of breastfeeding. Women who breastfed for any duration credited their doctors with heavily promoting breastfeeding, educating their patients about breastfeeding, and influencing their decision to breastfeed. One woman, who breastfed for at least four months, summarized her experience this way:

Like during her pregnancy and listen to the doctors, and doing research, it's like that what really make someone just only want to breastfeed...because they [the doctors] tell you about how healthier your baby will be, like they say how it keeps the baby from being sick, like they get sick, but not as much as a formula-fed baby. They tell you it makes the kid smarter, a lot of stuff. It's like really good, and it will make you think, "Oh, well that's all I want to do, is just breastfeed" (woman who breastfed for at least four months).

The message women heard from doctors was that breastfeeding would be healthiest for their babies. The women did not mention hearing about the benefits to mothers (postpartum weight loss, health benefits). Some women received additional information, such as the proper latch to avoid pain, the importance of colostrum, and the timing of milk production. However, they seemed to have received limited information on addressing common problems encountered in breastfeeding and referral to community resources for help.

How women responded to the breastfeeding promotion by doctors varied. One woman, who breastfed for at least four months, observed that she received a lot of pressure not to breastfeed from "a lot of people", but she credited her own strong-mindedness and the doctors' influence with her decision to breastfeed. Another woman, who breastfed for three months or less, felt she wasn't really pressured by the healthcare providers ("The pediatrician wanted me to breastfeed too, but they don't pressure it on you either, so they were just like, breastfeeding is, it has more nutrients in it and stuff than the formula") and another (from the same group), who had already decided to breastfeed, felt excessive pressure to breastfeed from doctors and nurses ("they just seemed like they was just pressuring me a little too much, like going from, you know, just pressuring me. I already said I was gonna breastfeed, but I mean, overall it was okay").

In spite of the heavy promotion of breastfeeding by doctors prenatally, women in both groups noted the mixed messages doctors gave through distribution of free formula samples and coupons at the first prenatal visit. A mother from the group who breastfed at least four months stated:

When we found out that we were pregnant, ...they gave us this huge package, this thing at the doctor's office ... with...all kinds of stuff, and then they had... a whole bunch of Similac coupons and...a free sample pack of the Similac....The doctor, of course, promoted doing it [breastfeeding], but it was almost like they contradicted themselves by giving me this package that gave me free formula....To me it just sent a mixed message that, "Hey, breastfeed, but here's another option if you wanted to." So, I mean it wasn't forced on me or anything, but it definitely was...if it was free, hey..

Another woman (who breastfed for three months or less) wondered whether doctors received incentives from formula companies to promote their product.

So I'm not sure if they [the doctors] get money, you know, I know they get a little bit of stipend or whatever from like the pills and stuff they suggest, I'm not sure if maybe Similac...I'm not sure if maybe they get an extra incentive for that.

While doctors heavily promoted breastfeeding, the women did not report receiving a message from doctors on the risks of formula. On the contrary, several breastfeeding women seemed to feel doctors supported formula as an alternative or supplementary feeding method ("they [doctors] will be ok with it [formula]" (mother who breastfed for three months or less)).

Women who exclusively formula-fed. Among women who only formula-fed their babies, several reported that doctors encouraged breastfeeding. However, the doctors' opinions did not sway them. "My doctor tried to get me to breastfeed but when they was talking to me, I

wasn't comfortable doing it." As with the breastfeeding mothers, they did not report any risks of formula-feeding being mentioned by doctors. Some of these women faced difficult dilemmas. Two formula-feeding mothers smoked: one mother's doctor encouraged her to breastfeed even though she smoked and a doctor encouraged the other mother to stop smoking. "My kid's doctor said, "Stop smoking, you'll be a good candidate for – for this, you have twins". But I didn't want to stop smoking. And I still don't want to stop smoking. I got Newports in my pocket now." Neither of them stopped smoking nor breastfed.

Summary of themes: institutional level – prenatal health care providers. We heard overwhelmingly that doctors promoted breastfeeding prenatally, but did not hear that doctors discussed the risks of formula, the benefits to the mother, nor details on the breastfeeding experience. How women responded to this advice varied – for some, it reinforced their conviction to breastfeed or encouraged them to try, but for others, the message was not sufficient to counter their convictions. Some women remarked about the mixed messages doctors sent by distributing free formula samples and coupons.

Environmental Factors: Institutional Level - Hospitals

Overview of hospital practices. In general, women in all groups reported strong promotion of breastfeeding in the hospital. However, infant feeding policies and practices varied. Women experienced hospital practices that supported or limited breastfeeding, discouraged or promoted formula-feeding or some combination of these. Women reported practices that were both compatible and incompatible with the "Ten Steps to Successful Breastfeeding" of the Baby Friendly Hospital Initiative (BFHI) (see Table 7), possibly reflecting the gradual transition of hospitals to Baby-Friendly status. BFHI-compatible practices that women reported included placing the baby skin-to-skin at birth (step 4), helping with lactation during the entire hospital

stay (step 5), rooming-in (step 7), encouraging breastfeeding on demand (step 8), and referring to post-discharge breastfeeding support (step 10). Examples of these supports and their corresponding BFHI steps are in Table 8.

Women also reported practices that were incompatible with the BFHI steps. These included not being shown how to breastfeed (step 5), supplementing the breast milk with formula (step 6), not rooming in (step 7), bringing the baby to the mother to feed on a schedule (step 8), and giving the baby a pacifier (step 9). These practices reflect inadequate training of staff to implement BFHI in the hospital (step 2). Examples of these practices are in Table 8.

Women reported on hospital practices around formula promotion and distribution. Two women reported finding formula in the baby's hospital bassinet and feeding it to their babies when difficulties with breastfeeding arose. Since formula was nearby, it was easy to feed the baby formula instead of asking for help with breastfeeding. "They gave me them bottles, and it was tempting for me to give her a bottle... Yeah, just seeing them bottles sitting right there [in the bassinet], I just had to give it to her" (mother who breastfed for three months or less). However, based on women's reports, it appears that hospitals are also considering how they can stop promoting formula-feeding as well as how they can increase the barriers to formula-feeding. Some formula-feeding women lamented the reduced amount of formula they received at discharge. One mother reported having to get up to ask for formula: "Yeah, that's what they [the hospital staff] gave me [bottles with formula]. I had to go out for them though" (mother who breastfed for three months or less).

Women who breastfed for at least four months. For the most part, women who breastfed for at least four months reported receiving instruction in the hospital on how to initiate and maintain lactation. They did not report awareness of any promotion of formula at the

hospital. They appreciated the availability of lactation consultants and nurses to answer questions and take the time to explain breastfeeding. One woman described the support as follows:

I felt like they [hospital staff] took time to really make me feel like if I had questions or if I wanted them to be there for the whole time I was feeding ...sit there with me and ... help me adjust the baby or adjust me or ...put pillows a certain way just to kind of make you more comfortable with it.

In the following quote, a mother describes the help and encouragement she received from the hospital lactation consultant and her mother. She felt well supported by hospital staff and her mother.

They had some lactation consultants come and help me with positioning and show me what I needed to do and how to hold the baby right and get the baby to latch on.... The support in the room, there was nurses there and the... lactation consultant had come and my mom was there and was telling me what she went through, so, you know, they just kept telling me, “Don’t give up”, so I didn’t give up.

For the most part, the women who breastfed longer had experienced hospital practices favorable to breastfeeding. As mentioned earlier, all of them had intended to breastfeed so the hospital staff’s approach was consistent with the women’ wishes, possibly creating a synergistic effect. Only one woman, who very much wanted to breastfeed, critiqued the nurses for feeding the baby formula.

Like if my baby couldn’t latch on, some of the nurses maybe would be impatient and just run and go get the little bottles, those formula, and it’s like okay, how’s he gonna learn, how to ever latch on if y’all gonna give him bottles, too?

Women who breastfed for three months or less. Women who breastfed for three months or less mentioned receiving hospital practices that helped and hindered breastfeeding and in several of the examples, the knowledge and skills the women acquired were insufficient to support long-term sustained breastfeeding. One mother, cited earlier (see Table 8, first quote under Incompatible Practices), had to repeatedly battle hospital practices that limited breastfeeding. Another mother said she was told about the size of a newborn's stomach – however, her limited understanding of newborn eating and sleeping patterns led to her worrying about insufficient milk. In this example, it appears that the mother did not seek information about her concern and the hospital did not provide the needed information. The mother's lower sense of self-efficacy together with limited education provided by the hospital may have led her toward a shorter breastfeeding duration.

I like how...the hospital kind of broke it down. It's like newborns, their... little tummies is only the size of...a marble?...A pea...I still...didn't know...how to measure if she was getting enough...I didn't feel like she was getting fulfilled, especially...she wasn't sleeping. I mean, two hours? I thought babies slept a lot more.

Another woman, with her baby in the neonatal intensive care unit (NICU), seems to have received hospital practices that both supported and limited breastfeeding. In this example, the mother was first told to pump her milk, presumably because feeding at the breast was contraindicated. She was then told to feed her baby at the breast and did so successfully. However, unsure of the amount her baby was receiving, she resumed pumping. Thanks to the hospital staff, she initiated breastfeeding successfully but did not seem to have received information in the hospital on proper assessment of her baby's intake of milk from the breast, nor did she take the initiative to learn about it herself. Again, neither the mother nor the hospital

obtained or provided the information that could potentially lead to more sustained breastfeeding, that is, an understanding of the feeding habits of newborns.

I was gonna give her a bottle, and ...right when after she came out of me, and they were like, “No, you need to pump,” so I’m like, “Alright I’m gonna pump,” so I pump, and ...I got like two bottles... I kept on trying to pump, and...I was tired...they waking me up two o’clock in the morning, I just had a baby. I ain’t feel like doing it. But I kept doing it, then it stopped coming out for real, like, and it was hurting, so they had enough milk to give her, but ...they wanted me to...get her to latch on.... She latched on real good, even when she was like a day old. But it was like she wasn’t getting food. I’m like, “Well, I need to pump it and put it in a bottle so I can see how much she drinking,” so that’s how I had to do it. I had to give her pump breast milk. Because she wasn’t getting full, because she was getting mad... She be snapping.

As reported above, a couple of women, both of whom ended up breastfeeding for three months or less, reported on the easy access to formula at their hospital(s).

Women who exclusively formula-fed. Most women who only formula-fed reported that hospital staff encouraged them to breastfeed. One reported that she was shown how to breastfeed. However, hospital staff was unsuccessful with these women – they had already made up their minds. One example:

Me, I didn’t smoke, drink or anything when I was pregnant....They tried to encourage me to breastfeed, too, but that’s not something that I wanted to do cause I never did it before and I wasn’t curious about it. I just decided just to bottle-feed.

It is hard to determine whether or not hospital staff missed an opportunity to convert these women to breastfeeding; for this group, there would be a fine line between encouragement

and coercion. Nevertheless, for some women, there was little attempt to encourage women to reconsider breastfeeding.

They came to me in the hospital. “What are you gonna to do? You want to breastfeed?” I said, “no”. I said I was thinking about bottle. They shut the door. So yeah, they gave me the WIC formula I needed.

The hospital helped these women with formula-feeding by distributing formula kits, helping them select the appropriate formula for her baby, and feeding their babies. However, one mother did mention the hospital’s policy to restrict the amount of formula given: “...and now the hospital is not allowing you to give that much formula out now, you only get a certain amount even if you get an amount when you leave the hospital.” Although the choice to formula-feed seemed straightforward, some women talked about the process of trial and error they went through to find a formula that did not cause health problems.

They got different milk for different things.... My son, he was acid reflux. That’s why he got to drink the purple can....They look at...what sickness your baby has when they come out... to know what kind of formula to try.... If that works, then they’ll work with that; if it don’t, then they’ll got to another style.

Summary of themes: institutional level - hospitals. In summary, efforts to support exclusive breastfeeding in hospitals varied significantly. In spite of the more positive breastfeeding environment in hospitals, women still reported receiving mixed messages about infant feeding and incidents of formula promotion. Overall, those women who had breastfed the longest reported receiving supportive experiences for breastfeeding; however some still had to demand more favorable practices. Those with shorter breastfeeding duration had experienced good support to initiate breastfeeding but not to sustain the practice. Several formula-feeding

mothers were encouraged to breastfeed and some were left alone but there was no mention of conversations to explore the reasons for their decisions and whether they could be convinced to breastfeed. Women who formula-fed seemed to receive good support for formula-feeding in the hospital.

Environmental Factors: Institutional Level - Postpartum Healthcare Providers.

Women who breastfed. Once at home with the baby, several women in both breastfeeding groups reported seeking advice from doctors when encountering problems with breastfeeding. In particular, several of the women reported turning to doctors for help with breast pain and perceived insufficient milk. It is difficult to know the circumstances under which advice was given, but women talked in both breastfeeding groups about receiving advice to abandon breastfeeding entirely, supplement with formula, and choose one or the other but not mix. The following mother discusses her first night home and her doctor's advice to supplement with formula when she thought her milk was insufficient.

My very first night when I brought her home was unbelievable. I left the hospital without no pacifiers, no formula, no nothing, just straight-out breast milk. It was unbelievable....I just felt like she wasn't eating...she wasn't getting enough milk. I started producing more as time went on, but like that first week was the roughest week ever....the first day, she cried nonstop, didn't go to sleep at all, stayed up for hours and hours and hours and hours....I went back to...my doctor that I just had the baby with...and I asked him, "What should I do, because I can't go another night like this." So that's when ...he asked me did I want to...try to give him some formula and some breast milk. I said I'll try to do that but I never did it...after two months, and that's when I decided to...go with the formula (mother who breastfed for three months or less).

Another mother, who was able to breastfeed at least four months, called her doctor's office but did not receive helpful advice.

I would call my doctor and they would, they gave me this stuff to like put on my breast to massage it, that did not work, like I don't, I don't know what my problem was but they tried to help me but a lot of stuff just wasn't working (mother who breastfed for at least four months).

The following mother experienced nipple pain. Her doctor advised her to switch to formula.

...my nipples getting sore, my nipples getting red, so my doctor said, "I prefer for you to bottle-feed."...[I had planned to breastfeed] up until he was a good eight months (mother who breastfed for three months or less).

One mother thought that a reason physicians recommended formula was due to the limited time doctors spend with patients and their need to expedite the visit.

[Participant 1]: The doctor don't know what they want. Because when I was taking her to [hospital], to the children's pavilion, they wanted me to breastfeed, when I switched my doctor over to Dr. X, he wanted me to put her on formula ...

[Participant 2]: They just say anything to get you in and out ...because the doctor she go to now, we won't even be back there for ten minutes... He get you in and out (mothers who breastfed for three months or less).

The reasons women gave for discontinuing breastfeeding, especially those who stopped by three months or earlier, were consistent with the paucity of breastfeeding advice they received postpartum. For example, one woman stopped breastfeeding because her breasts were leaking too much, others due to perceived insufficient milk, and another because she was fearful of the

contents of her breast milk: each of these reasons, with proper postpartum support, might have led to more prolonged breastfeeding.

Only one woman reported a doctor's recommendation favoring continuing breastfeeding: to increase milk production by drinking two gallons of orange juice per day. However, the woman calculated that orange juice would cost more than formula. She chose to switch to formula.

Well, the doctor tried to get me to continue to breastfeed, but ...the only thing that would help was me to drink juice and I had to drink like two gallons of orange juice a day. And that was too much orange juice because the price was just about as high as his formula was on the orange juice. And orange juice and formula, one of them wasn't going to work, so he got to eat, so he could have the formula and I would be without the orange juice (mother who breastfed for three months or less).

Reflecting the lack of support that breastfeeding women felt postpartum, one mother recommended more hands-on support through classes on breastfeeding techniques and home visits by lactation consultants to help women address breastfeeding problems.

Send a lactation consultant to their home, cause ...after you leave out the hospital, if you have a challenge or something at home I think it's a little more difficult to get somebody to help you at home...because you know you're not in the hospital, you're not surrounded by the doctors and the nurses who ...know about it and really want to help you and so you don't really have a lot of resources. I mean you can come to a WIC office and you know talk to somebody there but it's not like they can be at home with you ... where you're comfortable and you know work with you there (mother who breastfed for at least four months).

One mother who transitioned to formula experienced problems interacting with her doctor. Her baby had experienced health problems while drinking three types of formula. The doctor told the mother she was overfeeding her baby; instead, she felt the problem was with the multiple formulas her baby was drinking.

I remember I was feeding the baby; she was on three different cans of milk. One was purple, one was kind of orange and the last one was pink. And she was just gurcking [sic] and gasping for air and I just didn't know what to do. I didn't know what to do. Oh my God, we went to the doctor and they tried to say that I was overfeeding her milk, but I wasn't. Yes, that was crazy. I think it was the change of the milk, you know, by me feeding her so much different kinds of milk. And it probably wasn't digesting, you know (mother who breastfed for three months or less).

Women who exclusively formula-fed. The women who only formula-fed reported receiving formula directly from doctors, advice on the types of formula and nipples to use, and how to administer formula. They reported no negative interactions with their doctors around formula-feeding.

They [doctors, nurses, aides] talked to me, they asked me questions about how do I think that this formula is working with my baby, is my baby drinking it good enough. They showed me how, cause he won't suck in the bottle right when, when I had him, when I first had him, they had to show me how to prop it up to give it to him for him to be able to suck the bottle, the milk and everything. They just asked me questions ... and they answered my questions the best way they could and everything.

Summary of themes: institutional level – postpartum healthcare providers.

Postpartum, doctors were of little help to these women to sustain breastfeeding. Instead they gave improper breastfeeding advice or recommended formula or mixed feeding. In contrast, formula-feeding mothers seemed to receive satisfactory support from their doctors.

Environmental Factors: Institutional Level – WIC.

Women who breastfed for at least four months. Women who breastfed for at least four months were appreciative of the support provided by WIC to breastfeeding mothers. Among these women, there was an overall sense that WIC encouraged and favored breastfeeding. They felt that WIC was a helpful resource and were appreciative of the encouragement, advice through classes, and resources given to breastfeeding mothers -- like food for mothers, breast pumps, nursing pads and bras. “WIC gave me the double electric one [breast pump].... And the healthy food, the salmon and tuna, cause that’s good for your breast milk, and they [WIC] gave me a bra and the breast pads, so that was all helpful.” However, some women in this group also expressed frustration with WIC policies, such as the distribution of manual pumps. The following quote summarizes the difficulty with using the manual pump and the preference for the electrical pump. “It’s harder to do it with like a manual, just sitting there and pumping versus...setting up and plugging it up like an electrical one.”

Focus group participants were asked how WIC could better promote breastfeeding. Their answers shed light on perceived barriers to breastfeeding. One mother felt that WIC should not pay for formula unless approved by a doctor.

Don't give them any formula ...like she said, if a person can't get any formula they have no choice...you have to breastfeed. I mean, you not gonna let your baby go hungry....I think ...that maybe if the doctor or somebody see that you can't produce any milk, like if

it's... been approved by a doctor or something then ... give the baby formula but other than that, make it so people have to breastfeed. When you don't have a choice, no other options, okay, that's what you have to do.

Another mother recommended having WIC staff come to their homes: "maybe have coaches, classes, which they kind of got that... maybe send people out to the home".

Women who breastfed for three months or less. Among women who breastfed for three months or less, there was wide variation in their views of WIC's position on infant feeding and how WIC helped or hindered breastfeeding and formula-feeding. As with the women who breastfed longer, some women felt that WIC had been very helpful and supportive with breastfeeding, to the point of pressuring women. Others felt that WIC did not promote any type of infant feeding; rather they let women decide and then support their decisions, whatever it may be. Still others felt that WIC truly did not want women to breastfeed; instead, they discussed how WIC benefited from distributing formula. Below are quotes representing the three disparate views.

I think WIC really pressured me to breastfeed versus, you know, getting formula. They really didn't want to give me formulaThe first three days I went home with her she had no formula, nothing like that, up to like two months, and I finally decided to go to WIC, and they were just pressuring me, you know, I should keep breastfeeding.

The WIC people, they tell you about breastfeeding, they don't really pressure it on you, but if you choose to breastfeed, then they'll help you, and if you don't choose, they'll still help you.

WIC [got in the way of breastfeeding].... I don't feel that they [WIC] really, really want to support women that breastfeed, they kind of gave me a hard time, because I was really, really determined that that was it, and I don't feel like they did everything they could to help me with breastfeeding other than problems and headaches and adding to my frustration.

Overall, the women who breastfed three months or less expressed the most frustration with WIC. One woman, discussing her intensive weekend work schedule with a WIC staff member, and wanting to introduce formula, was told not to mix formula and breast milk. "When I told WIC that, they was just like, 'Uh-uh, you either one or the other.' ...I don't feel like WIC ... just supported that idea. They just... 'uh-unh, we gonna get you on Similac, forget breastfeeding' ". Another, who was having trouble with sore breasts, was advised correctly to breastfeed more frequently. However, she may not have been helped sufficiently. The advice she received did not help her sore nipples and she felt like throwing her baby across the room. She said:

I just didn't like it [breastfeeding]...it hurt...she was like three, four weeks, and my breasts was already swollen and sore, so they said "If you breastfeed, it'll help with the swelling and soreness," but when she did it just hurt even worse...so I just almost threw my baby across the room because I wasn't thinking because it was just hurting. So I just didn't like it.

Several women described poor experiences at WIC, either related to WIC policies or the way customers were treated. Policy problems included inconvenient hours for WIC check pick-up, particularly unfavorable for working women (no evening hours), and short grace periods for appointments. This latter issue impacted a woman's finances.

The people in the WIC building can be inconsiderate at times....They never know, things happen unexpectedly every day....One of the times, her [a friend's] car had broke down, so I couldn't make it to the WIC appointment, so they didn't allow me to come in late.

After a certain time, you will have to reschedule....I had to...pay cash out of money that I didn't have to go toward my bills to get my baby some milk.

Poor customer service manifested itself as unreturned or delayed phone calls and feeling unwelcome as an African American. The following woman attributed unreturned phone calls to her breastfeeding difficulties.

WIC kind of made it difficult for me [to breastfeed] too, because ...when I got close to actually having her, I was trying to get in contact with them [WIC] to see if I could ... get a electric pump from them and I called the WIC office several times and left messages. No one never called me back....After having her, someone called me back and at that point I had already, like, bought a electric pump myself, and she called and talked to me but I had already had help on the lactation consultant at the hospital talked to me....So by the time she called me back I didn't really need her assistance....I called them to ask can I schedule a time where I can come in, someone can talk to me about...breastfeeding. No one never called me back. I left voice mails and one time I think she was on vacation or something. It was just confusing.

This woman felt that Latino women were favored at one site and she felt unwelcome.

Over there at Southside Plaza they made me feel like no blacks allowed, all Spanish.

They got more Spanish than anything....And then when I went up to the window just to try to make an appointment ... they was talking in Spanish. I'm like, I can't understand anything he was saying.

Like the women who breastfed longer, this group of women also expressed frustration with WIC's distribution of pumps. Among all breastfeeding women, there were varied experiences: some women didn't know WIC had pumps, and some were told that pumps were only available to women who breastfed for one month or for women with sick babies. Some women were given an electric pump, others a manual pump, and some were denied a pump. There seemed to be little knowledge or understanding of the WIC pump policies and their rationales. Below are quotes from mothers expressing a dislike of the manual pump.

They [WIC] made it difficult for me [to breastfeed] because I did want to continue to try again but they gave me the prenats and a hand pump. That hand pump would make your fingers wrinkled and old and decrepit before you be able to use them for anything else. That is the hardest thing to do, that hand pump. But if you had like a Medela one that does it on its own, it's fine. But that hand pump, you'll get a drop of milk after like twenty minutes of sitting there pumping that thing.

This economy's terrible, so...if you're with your guy or you're raising your child single, you have to work. I don't think the hand pump is gonna do enough... that electrical pump is needed, because we're always on the move...and it's faster.

Women who exclusively formula-fed. Much of the discussion among the women who formula-fed centered on their interpretation of and adaptation to WIC's policy for formula distribution. It was apparent that the number of cans covered by WIC each month influenced the women's decision on how to best meet the baby's needs for formula. For example, since WIC does not cover the monthly cost of all formula needed by the baby, some mothers used SNAP to buy the remainder and others had to buy the extra cans with their own money. "I won't really

like actually buy five, I would buy like maybe two or three...because I was getting WIC too, you know”. For another woman, the formula-feeding package was more attractive than a breastfeeding package simply because she could receive more formula each month. “Well, if I was gonna tell WIC that I was gonna breastfeed, they would’ve gave me, like, one can, so... I was like, you know what? Let me just tell them I’m gonna formula-feed, so they can give me all the cans that I need for my child.”

One woman appreciated WIC’s flexibility to respond easily to her change in infant feeding method. “But you can switch and change [at WIC], because that’s what I had to do....You can switch and change ...if you start out breastfeeding and it don’t work out for you, you can switch over to bottle-feeding and let them [WIC] know.” Another mother appreciated the support WIC staff provided in helping mothers prepare formula: “nine times out of ten, on the formula thing, it has how many scoops for each ounces, and then you have wonderful people at the WIC office that’ll help and make sure you understand.” In contrast, they also thought certain WIC policies discouraged formula-feeding, such as the requirements to obtain the doctor’s permission to change the formula and having to pick up checks at WIC.

Women from all groups. Women from all groups felt that WIC facilitated formula-feeding by paying for it. “It [WIC] made it easier [to give the baby formula], because they helped me with, like, paying for the formula” [mother who breastfed for at least four months]. One woman also felt that WIC benefited from distributing formula: “with WIC, I mean it really doesn’t benefit them for women to be breastfeeding, I mean, they get the bulk of their money from giving out milk” (woman who breastfed for three months or less).

The women who obtained free formula from WIC appreciated the value of the WIC checks, citing the price of formula cans ranging from \$5 to \$27. An example, of this view is this exchange between two women:

[Participant 1]: They gave me milk [formula].

[Participant 2]: WIC...yeah, WIC give you some stuff of milk, they gave me like nine things of milk.

[Participant 1]: Girl, yeah, they gave me three different checks, five on each, I'm like, "What the world?" ... For one time period.

[Participant 2]: Yup, they make sure your baby eat (women who breastfed for three months or less).

With that incentive, the efforts of the hospital staff to promote breastfeeding with one woman (who formula-fed) were futile. She said:

They [hospital staff] was pushing me to breastfeed, but I didn't want to and since I can get milk for free, it made it easy. If I had to pay for the milk, I would've been breastfeeding, but I can go get WIC (mother who formula-fed).

Indeed, for some women, WIC is connected with formula distribution, not breastfeeding. "My next child that I have, I won't probably be at WIC at all, I'll just breastfeed and, you know, just go from there because I had a couple bad experience at [WIC]" (woman who breastfed for three months or less).

Another woman viewed breastfeeding as a supplement to formula-feeding: when she ran out of formula, she breastfed. Once she could count on regular funding of her formula by WIC, she stopped breastfeeding.

But I usually like breastfeed her if I ain't got no more milk or something until I can go to the store, I'll do that. But I don't need to do that no more like now. I just cash all her WIC at one time and get all the milk, I ain't breastfeeding her at all (woman who breastfed for three months or less).

In fact, one woman, who only formula-fed, waited until the end of the focus group to make this statement (the tape had just been turned off): "You want to know the truth? If WIC stopped giving formula, we would breastfeed". She then went on to explain that as long as women knew that they qualified for WIC, they would obtain formula from WIC.

Summary of themes: institutional level - WIC. Women who breastfed the longest had the most positive comments about the breastfeeding support they received from WIC. Women who breastfed for a shorter duration had mixed comments, but also experienced many frustrations with WIC customer service and breastfeeding support. Formula-feeding women in general felt well supported by WIC. Women in all groups recognized WIC's role in distributing free formula, making it easy to formula-feed or transition from breast milk to formula. Several women made stronger statements, citing distribution of free formula by WIC as a major impediment to breastfeeding.

Environmental Factors: Institutional Level - Work

Women who breastfed. The act of breastfeeding or planning to breastfeed affected women's relationship with their work, including considerations of finances, leave, and return to work. Without generous paid leave benefits, mothers cobbled together whatever leave benefits (paid or unpaid) their employer offered, mindful of probable reduced household income. Some mothers reported receiving and being grateful for six weeks of maternity leave granted by their employer. Others had temporary job status and received no leave benefits. For these mothers,

figuring out a way to take time off after giving birth and cover expenses was a source of anxiety. The quote below not only shows how the mother saved money ahead of time to fund her own maternity leave but also how she figured out a way to keep up her milk supply after returning to work (this latter aspect will be discussed later in this section).

When I started going back to work, ...I was just a temp ...and like with temporary, you don't get ...short-term disability benefits. So I was like really worried about, okay, I had to save all this money, you know, just to cover those six weeks that I'm off work, I'm not gonna have any money to buy formula, so I was gonna make it work regardless....When I went back to work, I didn't even know that they had a mothers' room until about a month after. So I would go in my car and I would park my car way back there and I would just pump on my lunch break (mother who breastfed for at least four months).

Another mother described the lack of paid leave for her first child but anticipated using short-term disability if she had another child and expected longer duration of breastfeeding with the prospect of a longer leave.

This last time ...I wasn't getting paid, I was just using vacation time I had saved up but I have a short-term disability thing now so if I was to ...have a child I would be able to get somewhat of a regular paycheck while I'm out so I think I'd be able to stay out longer which would allow me to be able to breastfeed longer (mother who breastfed for three months or less).

As women thought about returning to work and anticipated a challenging work environment for breastfeeding, one mother decided to wean prior to re-entry. "I needed to help him [her fiancé] out, too, with bills and different things, so I felt I needed to still work. So it was just easier to go to formula and just to stop the breastfeeding" (mother who breastfed for three

months or less). Another mother, eager to continue giving her infant breast milk, began pumping and storing her breast milk before returning to work. The first mother felt that feeding formula would be easier and more compatible with work (or that breastfeeding was incompatible with work); the second, determined to breastfeed, decided that she needed to start expressing and storing her milk early.

I started pumping, like, I knew I was going back to work...so I was, like, I got to come in two, three days before, so whenever I would pump like I would try to pump, and then I would put a bag in the freezer, put the bag in the fridge for the next day....That's how I would do it (mother who breastfed for at least four months).

Once at work, women experienced a wide variety of supports and challenges for breastfeeding in the workplace: break time, private space, work demands, and attitudes of employers and co-workers influenced breastfeeding success. Women had to find the time and private space to pump their milk as well as keep up the stamina and healthy diet required for simultaneously working and breastfeeding. One supportive employer provided employees with a designated nursing room and break time for nursing. This breastfeeding mother appreciated and took advantage of the favorable policies.

At the place I was working they actually had a nursing room where people could come and pump and so that was really, really nice. I liked that I was able to... take a break and not get penalized for my break time...to go and pump so that my baby would have milk, so that was really, to me that was a really nice thing (mother who breastfed for at least four months).

Another participant noted the employer's permission to pump while at work, although she didn't mention any specific work policies such as extra time off to pump milk or nursing rooms.

However, the environment was favorable and she found pumping easy and trouble-free.

I didn't really have a big deal worrying about, like, the milk supply, cause at my job I can pump at work, so...but I would just always go during lunchtime, while I'm eating my lunch, pump, and stuff like that. So it was okay (mother who breastfed for at least four months).

Several women faced challenges to maintain their milk supply when they returned to work. They tended to focus on their individual challenges and solutions as opposed to the availability of employer policies. One woman who weaned early seemed to take personal responsibility for difficulties she faced to keep up her milk supply while working.

Work mostly got in the way of mine [my breastfeeding]...I work forty hours a week and having the time to be able to eat right like I should and to keep my milk supply going, it got a little bit too much, too tiresome. I didn't have the time to breastfeed or pump as much as I should (mother who breastfed for three months or less).

In contrast, another woman also faced a challenging work environment but she persisted and ended up breastfeeding for a longer time.

Because I'm a CNA and it's kind of hard trying to find time to ...go pump, like every four hours....I would do it...I think it was every four hours, every two hours? I don't know. It was kind of hard going back and forth, trying to do that (mother who breastfed for at least four months).

Another mother described a similar situation but in her case she could not even envision being able to take a break.

I mean I don't think as far as work, I don't think it was supportive as much because it's already like hard enough in my job just to be able to take a regular lunch break at work. So there's definitely really no time if I needed to, you know, pump breast milk during my lunch break I wouldn't have time to do that (mother who breastfed for three months or less).

Two other women, who had breastfed for more than four months, offered suggestions on how a hypothetical breastfeeding mother could deal with problems with pumping at work or at school. Their exchange reflects not only resourcefulness but also a good knowledge of and confidence in breastfeeding. They suggested assertively articulating the need to a supervisor or using her own resources, like her car, to help her maintain her milk supply. This would be challenging for someone with a less understanding supervisor or for someone without her own transportation.

[Participant 1]: At work, I guess she could talk to her supervisor or somebody to find a designated room...where, you know, they can lock it and make sure she has enough time to pump.

[Participant 2]: Maybe start, for somebody who maybe can't get that [designated nursing room and time to pump] from a supervisor....If you know you going back to school or back to work, start pumping a couple days earlier so you have more, and enough to kind of fall back on.

[Participant 1]: But if she doesn't pump ...while she's at work, she'll become engorged....

[Participant 2]: Well, you can pump in the morning. I don't know. Pump on your lunchtime, maybe?...Get one of those carjacks, sit in the car with the AC on and pump (women who breastfed for at least four months).

Given their experiences juggling work and breastfeeding, women recommended various policies to help mothers successfully breastfeed and work. These included paid leave, additional break times, designated spaces for breastfeeding mothers, "bring your baby to work" days, and onsite daycare centers. One participant, noting that cigarette smokers already receive extra breaks at her workplace, suggested, "Maybe they [breastfeeding mothers] should get extra breaks, like cigarette smokers" (mother who breastfed for three months or less). However, additional benefits alone are not sufficient to assure successful long-term breastfeeding. One woman, who breastfed at least four months, described the challenge of finding time to pump in spite of breastfeeding friendly work policies.

Well they have a room that I could lock so nobody would come in, and they gave me enough breaks...and they didn't mind me going, you know, going off the floor to go pump, it's just that my, my work is so fast-paced and stuff I would hardly find time to go do it (mother who breastfed for at least four months).

Women who formula-fed exclusively. There was little discussion of work in this group, reflecting the ease with which women can combine formula-feeding with work. One mother described how her supervisor had encouraged her to breastfeed, had offered her a place to store her breast milk, and had told her to stop smoking. In spite of this supportive work environment, she decided to formula-feed her baby.

Summary of themes: institutional level - work. Breastfeeding mothers cited work as a significant barrier to breastfeeding and identified several work policies that support breastfeeding, from paid leave to additional break times at work.

In listening to the women from both breastfeeding groups, it appears that those who exhibited more resourcefulness and demonstrated dogged determination to continue breastfeeding while working ended up breastfeeding longer than those who did not have this characteristic. In comparison, it seems that those who breastfed for a shorter duration were more likely to desist when facing the challenges. However, it is difficult to know whether these apparent differences truly reflect different levels of self-efficacy or if the different work environments of women were more or less supportive of breastfeeding, resulting in longer or shorter duration of breastfeeding, respectively.

Environmental Factors: Community

The last level in the ecological model is that of community. It encompasses a wide range of topics including the media's handling of infant feeding, community resources, cost of infant feeding products, and breastfeeding in public. Most of the discussion centered around breastfeeding in public but the other topics were briefly discussed.

Media. One theme mentioned by women in both the breastfeeding and formula-feeding groups was the treatment of breastfeeding and formula-feeding in the media. Some women felt formula-feeding was widely promoted but that there are few images of breastfeeding mothers or babies. "It might just be a picture of a real cute baby, you might think, oh, she's cute and then you will see the Similac formula and it's talking about how healthy it is" (mother who breastfed for at least four months). They also mentioned the absence of images that normalize breastfeeding: "I think they should like have pictures of cute babies and this baby was breastfed

...you don't see a lot of that. All you hear as far as breastfeeding is the Internet or at the doctor, you don't see it all in public nowhere" (mother who breastfed for at least four months). Instead, they pointed out the negative breastfeeding images promoted by media, including the Time magazine cover of a four-year old boy breastfeeding and a Simpson's episode mocking breastfeeding.

Yes, I seen that on the Simpsons when they had a breastfeeding episode. They had a session where all the moms just go and breastfeed their babies in a room. ... And Margie was faking it, she had a bottle under there ... [laughs]. Yeah, she wanted to be in the group with the moms but ...she didn't like it [breastfeeding] either (mother who formula-fed).

Breastfeeding in public. Women in all groups reported a pervasive stigma of breastfeeding in public. Below are quotes illustrating this common feeling.

It seems like society thinks it's [breastfeeding is] like outdated, like barbaric or something like that (mother who breastfed for at least four months).

Everybody kind of thinks it's [breastfeeding is] gross but it's not, you know, this is what you have to do (mother who breastfed for at least four months).

The stigma around it [breastfeeding], like, people are not so comfortable with seeing people nurse out in the open (mother who breastfed for three months or less).

Well whether you wearing it [clothes for breastfeeding] or not, they still stare, especially guys, they, "Oh, I want to see her nipple, I want to see that..." (mother who formula-fed).

One participant described her perception of society's contradictory principles around breastfeeding and formula-feeding. She felt that many recognize the benefits of breastfeeding and promote it but they frown upon breastfeeding in public.

I think it's [society] supportive in the sense that it's ... healthy for the kid... and like they do like advertise that portion of it...but as far as it being natural and you, like your baby has to eat and you're out, you have to, you know, go grocery shopping and stuff, and people look at you like, "What are you doing, are you crazy?" -- like you're a porn star or something -- like you're just feeding your child (mother who breastfed for at least four months).

Participants' recommendations for facilitating breastfeeding in public included having billboards and advertisements promoting breastfeeding, especially to normalize breastfeeding and counteract those promoting formula-feeding.

If people thought it was as normal as they think other things are, then they wouldn't...feel so bad about it... in public especially, so ...put up a billboard that says ...something about being breastfed ... appropriate advertisement, appropriate knowledge of it [breastfeeding] just publicly would be good because then you don't feel bad if you're at the bus stop and you have to feed your kid and you know it is what it is (mother who breastfed for at least four months).

Several women recommended educating people about breastfeeding. They also wanted designated private spaces for breastfeeding ("Make a room for breastfeeding [in public places]. There ain't no other place to do it" (mother who breastfed for three months or less)), and signs on businesses that supported breastfeeding in that facility. "Maybe if it was signs or posters pushing or saying that this is a facility where it's okay to do it, then that's how you can deal with

that situation” (mother who formula-fed). One participant recommended increasing barriers to formula – such as further increasing the price or removing it from grocery store shelves. “I’m just thinking like something crazy or something like just take all the formula out the stores ...if they really want to do it [promote breastfeeding], make them order it or something, make it like thirty dollar” (mother who breastfed for at least four months).

Women who breastfed for at least four months. Participants in these groups breastfed in public despite the stigma, feeling quite comfortable and asserting their need and right to do so. These women found ways to work around or deal with the stigma. For example, one mother felt quite comfortable breastfeeding in a grocery store but was careful to state that no one could tell what she was doing. Another nursed in the mall and was ready with her retort should she receive disapproving glances, stares or comments. A third mother’s approach was to breastfeed in the car instead of nursing in the mall covered by a blanket. Indeed, the car was repeatedly mentioned as a safe personal space to breastfeed in a public setting. In all cases, the mother found a way to shield herself and her baby from an environment she perceived as largely hostile to breastfeeding.

I’ve never been in a situation where I felt embarrassed or felt like I needed to stop feeding my child because someone else said something. So you just have to kind of have, I guess, a thick skin, or have to have the kind of courage to say, “Look, my child’s hungry. You feed your child, I’m feeding mine.”

Women who breastfed for three months or less. Among these women, only one participant mentioned feeling comfortable breastfeeding in public and even then, the language she used seemed to connote a negative attitude toward the breast (“I used to whip that junk out

everywhere... Yeah, I had a blanket though”). The negative public attitudes and lack of privacy were enough to keep most of these women from breastfeeding in public.

I ain't like doing it in front of people. I don't really, I was comfortable with me and my baby, but as far as like trying to go out like places and stuff, it used to piss me off... Because I had like she'll be crying, I might be going somewhere and I got to whip my boobie out.

Overwhelmingly, these women felt uncomfortable feeding anywhere outside of the mother's home, especially when compared with formula-feeding.

When you formula-feed you can formula-feed anywhere, you can be with anybody. 'Cause, like, you – you can do anything. With breastfeeding you gotta hide from everybody, can't don't want everybody to see – your friends and everything – so you gotta be kind of, under a blanket or somewhere. At least under a blanket, I hope.

This theme of concealing the breast was repeatedly mentioned. It is a need perceived by women and reinforced by others: “Like she was saying, people just, you know, say put a cover or something over it and cover yourself when you have to do it.”

The need to conceal the breast and the lack of private space in public led some women to ask for private designated spaces to breastfeed in public. In fact, society's disapproval of breastfeeding in public and the lack of designated spaces were such important barriers that some participants in this group felt that, if it were not for breastfeeding in public, breastfeeding would actually be easier than formula-feeding. It was difficult for some women to breastfeed in businesses serving the public, such as grocery stores and fast food restaurants. Some also mentioned using the bathroom for breastfeeding in public. While some accepted this option if it

included a “mother’s area”, others were disgusted by the concept and recommended proper private (non-bathroom) spaces for breastfeeding.

Some of the women in this group mentioned the pump, as compared to feeding at the breast, as a way to deal with the problem of breastfeeding in public. The mother could leave pumped milk with someone else while the mother would go out (possibly leading to engorgement or reduced milk supply). The mother could also take the pump with her to prevent engorgement. This latter practice generates its own set of problems, including issues of storage and spoilage of breast milk. Some women perceived the pump as indispensable for successful breastfeeding and lamented that their high cost (“I think all females would breastfeed. I swear I think so [if you had a nice breast pump or if they were cheaper]”). One woman stopped breastfeeding because she didn’t have a pump. She said:

I gave her a bottle, like after like she was two days old, but I just kept doing both for like three weeks....At the beginning I had planned on breastfeeding, but at the end I started thinking about doing...the bottles. Because I ain’t have a pump, and I was just like, “I’m not gonna be able to feed her.” Like, what if I go somewhere, how she gonna eat?

Community resources. The women who breastfed for three months or less mentioned the availability of community resources for breastfeeding such as classes through Healthy Families, ABCs of Breastfeeding, and Healthy Hearts but felt that more were needed, especially free classes and pumps.

If they going to try to convince somebody or try...to get somebody to breastfeed, they need to make it...because it’s hard out here now, nowadays. Make it free. You know, maybe they might get more people, how can you expect for somebody to pay, you know, for the pumps or the class to learn more about why they should breastfeed, if...it doesn’t

make sense if you have to pay to go and learn more about why you should breastfeed. Make stuff, you know, not inexpensive.

Community support for formula-feeding. Women who exclusively fed their babies formula did not report facing community-level barriers, other than the expense of formula and the difficulty in finding special formulas. On the contrary, they were quite supported – such as being able to use SNAP to buy formula that the WIC program didn't cover, having a 24-hour helpline they could call in case they had problems with formula, and receiving free milk from many sources: WIC, hospitals, doctors' offices and parenting programs.

Summary of themes: community. Overwhelmingly the women in these focus groups felt that society frowned on and made it difficult for women to breastfeed in public. Feeding with a bottle was considered the norm such that some women felt more comfortable either feeding their babies formula or pumped milk rather than breastfeeding in public. However, women who breastfed for at least four months had found ways to breastfeed in public in spite of the stigma. Some women felt there was more information on and promotion of formula. They gave examples of the media favoring formula and characterizing breastfeeding as peculiar. Among all the groups, no one reported barriers to formula-feeding in public although some women did find that it was difficult to find the formula they needed and noted the high price of formula.

Summary

The women in the positive deviant groups showed determination to breastfeed and exhibited high levels of general self-efficacy, which may have helped them gain greater confidence in breastfeeding. While they received good interpersonal support for breastfeeding, some also experienced pressure to formula feed. The women's higher level of self-efficacy may have helped some of them withstand or convert the negative interpersonal or community

influences. In general, the positive deviant women were complimentary of the breastfeeding support they received from the hospital and WIC. Some of them found ways to breastfeed while working and some experienced positive work environments.

Some of the women who breastfed for three months or less intended to breastfeed while others intended to formula feed. While they were aware of the benefits of breastfeeding, some expressed ambivalence around breastfeeding. They experienced mixed interpersonal influences. At the institutional level, breastfeeding support was not as strong as that reported by the positive deviants and several reported formula-feeding facilitators from health care providers, hospital, and WIC. Combining breastfeeding and work was a challenge. As with the positive deviants, they felt a societal stigma of breastfeeding in public and consequently several mentioned avoidance of breastfeeding in public.

Nearly all of the women who only formula fed had intended to do so. They were aware of the benefits of breastfeeding but expressed fear of or insecurity around breastfeeding. They were comfortable with formula feeding. Some were encouraged to breastfeed by prenatal health care providers but they resisted the advice. They experienced good institutional support for their preference to formula feed from hospitals, postpartum health care providers, and WIC. Work was no barrier to formula feeding. They felt comfortable formula feeding in public.

RESEARCH QUESTIONS 2 AND 3: METHODS AND RESULTS

The objective of the self-administered survey was two-fold: 1) to quantify the differences in intention, skills, and environmental factors among primiparous low-income US-born adult African American mothers who engage in different infant feeding practices; and 2) to assess the relative influence of the above variables on infant feeding practices among low-income African American mothers.

Methods

Participant Characteristics

All study participants were adult (at least 18 years old) non-Latina/non-Hispanic US-born African American first-time mothers of infants ages six months to less than thirty-six months. Only primiparous women were included in the study, as prior breastfeeding experience has been found to be a strong predictor of breastfeeding subsequent infants (Meyerink & Marquis, 2002; Tenfelde, Finnegan, Miller, & Hill, 2012). By studying only primiparous women, we eliminate this effect and are able to focus on other variables. Other inclusion criteria were receipt by mother or child of WIC services, Richmond City residency, and English speaking. Exclusion criteria included multiple births, moderate to severe cognitive impairment or hearing or language difficulties. The minimum age of the first child was selected so as to measure the duration of breastfeeding to at least six months, a major milestone in breastfeeding duration. The maximum age of the first child was selected to capture enough participants given the timeframe for

recruitment and still be able to collect information reflecting fairly recent experiences with infant feeding.

From June to December of 2013, a convenience sample of study participants was recruited at the three WIC clinics in Richmond City: in the east end, downtown, and southside. Six women who qualified for the survey refused to complete it. One woman initiated but did not complete the survey. A total of 254 respondents completed surveys. Of these, fifty-five were by respondents who were ineligible for the survey⁵, five had missing information on the type of infant feeding (formula or breastfeeding and breastfeeding duration), three were duplicates (women who responded to the survey twice), and one was the mother of twins. The final sample totaled 190 surveys from respondents recruited from WIC clinics whose first singleton child was at least six months old and less than three years old. The surveys therefore included infants born from June 2010 to June 2013.

Eighty-six of the women only formula-fed (45.3%), 52 women breastfed for less than three months (27.4%) and 52 women breastfed for at least three months (27.4%). The mean age of the sample was 23.4 years ($SD = 4.4$). Nearly all (95.2%) of the women were not married but half (50.5%) of the women lived with the father of the child and over four-fifths (85.3%) lived with the father or one other adult when the baby was born. Nearly all (93.2%) women or their child received governmental assistance (that is, Medicaid, FAMIS, SNAP or TANF) other than WIC either during pregnancy or after the birth of the child. Nearly half (45.5%) had at least some college or technical school education; another 41.2% had a high school diploma or GED, and

⁵ Fifty-three of the 55 surveys were removed from the sample due to age of the child that was unknown or outside of the recruiting criterion; one respondent was Latina but not African American and one respondent exhibited limited comprehension. Forty-six of the 55 surveys were collected during the first two weeks of data collection and were due to recruiter techniques that were corrected.

13.4% had no high school diploma. Nearly two thirds (65.9%) had an annual household income of less than \$10,000.

Over four-fifths (83.6%) of women received prenatal care during the first trimester of pregnancy. Over a third of women (34.2%) had a Cesarean section. Thirty-two (17.5%) newborns had a low birth weight. Over one fourth (26.3%) of women smoked at some point during the baby's first year and 30.2% said that a household member smoked.

Comparing all three groups, differences were detected in marital status ($p = .02$), education ($p = .0025$), annual household income ($p = 0.046$), type of delivery ($p = 0.044$), and mother smoking during infant's first year of life ($p = .037$). No differences were found among the three groups in mean age of mother ($p = .25$) or child ($p = .19$), household composition at birth of child ($p = .36 - .74$), presence of father or other adult in the home at birth of child ($p = .45$), school attendance after birth of child ($p = .84$), percent obtaining prenatal care in the first trimester ($p = .66$), percentage of low weight births ($p = .81$), presence of newborn illnesses or conditions ($p = .75$), or other person smoking in the household ($p = .71$) (see Table 9).

The number of missing responses to survey items ranged from 0 to 24. Items for which at least 10% of responses were missing included: timing of the beginning of prenatal care (19 missing), "I knew how to get help if I had trouble with formula" (19 missing), "the health care provider helped or offered to help start breastfeeding" (24 missing), and "baby's dad helped with formula-feeding" (24 missing).

Recruitment Procedures

A member of the research team explained the study to women in the waiting rooms for WIC clients. If a woman was interested and stated that she qualified based on screening criteria, the research team member asked her to read and, if she agreed, sign the consent form. The

participant was given the questionnaire to complete and return to the research team member. No names or contact information were collected on the surveys. Each participant received a \$10 gift card for participation in the study. Feasibility of delivery method and likely preference by participants were the criteria for selecting the incentive.

Each survey was assigned an identification number. The paper surveys were kept in a locked filing cabinet and the data entered in a password-protected computer and database that was accessible only to members of the research team. All surveys will be destroyed upon completion of the study and publication.

Sample Size, Power and Precision

To answer RQ2, means and proportions of socio-demographic and infant feeding characteristics as well as variables related to intention, skills and environmental factors of each of the three infant feeding groups were compared using ANOVA and χ^2 analysis or Fisher's exact test. Due to unequal variances, Welch's *t*-test was used for comparison between breastfeeding groups. Variables are grouped (designated as levels) by intention, skills, and environmental factors. These latter variables are further grouped into intrapersonal, interpersonal, institutional – healthcare, institutional – work, institutional – WIC, and community levels. The significance level is .05. P-values and number of missing responses are reported for each variable. SAS 9.4 was used for analysis.

For a comparison of means of three groups using ANOVA, a minimum average group sample size of 52 allows the detection of a medium effect size ($f = 0.25$) with a power of 80% and under the assumption of $\alpha = .05$. For χ^2 analysis, a total sample size of 190 yields a power of .91 to detect a medium effect ($w = 0.3$), assuming $\alpha = .05$ and (6 degrees of freedom – equivalent

to a 4 x 3 table). For *t*-tests, a group size of 50 allows for an approximate medium effect size ($d=0.50$) at $\alpha = .05$ and power = .70, even with unequal variances (Cohen, 1988).

To answer RQ3, the first step was to perform multinomial simple logistic regression analyses with each variable that was identified as significant through the aforementioned ANOVA and χ^2 analyses. The women who breastfed for at least three months (deviant group) were compared with each of the two other groups: women who only formula-fed and women who breastfed for less than three months. To reduce the number of variables for the final analysis, the second step was to perform multinomial multiple logistic regression analyses with all the significant variables remaining at each level after the first step. For example, all skill-level variables that were significant at the first step were entered into a multinomial multiple logistic regression. The third step was to perform a multinomial multiple logistic regression with all variables that remained significant after the second step. The fourth step was to perform a final multinomial multiple logistic regression with only the variables that remained significant after the third step. Odds ratios and 95% confidence intervals are reported for all analyses. For multiple regression analyses, a sample size of at least 171 would have allowed for the entry of at least 20 candidate independent variables ($\alpha = .05$, $v = 171 - 20 - 1 = 150$, $\lambda = 0.15 \times 171 = 25.65$) at a power of at least 81% (Cohen, 1988) to identify at least a medium effect ($t^2 = 0.15$). The full information maximum likelihood (FIML) method was used to handle missing variables. This method has the advantage of using the full sample size, thereby resulting in accurate standard errors (Schlomer, Bauman & Card, 2010). MPLUS 6 was used for regression analyses.

Instrumentation

The survey instrument was developed as focus groups were completed and results analyzed. The draft survey was distributed to and completed by sixteen female members of the

Richmond Healthy Start Initiative's Community Advisory Board. Each participant was timed and asked to complete the survey using mock data and provide written or verbal comments. Changes to the draft survey were made based on these comments.

In addition to the focus group results, measures and questions were derived from the literature and surveys such as the IFPS II (CDC, 2009a). The survey instrument included questions designed to characterize the mothers and children according to demographic characteristics, pregnancy, birth outcomes and infant feeding practices. The outcome variable was infant feeding practice, a variable formed from the combination of type of infant feeding (formula or breastfeeding) and duration of breastfeeding (less than three months, greater than or equal to three months). Covariates included questions and measures of intention and its antecedents (attitude, norms, and self-efficacy), skills, and environmental factors. Table 10 is a summary of the skill and environmental factor variables included in the survey by level in the ecological theory and according to breastfeeding or formula-feeding incentives and disincentives.

Participant characteristics and behaviors. Demographic variables include mother's age, child's age, marital status, race/ethnicity, educational level, occupation, and family income level. Women were asked whether they or their child participated in or received benefits from various governmental and non-governmental institutions such as Medicaid, WIC, TANF, SNAP, CHIP and Healthy Families, either prenatally or postpartum. Participants were asked whether or not they smoked at any time during the baby's first year or whether someone in their household smoked.

Birth outcome measures. These include questions on the infant’s weight, birth and due dates, whether the birth was vaginal or by cesarean section, any illnesses at birth, and medical reasons not to breastfeed.

Infant feeding practice. Questions measuring infant feeding practice were derived from the CDC’s IFPS II (CDC, 2009a) and the National Immunization Survey (NIS) (CDC, 2012d) – the latter collects data to measure the Healthy People 2020 breastfeeding objectives. The outcome variable, a combination of type and duration of infant feeding, was measured through answers to two questions: “was your first child ever breastfed or fed breast milk through a bottle?” and “how old was your first baby when he or she completely stopped breastfeeding or was no longer fed breast milk?” (adapted from NIS; CDC, 2012d). An important factor limiting duration of breastfeeding is supplementation with formula or early non-exclusive breastfeeding. These data were collected through the questions “how old was your baby when he or she first had formula”) (adapted from NIS) (CDC, 2012d) and “The next question is about the first thing your baby was given other than breast milk or formula -- like juice, cow’s milk, sugar water, baby food, or anything else, even water. How old was your baby the first time he or she had any other liquid or solid, not counting vitamins, minerals or medicines?” This NIS question was adapted to conform to the WHO definition (2008) of exclusive breastfeeding.

Two questions on infant feeding decisions were reasons not to breastfeed (“At birth or when you were pregnant with your first child, did a doctor tell you not to breastfeed for medical reasons?” and “What made you decide not to breastfeed”) and reasons to terminate breastfeeding (“Why did you stop breastfeeding your baby or pumping milk for your baby?”). The last two questions were derived from the CDC IFPS II (CDC, 2009a). The response choices for the question on reasons to terminate breastfeeding were obtained from the IFPS, with only minor

changes. Response choices were selected from the IFPS II if at least 15% of respondents who had breastfed for less than six months had chosen that response (CDC, 2009a). This is a common question found in the literature and using the IFPS II responses allows comparison with other research. A few reasons were added that related to formula incentives (“It was easier to give my baby formula”, “I felt more comfortable giving my baby formula”, and “I got free formula from WIC”). Reasons gleaned from the focus groups were also added: “I didn’t want to have to watch what I ate and drank” and “I had trouble with the breast pump or I didn’t get enough milk by pumping”.

Infant feeding intention. Mothers were asked how they intended to feed their first-born baby during the first month, how long they intended to breastfeed, and when they decided to breastfeed. To assure comparability of responses and as intention can vary during pregnancy, all mothers were asked to recall their intention right before birth. These questions were adapted from the revised Breastfeeding Attrition Prediction Tool (BAPT) with permission of the author (Gill, Reifsnider, Lucke, and Mann, 2007).

Determinants of infant feeding intention. The original BAPT is a 94-item tool developed by Janke (1992) to predict breastfeeding attrition among postpartum women. It is based on the theory of planned behavior and was designed to measure the main construct of intention and its determinants: attitudes, subjective norms, and perceived behavioral control. It also incorporates commitment; social and professional support; lack of knowledge, skills or abilities; and negative breastfeeding feelings (Gill et al., 2007). It includes 4 subscales: positive breastfeeding sentiment (PBS), negative breastfeeding sentiment (NBS), social and professional support (SPS), and perceived behavioral control (PBC). The tool was shortened and simplified first by Dick et al. (2002) to 42 items and a 5-point Likert scale and then by Gill et al., (2007)

who sought to develop a tool to predict attrition that could be used with pregnant Mexican American women. In a review of breastfeeding assessment tools, Ho and McGrath (2010) concluded that three studies demonstrated adequate construct and predictive validity of the BAPT.

Gill et al.'s (2007) revised tool consists of only 35 items and uses a 3-point scale (agree, neutral, disagree); the 6-point scale in the original tool was found to be too confusing in a pilot study Gill et al. conducted. The tool revised by Gill et al. consists of the four original subscales (see Table 11). Gill et al.'s revised tool had good reliability for the entire tool and all subscales: a Cronbach's alpha of .86 for the entire revised BAPT, .78 for the NBS subscale, .80 for the SPS subscale, .82 for the PBC subscale, and .83 for the PBS subscale. In this study, Cronbach's alpha (using standardized variables) for the BAPT scale was .60. Cronbach's alpha was .72 for the PBS scale, .86 for the NBS scale, .72 for the PBC scale, and .77 for the SPS scale. Applying item response theory, Gill et al. reported overall good discrimination of breastfeeding intentions but recommended that the tool be used with samples of women with other backgrounds and in other settings. The author permitted my use and proposed adaptations of the revised BAPT. Each subscale was calculated by multiplying the score for each item in the scale by its weight (as described by Gill et al.) and summing all the weighted item scores.

Skills. The BAPT PBC subscale measures the perceived behavioral control construct of the TPB (self-efficacy in IM). While individual statements that make up the PBC subscale do not assess the mothers' specific breastfeeding skills (such as positioning of the baby, expressing the milk), several of the statements assess her perceived breastfeeding skills (for example, "I had the necessary skills to breastfeed", "I knew how to breastfeed"). Included in the PBC scale are also two questions about a woman's confidence and determination to breastfeed, paralleling Avery et

al.'s (2009) concept of confident commitment. Due to time constraints, the survey included the PBC subscale as a measure of both self-efficacy or perceived behavioral control and skills. Four items, based on items from Gill et al.'s (2007) PBC scale except focusing on formula-feeding instead of breastfeeding, were included. Items are: "I know how to prepare and give my baby formula", "I was determined to give my baby formula", "formula-feeding is easy", and "I am confident I can formula-feed".

Environmental factors: intrapersonal. The BAPT addresses intrapersonal level barriers and facilitators through its positive and negative breastfeeding scales, which in turn measure the attitude construct of the TPB and IM. Although several questions in the revised BAPT (Gill et al., 2007) indirectly test knowledge of infant feeding, one survey question asked about participants' knowledge of medical doctors' recommendations on exclusive breastfeeding ("how long do doctors say a mother should feed a baby nothing but breast milk, that is, with no added liquids or foods?"). This question originated from the CDC's IFPS II (CDC, 2009a).

Items based on the revised BAPT were added to the survey to: 1) incorporate topics that were brought up by focus group participants⁶; 2) ask about mothers' comfort with breastfeeding and formula-feeding⁷; and 3) ask about perception of formula as a risk factor for childhood illness⁸. By adding parallel questions on the mothers' positive and negative attitudes toward

⁶ "Formula feeding is more stressful than breastfeeding", "my breast milk could harm or may not be good enough for my baby", "I feel uncomfortable having a baby sucking at my breast", and "I have to give up too much, like eating or drinking whatever I want, when breastfeeding".

⁷ "I feel comfortable giving my baby formula" and "I feel comfortable breastfeeding". The concept of the relative comfort of formula feeding versus breastfeeding is presented by Nommsen-Rivers et al. (2010).

⁸ "Formula-fed babies get sick more often than breastfed babies".

formula, statements on incentives and disincentives to formula-feeding were also included, as per the INBM theory.

Environmental factors: interpersonal. The SPS subscale of the revised BAPT (Gill et al., 2007) measures the social and professional support the mother receives for either breastfeeding or formula-feeding and also serves as a measure of the subjective norm construct of the TPB and IM. The original revised BAPT included “my mother-in-law thinks I should” and “my sister thinks I should”. These were replaced by “my mother-in-law or the mother of my baby’s father wanted me to” and “my closest female friend or family member wanted me to” as it is possible that a significant percentage of the respondents may have neither a mother-in-law nor a sister. These changes were approved by Gill (written communication).

Questions related to social support were added to the survey. Two questions were added to find out whether the mothers know where to find help with infant feeding. They are “I know how to get help if I have trouble with breastfeeding” and “I know how to get help if I have trouble with formula”, with the responses being “agree”, “neutral”, and “disagree”. Another two questions ask whether the mother knows someone close to her who either breastfeeds or formula-feeds. Two questions ask whether the baby’s dad helped with breastfeeding and formula-feeding and one question asks whether or not the mother thinks she gets more help from family and friends when she breastfeeds.

Finally, there is a question on the structural support that is available to the mother, in the form of the father or another adult in the household. While this person may not necessarily be supportive of the mother’s infant feeding choice, this question is included as Racine et al. (2009) reported that the father’s not being in the household was a significant predictor in a multivariate

model of breastfeeding cessation among low-income women. These questions were adapted from CDC's IFPS (CDC, 2009a).

Environmental factors: institutional. Barriers and facilitators of four institutions were assessed: hospital, health care providers, WIC, and employers (work). Mothers were asked about hospital practices recommended by the Baby-Friendly Hospital Initiative (BFHI) that have been shown to be particularly effective in extending duration of breastfeeding across all socio-economic levels (Murray, Ricketts, & Dellaport, 2007). These practices include Steps 4, 6, 7, 9 and 10 of the BFHI, described below:

- Step 4 - Breastfeeding in the first hour after birth. This step also includes finding out whether the mother held the baby skin-to-skin immediately after birth;
- Step 6 - Exclusive breastfeeding unless medically indicated. This step also includes finding out whether the mother was given free formula samples,
- Step 7 – At least 23-hour rooming-in during the first 24 hours;
- Step 9 - No pacifier use; and
- Step 10 - Providing information on community breastfeeding support resources and a phone number to call after discharge.

In addition, we included a question (Step 5 of the BFHI) on whether hospital staff showed the mother how to breastfeed. The wording of the questions was adapted from Canada's Maternity Experiences Survey that includes questions measuring steps 3 to 10 of the Baby-Friendly Hospital Initiative (Chalmers et al., 2009).

Since receipt of breastfeeding instruction has been found to positively influence breastfeeding practices (Racine et al., 2009; Ma & Magnus, 2011), one question, derived from CDC's IFPS (CDC, 2009a), is asked about mothers' attendance at classes that discuss

breastfeeding, either prenatally or postpartum, and another question is whether mothers received specific instruction about breastfeeding.

Physicians, lactation consultants and other health care providers can strongly influence a woman's infant feeding practice (Humphreys et al., 1998; Racine et al., 2009; USDHHS, 2011). Therefore, several questions about health care providers' advice and practice were included in the survey. These were: whether the doctor's office gave or offered the participant free formula samples during pregnancy or after she had her baby; whether she thought her doctor wanted her to formula-feed or breastfeed (from the BAPT); whether she could correctly state physicians' recommended duration of exclusive breastfeeding (adapted from IFPS); timing of her utilization of prenatal and pediatric care; and utilization of various health care providers (physicians, lactation consultants, lay health advisers) for help with breastfeeding (adapted from IFPS).

As all participants were WIC clients at the time of interview, we asked about the type of WIC infant feeding package received and the perceived relative value of the three WIC packages. We also asked about the possible role WIC may have had in supporting or promoting women's infant feeding practice: "WIC makes it easy for women like me to give formula to my baby", "WIC makes it easy for women like me to breastfeed", and "for me, formula-feeding is cheaper than breastfeeding". Finally, due to WIC's practice of distributing free formula, we added "I got free formula from WIC" as a possible choice for deciding to stop breastfeeding.

Work and school questions were adapted from the CDC's IFPS (CDC, 2009a) and the HealthStyles Surveys (CDC, 2013). Mothers were asked whether or not they worked or studied during pregnancy or after the baby was born. They were also asked the age of the baby when the mother returned to work and school and the usual number of hours of work or study after the baby was born (< 20 hours; 20 - 39 hours, and 40 or more hours/week). A question adapted from

the HealthStyles survey (CDC, 2012a) asked whether the mother knew of a formal work policy to let women take breaks to breastfeed or pump, offer a private place for women to breastfeed or pump, offer flexible work schedules, or offer paid maternal or family leave.

Environmental factors: community. Besides asking about women's comfort with breastfeeding in public (included in the revised BAPT) (Gill et al., 2007), which not only reflects the mother's attitude but also society's norms, the survey included a question on whether women could easily find places to breastfeed comfortably in public. This question aimed at finding out about the perceived existence of places to comfortably breastfeed, whether designated private spaces or not.

Results

Research Question 2

The following analyses identify the quantitative differences in intention, skills, and environmental factors among low-income African American women who engage in different infant feeding practices: those who only formula-fed, those who breastfed for less than three months, and those who breastfed for at least three months. The environmental factors are presented in accordance with the ecological model, beginning with the intrapersonal level.

Infant Feeding Characteristics

One hundred and four (54.7%) women stated that they had breastfed or fed their baby breast milk. The median duration of any breastfeeding was 2.8 months (IQR = 1 to 6 months) and the median duration of exclusive breastfeeding (n = 96) was 2 months (IQR = 7 days to 4 months). For the women who breastfed for less than three months, the median duration of any breastfeeding was 1 month (IQR = 11 days - 2 months) and for exclusive breastfeeding it was just under a month (IQR = 2 days to 2 months). For the women who breastfed for at least three

months, the median duration of any breastfeeding was 6 months (IQR = 4 - 7.1 months) and for exclusive breastfeeding it was four months (IQR = 2 - 5.5 months).

One half (50.0%) of women had stopped breastfeeding before the third month; nearly three quarters (72.9%) were no longer exclusively breastfeeding by that time. At six months, 18.3% and 6.2% were breastfeeding and exclusively breastfeeding, respectively. Therefore, of the entire sample of 190 women, only 7 women (3.7%) breastfed exclusively for the recommended six months. This compares with the 18.8% of infants nationally who were breastfed exclusively through six months in 2011 (CDC, 2012a).

The median age of formula supplementation was two months (IQR = 7 days to 3 months). For the women who breastfed for less than three months, the median was 21 days (IQR = 2 days - 2 months) and for the women who breastfed for at least three months, the median was 3 months (IQR = 2 - 5 months). Tables 12 and 13 summarize the infant feeding practices of the sample.

Intention and determinants of intention. Nearly two-fifths (39.0%) of women intended to only breastfeed, and another 13.9% to mainly breastfeed for a total of 52.9% who intended to breastfeed. Two-fifths (40.1%) of women intended to only or mainly formula-feed. There was a significant difference in infant feeding intentions among the three groups ($p < .0001$). Among those who breastfed for at least three months, 63.3% had intended to only breastfeed as compared to 48.1% of those who breastfed for less than three months and 19.8% of those who only formula-fed.

Among the women who breastfed, 80.8% made the decision to breastfeed by the second trimester of pregnancy. Although 70.0% of breastfeeding women had intended to breastfeed for at least six months, only 26% of breastfeeding women actually breastfed for that duration. Of the

seventy women who intended to breastfeed for at least six months, only twenty-six (37.1%) met their goal.

The mean BAPT scale (with standard deviations in parentheses) for the entire sample was 17.6 (8.5) with a significant difference in scores among the three groups ($p < .0001$). Scores ranged from 12.3 (6.3) for women who only formula-fed to 24.1 (6.7) for the women who breastfed for at least three months. Table 14 summarizes the infant feeding intentions and BAPT scores of the sample. The results of the PBS and NBS scales are discussed under the Intrapersonal and the SPS scale under the Interpersonal sub-sections in the Environmental factors section.

Skills. Breastfeeding skills were measured through the PBC sub-scale, which asks women about their skills, ability, knowledge, determination, and confidence to breastfeed. The mean PBC score for the entire sample was 5.2 (3.9), ranging from a score of 3.2 (3.2) in the formula-feeding group to 8.3 (3.1) among women who breastfed for at least three months. A significant difference in this scale was found among the groups ($p < .0001$). Also, two survey items related to breastfeeding skills (that were not included in the PBC scale) demonstrated significant differences among groups: they were “I knew how to get help if I had trouble breastfeeding” ($p < .0001$) and “I felt comfortable breastfeeding” ($p < .0001$). While 44.6% of all women felt comfortable breastfeeding, only 18.1% of women who formula-fed agreed with this statement as compared to 49.0% of those who breastfed for less than three months and 82.7% of women who breastfed for at least three months. Over two thirds (67.4%) of women knew how to get help if they had trouble breastfeeding; this percentage ranged from just over half (50.6%) for formula-feeding women to 90.4% for women who breastfed for at least three months.

About three fourths (74.6%) of women felt comfortable with formula-feeding; 82.2% agreed it was easy; 85% felt confident formula-feeding; and 89.9% knew how to prepare and give the baby formula. There were significant group differences for the items “I was determined to give my baby formula”, “formula-feeding was easy”, and “I felt comfortable giving my baby formula” ($p < .0001$). The group differences for the items “I was confident I could formula-feed” and “I knew how to prepare and give my baby formula” were significant at $p = .0002$ and $p = .0248$, respectively. For example, less than half (48.8%) of women who breastfed for three or more months agreed that they were comfortable giving their babies formula versus 88% of women who only formula-fed their babies. There were no group differences in agreement to the statement: “I knew how to get help if I had trouble with formula” ($p = .26$). Table 15 summarizes the infant feeding skills of the survey sample.

Environmental factors.

Intrapersonal. The mean PBS and NBS scores were 6.4 ($SD = 3.7$) and 2.4 ($SD = 1.9$), respectively. The PBS scale differentiated the groups ($p < .0001$) but not the NBS scale ($p = .3273$). The PBS scores ranged from 4.3 for formula-feeders to 8.4 for women who breastfed for three or more months.

Additional questions were asked on attitudes toward infant feeding that resulted from the focus groups. They were questions on whether formula was more stressful than breastfeeding (10.9% agreed), whether her breast milk could harm her baby (10.3% agreed), whether she had to give up eating or drinking to breastfeed (22.5% agreed), whether she felt discomfort with the baby sucking on her breast (18.7% agreed) and whether formula-fed babies get sick more often (35.9% agreed). There was a significant difference among groups only for the last two items ($p = .018$ and $p = .024$, respectively). Among women who formula-fed, 27.8% felt it would be

uncomfortable to have a baby sucking on her breast as compared to 9.6% of women who breastfed for at least three months. Also, only 25.9% of women who formula-fed agreed that formula-fed babies get sick more often as compared to 49.0% of women who breastfed for three months or more.

Women were asked how long physicians recommend that women breastfeed exclusively. Less than a quarter (23.2%) of women gave the correct answer (6 months). This percentage did not vary by group ($p = .26$). These findings are summarized in Table 16.

Women who only formula-fed their infants were asked, in an open-ended question, what made them decide not to breastfeed. Among women who only formula-fed, 22.0% said they did not breastfeed because they were uncomfortable with the idea or did not want to breastfeed; 12.8% anticipated breastfeeding pain; 9.3% anticipated a return to work; 8.1% felt they should not breastfeed because they smoked; 7.0% experienced or anticipated low milk supply; 7.0% said their baby had trouble sucking or latching on; 5.8% didn't know how to breastfeed; 5.8% thought they wouldn't have time to breastfeed; and 5.8% never considered breastfeeding. Table 17 summarizes these findings.

The researchers asked breastfeeding women to check the reasons they had stopped breastfeeding. Table 18 shows the top ten reasons women gave for discontinuing breastfeeding, by infant feeding group. The top three reasons for all women were: perceived insufficient milk (32.7%), problems with breasts or nipples (32.7%), and baby had trouble sucking or latching on (28.8%). The top three reasons given by women who breastfed less than three months were: baby had trouble sucking or latching on (44.2%), problems with breasts or nipples (40.4%), and painful breastfeeding (38.5%). For women who breastfed for at least three months, the top three reasons included perceived insufficient milk (36.5%), problems with breasts or nipples (25.0%),

and trouble getting milk flow to start (15.4%). Among these top reasons, similar proportions in both breastfeeding groups were noted for: problems with breasts or nipples ($p = .094$), trouble getting milk flow to start ($p = .063$), not wanting to breastfeed in public ($p = .75$), breast milk alone did not satisfy baby ($p = .75$), not having enough milk ($p = .403$), breastfeeding was too inconvenient ($p = .34$), and trouble with breast pump or not getting enough milk by pumping ($p = .22$). All other cited reasons were significantly different by group.

Interpersonal. The mean SPS score (with standard deviations in parentheses) for the sample was 3.6 (2.4), ranging from 2.6 (2.2) for formula-feeding women to 4.9 (2.3) for those who breastfed for at least three months. There were significant differences in the SPS scale among the three groups ($p < 0.0001$). Responses to SPS items that were adapted to formula-feeding (e.g. “my mother wanted me to formula-feed”) were also significantly different among the groups⁹. Two additional items related to social support for breastfeeding and formula-feeding showed significant difference among groups for the breastfeeding but not the formula-feeding items. For example, there was a difference among group responses for “someone close to me breastfed” ($p = .0041$) and “knows how to get help for breastfeeding” ($p < .0001$) but not for “someone close to me formula-fed” ($p = .19$) or “knows how to get help with formula-feeding” ($p = .26$). Over one third (34.9%) of women who formula-fed agreed that someone close to them breastfed compared to nearly two thirds (63.5%) of women who breastfed for at least three months. In contrast, nearly three fourths (71.7%) of all women agreed that someone close to them formula-fed their baby; this percentage did not vary significantly among the groups. No differences were detected among the groups for responses to items on whether the baby’s dad

⁹ These items included: my baby’s father wanted me to formula feed ($p = .032$), my mother wanted me to formula feed ($p = .0004$), baby’s dad’s mother wanted me to formula feed ($p = .011$), and closest friend or family member wanted me to formula feed ($p = .0009$).

helped with breastfeeding ($p = .56$) or formula-feeding ($p = .20$). Significant differences were detected among the groups for responses to the item “I received more help from family and friends when I breastfeed” ($p < .0001$). There was no difference between the proportions of women who said they received help from at least one person for breastfeeding problems ($p = .33$). Table 19 summarizes these findings.

Institutional: Healthcare. Questions were asked about timing of attendance at breastfeeding classes and instruction on how to breastfeed (such as alternating breasts, frequency of feeding, and assessing sufficient feeding). Over half (56.5%) of women did not attend any breastfeeding classes. The percentage of women who did not attend breastfeeding classes differed among groups ($p = .025$) as well as those who attended before pregnancy ($p = .011$) and after hospital discharge ($p = .022$) but not for those who attended during pregnancy ($p = .37$) or in the hospital ($p = .42$).

Four-fifths (80.5%) of women received breastfeeding instruction; this varied from 61.6% for women who only formula-fed to 94.2% for women who breastfed for at least three months. The groups differed according to whether or not they received breastfeeding instruction ($p < .0001$); among those who did receive instruction, there was no proportional difference among the groups who received instruction during pregnancy ($p = .34$), but there were proportional differences among the groups by receipt of instruction before pregnancy ($p = .012$), at the hospital ($p < .0001$), and after hospital discharge ($p < .0001$). For example, over one fourth of women who formula-fed received breastfeeding instruction in the hospital, compared to over half (59.6%) of women who breastfed for at least three months.

Women were asked about physician practices and advice. Over three fourths (76.3%) agreed that their physician had wanted them to breastfeed. There was a significant difference

among the groups in responses to questions about their doctors' advice to breastfeed ($p < .0001$) or formula-feed ($p = .02$). For example, 59.5% of women who formula-fed said their doctors wanted them to breastfeed as compared to 88.0% and 92.3% of women who breastfed for less than three months and at least three months, respectively. However, 76.8% of women said that they had received free formula either during pregnancy or postpartum. There was no difference among the groups in the proportion that were offered or given free formula samples by their physicians ($p = .07$).

Several items, addressing BFHI practices, asked about women's experiences in the hospital. With the exception of not offering free formula and not giving the baby a pacifier, at least two thirds of women experienced each of the BFHI steps included in the survey (BFHI steps 4, 5, 6, 7 and 10). Of all the items, the only group differences were for those who held their baby skin-to-skin ($p = .0037$) and those who said their health care provider helped or offered to help start breastfeeding ($p = .024$). For example, two thirds (66.5%) of women said they held their babies skin-to-skin; this percentage varied from 54.8% for women who formula-fed to 82.4% for women who breastfed for at least three months. There was no difference among breastfeeding groups in the proportions of women who breastfed in the first hour after birth ($p = .46$), whose babies were given other liquids ($p = .62$), whose babies roomed-in for at least 23 hours daily ($p = .16$), whose babies were given a pacifier ($p = .14$), or who were given information on where to get help with breastfeeding (0.076). There was also no difference among the groups in the proportion that were given or offered free formula at the hospital ($p = .88$).

Postpartum, women were asked whether they had problems breastfeeding and whether they received helpful advice. Among breastfeeding women, 54.8% experienced problems breastfeeding. This percentage did not vary significantly by group ($p = .17$). However, there was

a significant difference among the proportion of women whose help resolved, partially resolved, or did not resolve breastfeeding problems ($p = .0013$). For example, among women who breastfed for at least three months, 29.2% reported receiving help that resolved all their problems compared to none of the women who breastfed for less than three months. Table 20 summarizes these findings.

Institutional: WIC. Items were developed to find out whether perceptions of WIC practices were associated with infant feeding practice groups. Overall, 85.3% of respondents agreed that WIC made it easy to formula-feed; there was no significant difference among groups in the proportion of respondents agreeing with this statement ($p = .068$). In contrast, only 38.9% of women agreed that WIC made it easy to breastfeed; with this statement, there was a significant difference among group responses ($p < .0001$), ranging from 18.5% among women who only formula-fed to 71.2% among women who breastfed for at least three months.

Less than one-fifth (17.9%) of women were offered or given free formula samples at WIC; there was no difference in proportions among the infant practice groups ($p = .85$).

As WIC distributes free formula to formula-feeding recipients, the survey included questions on the perception of the relative cost of breastfeeding to formula-feeding. Over two thirds of women (66.8%) thought breastfeeding was cheaper than formula-feeding, and only 13.0% thought formula-feeding was cheaper than breastfeeding. There was no group difference among women agreeing that formula-feeding was cheaper than breastfeeding ($p = .22$) but there was a group difference among women believing that breastfeeding was cheaper than formula-feeding ($p < .0001$), ranging from 50% for women who only formula-fed to 84.6% for women who breastfed for at least three months.

Nearly two thirds (64.5%) of women reported first receiving the formula package from WIC while similar percentages of women received the partial breastfeeding package (17.5%) and full breastfeeding package (18.0%). There was a significant difference among groups in the types of packages received ($p < 0.0001$). Nearly half (48.0%) of women who breastfed for at least three months received the full breastfeeding package as opposed to 8.2% of women who breastfed for less than three months. Nearly two thirds (65.3%) of women who breastfed for less than three months first received the formula package.

Women were also asked what WIC package they found most valuable. Over half (57.2%) of women thought the formula package was most valuable, compared to 43.5% who ranked the full breastfeeding package as most valuable, and 10.5% who ranked the partial breastfeeding package as most valuable. Rankings for the full breastfeeding and formula packages were significantly different among groups ($p < .0001$). Over four-fifths (81.2%) of women who breastfed for at least three months ranked the full breastfeeding package as most valuable. In contrast, only 26.8% of the women who only formula-fed and 23.3% of the women who breastfed for less than three months ranked the full breastfeeding package as most valuable. Nearly three fourths (73.2%) of women who formula-fed felt the formula package was most valuable compared to 68.1% of women who breastfed for less than three months and 15.9% of women who breastfed for at least three months.

Survey respondents were asked about the timing of their first postpartum WIC visit. Over half (54.6%) had their first postpartum WIC visit when the child was three weeks old or older. Less than one third (30.2%) had the first postpartum WIC visit by the first week. There were no significant differences among groups ($p = .25$).

Institutional: Work. After the child was born, nearly two thirds (63.1%) of women worked for pay and approximately two-fifths (42.9%) returned to school after the baby was born. Of the women who returned to work, nearly a quarter (23.3%) returned to work by the baby's sixth week and three-fifths (60.2%) returned to work by the baby's twelfth week. Over a fourth (27.6%) of women worked and/or studied less than twenty hours per week, nearly half (46.3%) worked and/or studied from twenty to thirty-nine hours weekly, and over a fourth (26.1%) worked and/or studied at least forty hours per week. There was no difference among the groups in the timing of return to work ($p = .58$) although there were only 103 responses and 15 missing values for this item. There was also no difference among the groups in the number of hours the women studied and worked weekly. Less than a quarter of all women (23.5%) agreed that "breastfeeding made returning to work difficult"; this proportion did not differ among groups ($p = .46$).

One question asked about women's perceptions of work policies that were favorable to breastfeeding (breaks and private places to pump or breastfeed, flexible work schedule, and paid maternal or family leave). However, a large proportion of the women who worked after the birth of their child (19.0 - 36.2%) answered that they did not know about the policies; therefore the answers are not a good reflection of actual work policies. The large percentage of working women who reported not knowing their employers' policies may reflect unclear or inadequate communication of policies.

Community. Respondents answered questions on their attitudes toward breastfeeding in public. Less than a quarter of women (23.6%) agreed that they could "find plenty of places to breastfeed in public"; the proportion agreeing varied by group ($p < .0001$) from 11.5% for women who only formula-fed to 44.2% for women who breastfed for at least three months.

However, two-fifths (39.9%) thought it was difficult to breastfeed in public; this proportion did not vary significantly by group ($p = .65$). Table 21 summarizes the findings related to WIC, the workplace, and the community.

Research Question 3

The third research question asked “What is the relative influence of each of intention, skills, and environmental factors on infant feeding practices among low-income African American women?” Table 22 shows the results of the regression analyses performed to answer this question: the multinomial simple logistic regression analyses, the multinomial multiple logistic regression analyses by level, the multinomial multiple logistic regression, and the final multinomial multiple logistic regression analysis.

Multinomial simple logistic regression. Comparing the positive deviant group with the women who only formula-fed, socio-demographic variables (marital status, education, household income and smoking status) the intention to only breastfeed, and all skills variables were statistically significant. Among the environmental factors, all variables at all levels (intrapersonal, interpersonal, healthcare, WIC, and community) were statistically significant with the exception of employment after the birth of the child.

When comparing the positive deviant group with the women who breastfed for less than three months, education was statistically significant, as were the breastfeeding skills variables, and three of the formula-feeding skills (formula-feeding was easy, confidence in formula-feeding, and comfort with formula-feeding). There were no significant differences in intention to only breastfeed or in variables at the intrapersonal level; however, at the interpersonal level, having someone close to her who breastfed differentiated the women in the two groups. None of the healthcare variables were significant, but returning to work after birth of the child was. Both

WIC variables were statistically significant. At the community level, women who agreed that they could find places to breastfeed in public were more likely to be in the positive deviant group.

Multinomial multiple logistic regression by level. All variables that were significant in the multinomial simple logistic regressions were entered into one of seven multinomial multiple logistic regressions. Those variables that were not significant were excluded from the final model. Intention to only breastfeed, returning to work after the baby was born, and finding places to breastfeed in public were retained for the final regression as they were the only variables at their respective levels. Among the socio-demographic variables, excluded variables were marital status, education, and household income. Smoking status was the only variable retained for further analysis at this level although this variable was significant only in differentiating the positive deviant group from the women who breastfed for less than three months. At the skills level, breastfeeding skills that were entered into the final model included the PBC scale and comfort with breastfeeding; formula skills included the determination to formula-feed. The skills level variables were only significant in comparing the positive deviants with the women who formula-fed. At the intrapersonal level, all three variables were retained: the PBS scale and feeling uncomfortable with the baby sucking at her breast were significant when comparing the formula-feeding women with the positive deviant group but women who knew someone close to them who mostly breastfed differentiated the two breastfeeding groups. At the institutional level, type of delivery (vaginal or C-section) was retained, as were breastfeeding instruction and skin-to-skin care in the hospital. However, these three variables were associated only with differences between the positive deviants and the women who formula-fed. Both WIC variables were retained: agreeing that WIC made it easy for women to breastfeed differentiated the women who

formula-fed from the positive deviant group. The other WIC variable, ranking the full breastfeeding package as most valuable, was significant in comparing the positive deviants with both of the other groups.

Multinomial multiple logistic regression. Four variables remained statistically significant once the final multinomial multiple logistic regression was completed. They are: placing the highest value on the WIC full breastfeeding package, type of delivery, smoking status, and the PBC scale. These four variables were entered into the final multinomial multiple logistic regression.

Final multinomial multiple logistic regression. In the final multinomial multiple logistic regression, those who ranked the full breastfeeding package as most valuable were 14.9 times (95% CI [4.8-45.5]) and 16.1 times (95% CI [5.3-50.0]) as likely to be in the positive deviant group compared to women who only formula-fed or breastfed for less than three months, respectively. Women who did not smoke during the child's first year were 4.3 (95% CI [1.5-12.3]) and 5.6 (95% CI [2.1-15.1]) times as likely to be in the positive deviant group compared to women who only formula-fed and women who breastfed for less than three months, respectively. Women who had C-sections (as opposed to vaginal deliveries) were 3.6 (95% CI [1.3-9.6]) and 2.9 (95% CI [1.0-7.8]) times as likely to be in the positive deviant group compared to women who only formula-fed and women who breastfed for less than three months, respectively. Finally, a one unit increase in the PBC scale, there is a 50% increase (95% CI [1.3-1.7]) and an 18% increase (95% CI [1.03-1.3]) in the odds of breastfeeding for three or more months compared to women who only formula-fed and women who breastfed for less than three months, respectively.

DISCUSSION

The present study demonstrated that, within a sample that characteristically is at high risk for low breastfeeding rates, there is a subset of women with more positive breastfeeding practices than the rest of the sample (positive deviant group) and the differences in infant feeding practices can be attributed to four factors: higher breastfeeding self-efficacy, not smoking, delivery via C-section, and valuing the WIC full breastfeeding packages. A number of potential predictors (related to socio-demographics, intention, skills and environmental factors) were examined that could differentiate the positive deviant group; however, when entered in a model with the four aforementioned factors, the remaining variables were not significant. The variables that were significant in simple logistic regression but were excluded from the final model, included marital status, education, household income, intention to only breastfeed, knowledge of sources of help for breastfeeding, comfort with breastfeeding, variables related to formula self-efficacy, social and professional support (SPS scale), knowing someone close to her who mostly breastfed, receiving more help when breastfeeding, breastfeeding classes and instruction, skin-to-skin care and help with breastfeeding in the hospital, perceiving WIC as facilitating breastfeeding, and ease of finding places to breastfeed in public. Each of the factors that differentiate the positive deviant group from the other two groups is discussed below.

Perceived Behavioral Control – Skills and Self-Efficacy

This study confirms previous findings that breastfeeding self-efficacy, perceived behavioral control, skills, or confident commitment predicted or were associated with both initiation and duration of breastfeeding (MacGregor & Hughes, 2010; Dennis & Faux, 1999; Blyth et al., 2002; Dennis, 2002; Avery et al., 2009; McCarter-Spaulding & Gore, 2009). In this study, the PBC scale predicted breastfeeding for at least three months when compared to women who only formula-fed or breastfed for less than three months, and controlling for a number of socio-demographic, intention, skills, and environmental factor variables.

The focus groups served to elucidate and illustrate the meaning of self-efficacy for these women. An overall sense of self-confidence was palpable among the women who had breastfed for at least four months, compared to the ambivalence of women who had breastfed for three months or less and the fears of breastfeeding and strong formula-feeding self-efficacy expressed by women who only formula-fed.

One of several measures developed for perceived behavioral control or self-efficacy is the PBC scale of the revised BAPT. Gill et al. (2007) developed the revised BAPT as a tool to predict infant feeding intentions of pregnant Mexican American women. This is the only published study using this tool. Cronbach's alpha for the PBC scale was .82 with the sample of Mexican American women and in the present study it was .72, a lower but still acceptable level (Tavakol & Dennick, 2011). Gill et al. (2007) recommend use of the BAPT, and more specifically the PBC subscale as a simple tool to screen pregnant women and provide customized training. The PBC scale could also be used to identify women with high levels of self-efficacy, or positive deviants, who could, if willing, be recruited to serve as mentors to other expectant and new mothers within their communities.

The PBC measures breastfeeding self-efficacy. During the focus groups, the women who breastfed for four or more months seemed to exhibit high levels of general self-efficacy, that is, a sense of confidence that could possibly extend to others areas of their lives. Luszczynska, Gutiérrez-Doña and Schwarzer (2005) describe general self-efficacy as “the belief in one’s competence to tackle novel tasks and to cope with adversity in a broad range of stressful or challenging encounters” (p. 80). One study was found (Ystrom, Niegel, Klepp, & Vollrath, 2008) that examined the relationship between general self-efficacy, using the General Self-Efficacy Scale (Luszczynska, Scholz & Schwarzer, 2005) and breastfeeding. Reporting on a Norwegian prospective cohort study, Ystrom et al. (2008) concluded that a higher general self-efficacy score, when adjusted for negative affect, predicted predominant breastfeeding compared to bottle-feeding. Further exploring the relationship between general self-efficacy and breastfeeding could be a promising line of research. If a relationship exists between general self-efficacy and breastfeeding, as suggested by Ystrom et al. and through the focus groups, increased attention could be placed on increasing girls’ or women’s general self-efficacy as well as specific breastfeeding skills, an important distinction.

Not Smoking

In the present study, not smoking significantly differentiated the positive deviant women from the other groups. Women who did not smoke during the infant’s first year were four and five times as likely to breastfeed for at least three months (versus women who formula-fed and women who breastfed for less than three months, respectively) compared to women who did smoke during that period. This finding is consistent with the literature, where smoking has been reported to be a barrier both to initiating and continuing breastfeeding (Hill & Aldag, 1996; Dennis, 2002; Kendzor et al., 2010).

In this study, over one fourth (26.3%) of women smoked at some time during their baby's first year of life. Of the women who smoked, 14.0% women breastfed for at least three months; in comparison 32.1% of non-smokers breastfed for at least three months. The focus groups shed light on the reasons some women who smoke do not breastfeed or stop breastfeeding early. Some women were unwilling or unable to stop smoking and felt that smoking and breastfeeding were incompatible. One woman said she wanted the freedom to smoke when she so desired. Some women expressed concern that their milk would be unsuitable for the baby and felt that smoking and formula-feeding was a safer combination. Another woman, a single parent, said she returned to smoking because she was "stressed out" from all her duties.

Smoking is not a contradiction for breastfeeding; however the American Academy of Pediatrics recommends that physicians strongly discourage smoking while breastfeeding due to its association with infant respiratory allergy and Sudden Infant Death Syndrome, and the potential for low milk supply, poor weight gain, and passive smoke inhalation (AAP, 2012). The CDC (2009b) is clearer. Their recommendation is that "Mothers who smoke are encouraged to quit, however, breast milk remains the recommended food for a baby even if the mother smokes. Although nicotine may be present in the milk of a mother who smokes, there are no reports of adverse effects on the infant due to breastfeeding" (CDC, 2009b). These messages could be confusing and, indeed, reflect the complex relationship between smoking and breastfeeding.

According to national data (CDC, 2009c)¹⁰ from 2005, 16.4% of mothers said they smoked postpartum when surveyed approximately four months after delivery. Just under half (45.7%) of smokers quit during pregnancy. Of those who quit smoking during the last 3 months

¹⁰ Data from 31 sites reporting Pregnancy Risk Assessment Monitoring System (PRAMS) data.

of pregnancy, over half (51.4%) relapsed to smoking after delivery. Pre-pregnancy smoking level and high depression scores predicted relapse (Solomon et al., 2007). Relapse has been found to be associated with negative affect: In one small study, mothers' first postpartum cigarette was concurrent with a negative emotion in 76% of mothers. Women are especially vulnerable to relapse during the postpartum period due to hormonal changes and stresses of motherhood (Solomon et al., 2007).

Results from a clinical trial where pregnant smokers were assigned¹¹ to a smoking cessation treatment group or control, suggest that treatment, mediated by smoking cessation, results in a greater proportion of women breastfeeding at 8 and 12 weeks (Higgins T. et al., 2010). However, Kendzor et al. (2010) suggested that breastfeeding and smoking cessation have a reciprocal relationship, citing studies supporting "breast feeding promotes smoking cessation and smoking cessation prolongs breast feeding" (p. 986). The former relationship, that breastfeeding promotes smoking cessation, has been supported in numerous studies (Kendzor et al., 2010). Should this indeed be the case, interventions that promote breastfeeding, especially among mothers who quit smoking during pregnancy, may result in both prolonged breastfeeding and abstinence from smoking.

As researchers sort out the complexities of the relationship between breastfeeding, smoking and other variables, such as depression, it will be important to carefully craft clear messages for women on smoking and breastfeeding. With proper support, perhaps women could be convinced to breastfeed so as to quit smoking and derive benefits, for themselves and their infants, from both behavioral changes.

¹¹ Out of a sample size of 158, 126 were randomly assigned to a group; the remainder was not randomly assigned.

Type of Delivery

A surprising finding of this research was that delivery via C-section¹², adjusted for covariates, significantly predicted breastfeeding for three or more months as compared to formula-feeding and breastfeeding for less than three months. According to a meta-analysis of 48 studies from around the world to see whether type of delivery is associated with breastfeeding, there is a significant association between C-section rates and lower breastfeeding rates, but among women who had initiated breastfeeding, there was no difference between the two delivery types in breastfeeding rates at 6 months of age (Prior et al., 2012). A recent study of the relationship between delivery type and breastfeeding initiation and duration showed no association between breastfeeding initiation and delivery method but a lower likelihood¹³ of breastfeeding at four weeks among women with induced vaginal deliveries and at six months among women with emergency cesarean sections and induced vaginal deliveries as compared with women with spontaneous vaginal deliveries, but no difference among women with planned cesarean deliveries (Ahluwalia et al., 2012). However, one study from Japan reported women with C-sections being 2.12 times¹⁴ as likely (95% CI [1.6-2.8]) to exclusively breastfeed at one month compared to women delivering vaginally. The authors speculate that this finding may be related to the longer length of stay of women undergoing C-sections and the corresponding opportunity for breastfeeding instruction of mothers by midwives in the hospital. In the cited

¹² The AAP recommends that newborns be breastfed within the first hour after birth, regardless of mode of delivery (AAP, 2012).

¹³ Adjusted for pre-delivery attitude toward breastfeeding, intention to breastfeed, maternal age, race/ethnicity, education, income/poverty level ratio, marital status, parity, and pre-pregnancy weight classification.

¹⁴ Crude odds ratio

study, length of hospital stay was 7 - 9 days for C-sections and 3 - 5 days for vaginal deliveries (Suzuki, Hirohata, Uriu, Hutago, & Murakami, 2013).

While length of stay for deliveries in the US is shorter, in 2010, there was nevertheless a 1.5 day difference between the mean length of stay for vaginal (2.2 days) and C-section deliveries (3.7 days) (CDC, 2010a). The extra day and a half in the hospital for C-sections may give more opportunity for hospital staff to educate and support the mother with breastfeeding. Perhaps the C-section variable is a proxy for longer length of stay. No recent published research was found on the relationship between length of stay after delivery and breastfeeding although this would be an important area of investigation, especially due to the research findings connecting substantial health care savings with extended and exclusive breastfeeding (Bartick & Reinhold, 2010; Bartick et al., 2013).

Value of WIC Food Packages

In this study, women who ranked the full breastfeeding packages the highest were 15 and 16 times as likely to breastfeed for at least three months as compared to the women who only formula-fed and breastfed for less than three months, respectively. When ranking the different WIC food packages, some participants may have ranked only the package(s) with which they were familiar. Therefore, giving a food package the highest rank may mean that a participant viewed it as the best among the three packages or it may mean that it is the only package with which the participant was familiar, and as such, was considered the best.

The finding raises many questions. What is the retail value of the different packages? What might be the mechanism for such a relationship? Do women make a decision to initiate and continue breastfeeding based on the perceived relative value of the packages or do they choose to breastfeed based on other factors (such as breastfeeding self-efficacy), receive the breastfeeding

package and then recognize its value over the other packages? This research does not answer these questions fully but, together with other research findings, can fill in some of the gaps in our knowledge.

In 2009, with the aim to promote breastfeeding, the WIC program introduced a major change in the types of foods it allows women to purchase for themselves and their infants. The three WIC food packages that women can choose at birth are the full breastfeeding package, the partial breastfeeding package, and the formula-feeding package. In particular, the full breastfeeding package contains more healthy foods for the breastfeeding mother and continues this support for both mother and baby through the infant's first year. In contrast, the formula package contains food for the mother only through the first six months and does not provide all the formula a baby needs each month. Evaluations of the impact of the new packages have produced mixed results with one national study reporting no change in initiation of breastfeeding (Wilde, Wolf, Fernandes & Collins, 2012) while another, in Los Angeles county, reported significant increases in breastfeeding initiation (Langellier, Chaparro, Wang, Koleilat & Whaley, 2014) and yet another, of California recipients, showing significant increases in issuance of full breastfeeding packages and significant declines in issuance of formula-feeding packages after implementation of the new packages (Whaley et al., 2012). These diverse findings may reflect different research methods and implementation strategies as well as different demographic composition of WIC recipients.

Drago (2011) presented an analysis of the retail values of the new packages. According to his estimates, the monthly retail value of the formula package during the first six months ranged from \$129 - \$139 compared to \$48 for the full breastfeeding package while during the second six months, the monthly retail value of the formula package is estimated at \$92 compared to \$108

for the full breastfeeding package. Thus the formula package is monetarily nearly three times as valuable as the full breastfeeding package during the first six months and a little less valuable thereafter.

While these studies shed light on changes in WIC participants' infant feeding decisions and the retail value of the packages, there do not appear to be any other studies where WIC participants have been asked to rank the value of the WIC packages. Findings from the focus groups and survey clarify the thoughts of women on the value of the WIC food packages.

In the focus groups, among the women who breastfed for at least four months, there was an overall appreciation of the breastfeeding support received from WIC and some explicitly valued the material resources they received from WIC. This observation is supported by the survey as 71.2% of women who breastfed for at least three months agreed that WIC made it easy to breastfeed (versus 74.4% who agreed that WIC makes it easy for formula feed), 81.2% valued the full breastfeeding package the most, and 48% chose the full breastfeeding package as their first package. In contrast, in the focus groups, the main concerns of the women who breastfed for three months or less centered on the service received from WIC and the types of pumps distributed. Among survey respondents who breastfed for less than three months, close to all (88.5%) agreed that WIC made it easy to formula-feed (38.5% of them agreed that WIC made it easy to breastfeed), less than a fourth (23.3%) valued the full breastfeeding package the most (over two thirds (68.1%) valued the formula package the most), and only 8.2% received the full breastfeeding package first. It is further interesting that over half (54.6%) of women had their first WIC postpartum visit after three weeks, and this percentage does not vary by group. For the women who breastfed for less than three months, this may mean that a large percentage attempted breastfeeding without WIC support during the first few weeks but then turned to WIC

for formula when problems arose with breastfeeding. As for the women who breastfed for at least three months, it may be that their ranking of the food packages reflects their recognition of the value of the full breastfeeding package over the formula package during the second six months.

Women who valued the breastfeeding package the most were fifteen times as likely to breastfeed for three months or more (compared to women who only formula-fed) than women who valued another package the most. In fact, among survey respondents who only formula-fed, over a fourth (26.8%) valued the full breastfeeding package the most, nearly three fourths (73.2%) valued the formula package the most, and nearly all (91.7%) received the formula package first. In the focus groups these women seemed to be concerned with how to meet the formula needs for the baby and were appreciative of the support provided by WIC to help them formula-feed.

Study Limitations and Strengths

Potential threats to internal validity include imprecision of some measures, selection bias, recall bias, social desirability bias, missing values in some variables, and confounding variables. Many variables were collected for this study to capture intention, skills and environmental factors that may influence infant feeding behavior. The extensive list of variables and the need to keep the survey length reasonable came at the expense of precision. For example, the question on smoking only collected any smoking by the mother during the first year of life of the child. It did not include a measure of quantity smoked, for example, which would have added to the precision of the measure.

Unfortunately, there appears to be imprecision in the definition of breastfeeding. The survey question to classify a woman as breastfeeding or not was “Was your first child ever

breastfed or fed breast milk through a bottle”? However, eight women who answered “no” to this question stated that they breastfed in the first hour after birth, thus highlighting the ambiguity of the question for some respondents and the potential for misclassification of women according to infant feeding type. Also, some survey questions were open-ended, leaving it up to the respondent to use her own words and terms. This led to greater imprecision than would have occurred with close-ended questions.

To minimize selection bias, researchers recruited a convenience sample of women from all three WIC sites in Richmond and at a variety of times and days of the week. However, some women were represented at the clinic by another family member. These may have been women who were working outside the home or perhaps they or their children were ill. If these omissions were systematic, the study sample may have resulted in a smaller percentage of working women or mothers whose children were ill than would be expected in the population of WIC participants. Selection bias and recruitment of a convenience sample would consequently also impact generalizability of the study.

Researchers asked mothers to answer questions about events or thoughts that may have occurred at the time of birth of their first child, from six months to up to three years earlier. For focus groups, the maximum recall time was two years. In a review of studies on the validity and reliability of maternal recall of breastfeeding practice, Li, Scanlon and Serdula (2005) concluded that maternal reporting of breastfeeding initiation and duration was most accurate within three years of birth. Inaccuracies could be due to problems with recall or reporting of socially desirable behaviors. For maternal attitudes or breastfeeding experiences, it is likely that recall varies depending on the item in question. For example, Gillespie, d’Arcy, Schwartz, Bobo and Foxman (2006) reported differences in recall accuracy of various reasons that women stopped

breastfeeding, with the highest sensitivity for more memorable events, such as mastitis and return to work.

Very few variables had more than ten percent of missing variables so this is a limited concern. However, women could answer “not applicable” to the formula-feeding skills questions and several of the women who breastfed for at least three months chose this answer, resulting in a larger proportion of missing values among this group of women. Lastly, confounding was minimized due to the many variables included in the study. However, one omitted measure may have been an important confounder: body mass index. Specifically, a systematic review found that most papers found an association between obesity and duration of breastfeeding, when adjusting for confounders (Amir & Donath, 2007).

With a relatively small sample size, the risk of a type II error increases. With a larger sample size, the precision of the estimate increases, with a corresponding decline in the risk of incorrectly not rejecting the null hypothesis. For example, one survey item “someone close to me breastfed”, had a p-value of .086 in the multinomial multiple logistic regression when comparing the positive deviant group with the women who breastfed for less than three months. With a larger sample size and a more precise estimate (with narrower confidence intervals), the difference may have been found to be significant.

A second type of variable omission was due to the type of analysis selected. The use of multinomial logistic regression forced the use of the same set of variables for the two comparisons, between the positive deviant group and each of the other two groups. Variables that were unique to breastfeeding women were omitted in analysis. For example, certain reasons women stopped breastfeeding may have been a factor differentiating women in the breastfeeding groups but they were omitted from analyses as they did not apply to formula-feeding women.

In this study, the focus groups were designed to inform the survey. Therefore, the focus groups had limited information on the specific findings found to be significant in the survey. This limited the usefulness of focus group findings for interpretation of survey results.

Strengths of the study included the positive deviant approach that allowed exploration of the factors that distinguish women who are similar to those who are at highest risk for not breastfeeding, yet have found ways to breastfeed for at least three months. Assessing how the positive deviant group differed from the others is an approach that has appeared only once in the national published literature on breastfeeding (Ma & Magnus, 2011). The incorporation of the ecological and INBM frameworks within Fishbein's IM provided the structure for the selection of a wide range of variables representing the levels of the ecological model and both breastfeeding and formula-feeding facilitators and barriers. The quantitative and qualitative portions of the study complemented each other so that findings from the focus groups and interviews informed the content of the survey, the results of which were better understood due to the qualitative methods. Further strengths of the study related to missing data. There were few survey items with more than 10% missing data. Furthermore, by using the FIML method of analysis, the full sample was studied, thereby resulting in accuracy of standard errors.

Conclusion and Directions for Future Research

This study set out to examine an important public health problem, barriers and facilitators to infant feeding among low-income African American women, through a new lens, a mixed methods research that combined the positive deviance approach with a modified Integrated Model as a theoretical framework. This unique methodological approach resulted in an unusual combination of relevant findings that set the positive deviant group apart from the rest of the

survey sample. Inquiry into the nature of the relationship of these four variables with breastfeeding led to the exploration of potential interventions and even further inquiry.

While there was a more than 2:1 ratio of women agreeing that WIC helped women to formula feed as opposed to breastfeed, the positive deviant women, who breastfed for at least three months, valued the breastfeeding incentives they received from WIC and viewed WIC as equally helping women breastfeed and formula feed. Perhaps the positive deviants' higher breastfeeding self-efficacy is related to their valuing of the WIC breastfeeding incentives. While the WIC program restructured its food packages just five years ago, should there be a thorough re-examination of these packages and the incentives they promote? Perhaps women with lower breastfeeding self-efficacy may need WIC incentives to more strongly favor breastfeeding and discourage formula feeding than presently offered.

Findings from the qualitative study are suggestive that general self-efficacy as well as breastfeeding self-efficacy may be important in influencing breastfeeding success. Is general self-efficacy also related to a longer duration of breastfeeding? This is an area needing further research, as efforts to improve general self-efficacy are different from those to improve breastfeeding self-efficacy. Meanwhile, the PBC or similar tool could be used to identify women prenatally and tailor education and training to their level of readiness to breastfeeding. Using the same tool postpartum to identify women who may be interested in promoting and helping women as peers could help to extend the network of community support for breastfeeding.

Results of this study were consistent with previous research findings of an association between smoking and lower initiation and shorter duration of breastfeeding. How can messaging be improved so that women breastfeed regardless of smoking status? Or can breastfeeding be

promoted as a means to stop smoking postpartum? There needs to be further exploration of interventions to promote breastfeeding to stop smoking and vice versa.

The C-section results raise a number of questions. Can the finding relating C-section rates with increased breastfeeding duration be replicated? Is the C-section rate really a proxy for longer length of stay and if so, what is the relationship between length of stay and breastfeeding? If a longer length of stay results in greater mastery of breastfeeding, it would be interesting to explore the possibility of a half-day extended hospital stay for women who are not yet comfortable with breastfeeding so that they can focus their attention, with help from lactation consultants, on mastering breastfeeding prior to discharge.

These ideas for further exploration and investigation (see Table 23) resulted from an inquiry into the most salient factors that differentiate women who breastfeed for at least three months in spite of circumstances that would tend to lead to less favorable behaviors. By listening directly to the women who have recently fed their infants, through qualitative and quantitative research, and learning about factors that may have led some women to breastfeed longer, interventions can be explored that build on these factors and hopefully result in improved breastfeeding rates among low-income African American women.

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Appendix A

Tables

Table 1. Chronology of Major Global Breastfeeding Policies

Policy/declaration	By whom/when	What it says or does
International Code of Marketing of Breast-Milk Substitutes	WHO, 1981	Recommendations to regulate marketing of breast-milk substitutes that should be available but not promoted, including free provision of product samples to health workers or families.
10 Steps to Successful Breastfeeding	WHO/UNICEF, 1989	10 steps for facilities providing maternity services and newborn infant care. Baby Friendly Hospital Initiative established in 1992 to promote the 10 Steps.
The Innocenti Declaration on the Protection, Promotion and Support of Breast-feeding	WHO/UNICEF, 1990; thirty countries signed.	Targets set for governments, by 1995 to: <ul style="list-style-type: none"> ▪ Appoint breastfeeding committee; ▪ Assure all facilities practice 10 Steps to Successful Breastfeeding ▪ Give effect to the International Code of Marketing of Breast Milk ▪ Enact legislation to protect breastfeeding rights of working women.
Global Strategy for Infant and Young Child Feeding	WHO/UNICEF, 2003	Reaffirmed Innocenti Declaration objectives and recommended all governments: <ul style="list-style-type: none"> ▪ Develop a comprehensive policy on infant feeding; ▪ Ensure health and other relevant sectors promote exclusive breastfeeding for six months and continued breastfeeding for up to two years or beyond; ▪ Promote appropriate complementary feeding with continued breastfeeding; ▪ Provide guidance on feeding infants in exceptional circumstances; and ▪ Consider means to give effect to International Code of Marketing of Breast-milk Substitutes.

Table 2. Healthy People 2020 Breastfeeding Objectives and Targets

Number	Objective	Baseline (year measured) %	2020 target %
MICH-21	Increase the proportion of infants who are breastfed:	(2006)	
MICH-21.1	Ever	74.0	81.9
MICH-21.2	At 6 months	43.5	60.6
MICH-21.3	At 1 year	22.7	34.1
MICH-21.4	Exclusively through 3 months	33.6	46.2
MICH-21.5	Exclusively through 6 months	14.1	25.5
MICH-22	Increase the proportion of employers that have worksite lactation support programs	25.0 (2009)	38.0
MICH-23	Reduce the proportion of breastfed newborns who receive formula supplementation within the first 2 days of life	24.2 (2006)	14.2
MICH-24	Increase the proportion of live births that occur in facilities that provide recommended care for lactating mothers and their babies	2.9 (2009)	8.1

Table 3. Characteristics of Qualitative Study Participants

Characteristics	Only formula fed (n = 9) no. (%)	Breastfed for three or less months (n = 13) no. (%)	Breastfed for four or more months (n = 6) no. (%)
Age of mother (years), mean (SD)	22.9 (3.1)	23.6 (5.9)	24.8 (3.9)
Marital status			
Never married	8 (88.9)	5 (38.5)	3 (50.0)
Married	0 (0.0)	3 (23.1)	1 (16.7)
Member of unmarried couple	1 (11.1)	5 (38.5)	2 (33.3)
Highest level of education			
Less than high school	6 (66.7)	2 (15.4)	1 (16.7)
High school graduate	0 (0.0)	3 (23.1)	0 (0.0)
Less than two years of technical school or college	3 (33.3)	6 (46.2)	0 (0.0)
Two to four years of technical school or college	0 (0.0)	0(0.0)	4 (66.7)
College graduate or higher	0 (0.0)	1 (7.7)	1 (16.7)
Unknown	0 (0.0)	1 (7.7)	0 (0.0)
Student status			
Full or part-time student	0 (0.0)	3 (23.1)	5 (83.3)
Not a student	9 (100.0)	10 (76.9)	1 (16.7)
Employment status			
Employed full or part-time	1 (11.1)	5 (38.5)	3 (50.0)
Unemployed/homemakers	8 (88.9)	8 (61.5)	3 (50.0)
Annual household income			
<\$10,000	8 (88.9)	10 (76.9)	2 (33.3)
\$10,000 - <\$20,000	1 (11.1)	0 (0.0)	0 (0.0)
\$20,000 - <\$50,000	0 (0.0)	2 (15.4)	3 (50.0)
Unknown	0 (0.0)	1 (7.7)	1 (16.7)
Duration of breastfeeding (months), median (range)	N/A	1 (0.25 – 3)	6 (5 – 11.5) ¹

¹Only half of participants (whose child was at least four months old) had stopped breastfeeding when interviewed (n = 3).

Table 4. Focus Group Guiding Questions

<p>Knowledge and attitudes on infant feeding</p> <ul style="list-style-type: none">➤ What are good things about (feeding formula) (breastfeeding)? What makes it easy to (give baby formula) (breastfeed)?➤ What are the problems with feeding the baby this way? What makes it difficult to feed the baby this way?
<p>Own experience with infant feeding</p> <p><i>Intention</i></p> <ul style="list-style-type: none">➤ Before your baby was born, how did you think you'd feed your baby? <p><i>Barriers and Facilitators</i></p> <ul style="list-style-type: none">➤ What made it easy for you to (breastfeed)(give your baby formula)?➤ What made it difficult to (breastfeed)(give your baby formula)? <p>For each of above two questions, probe for:</p> <ul style="list-style-type: none">• Personal knowledge and beliefs• Spouse/partner or family• Social support (friends, peer counselors, lay health workers)• Health care workers (doctors, nurses, lactation consultants)• Health care providers (hospital, WIC, health department, clinic)• Community organizations (church, social services, child care)• Work and businesses• Community (media, parks, restaurants)
<p>Community recommendation</p> <ul style="list-style-type: none">➤ What could be done to make it easier for women to only breastfeed for the first six months?

Table 5. Summary of Focus Group Results by Infant Feeding Group

Variables or levels	BF at least 4 months	BF <3 months	Formula feeding
Intention	Strong BF intention	Mixed intention	FF intention
Skills	High self-efficacy	Limited BF skill or knowledge	BF insecurity or fear
Environmental factors:			
Intrapersonal	Value BF FF disadvantages	Aware of BF benefits Ambivalence Distrust of own milk	Aware of BF benefits BF risks (pain) FF convenience, comfort
Interpersonal	Mixed influences Resist BF-/FF+ influences BF+ influence on others Expect BF support	Mixed influences Mixed responses Neutral families Dads left out with BF	Mixed influences Resist BF+ advice FF tradition Receive help with FF
Prenatal health care providers	Promote BF: receptive Limited information on BF problems Distribute formula No formula risks	Promote BF: mixed response Limited information on BF problems Accepting of formula Distribute formula	Promote BF – reject Distribute formula No formula risks
Hospital	BF instruction Good BF support BF+/BF- practices	Insufficient BF instruction Some BF+/BF- practices Formula available	Some BF encouragement Good formula help
Postpartum health care providers	Perceived resource for BF Advice not helpful	Resource for BF Unhelpful BF advice Recommend formula for BF problems	Resource for FF Helpful advice
WIC	Appreciate WIC support Need better pumps Need home visits Excessive formula promotion	Mixed perception of role (BF+/FF+) Unhelpful BF support and customer service Free formula Need better pumps	Free formula Help with formula Check does not cover full needs
Work	Determined to work and BF Better BF benefits needed	Significant work obstacles Challenge to combine work & BF	Not a barrier to FF
Community	Stigma BF in public; bottle is norm Limited spaces to BF Comfort BF in public Promotion of formula Need barriers to FF	Stigma BF in public; bottle is norm Avoid BF in public Need more community resources for BF Formula expensive	Stigma BF in public Bottle is norm Formula expensive Pumps expensive
Code: BF+/BF-: positive or negative breastfeeding		FF+/FF-: positive or negative formula feeding	

Table 6. Qualitative Study Participants' Recommendations to Facilitate Exclusive Breastfeeding

Variables	Recommendations
Skills/Self-efficacy	<ul style="list-style-type: none"> • Give mothers confidence classes • Provide information/training so that mothers are more comfortable with BF
Environmental Factors	
Intrapersonal	<ul style="list-style-type: none"> • Stress benefit of losing weight with BF
Interpersonal	<ul style="list-style-type: none"> • Teach dads how to help when mother has problems (e.g. pain, not enough milk) with BF • Provide more parenting classes for fathers, especially for first-time fathers • Figure out more ways dads can help while moms BF • Be surrounded by positive people to talk to about BF • Have someone BF moms can speak with face-to-face about BF • Have someone checks in on BF moms at home post-partum
Institutional – Healthcare	<ul style="list-style-type: none"> • Encourage BF more • Find ways to tell people formula is OK too • Provide free/inexpensive BF classes • Include BF essentials in give-away kits (like teas to increase milk supply) • Have someone BF moms can speak with face-to-face about BF • Have someone check in on BF moms at home post-partum • Send lactation consultant to women's homes • Provide more hands-on training to help women BF – how to get baby to latch on, what foods will help produce more milk, free samples of vitamins that help in milk production • Increase BF knowledge among pregnant women by having doctors and home visitors continue to discuss BF with women
Institutional – WIC	<ul style="list-style-type: none"> • Be more accepting/respectful of all participants • Hold evening hours to pick up WIC checks • Stop giving out formula unless approved by a doctor • Provide free nursing covers and pillows for BF women • Include BF essentials in give-away kits (like tea to increase milk supply)
Institutional – Work	<ul style="list-style-type: none"> • Provide extra or longer breaks
Community	<ul style="list-style-type: none"> • Hold focus groups on BF • Educate men about BF so that they will promote BF • Teach people not to judge you – that BF is natural • Educate other people about BF/change negative BF attitudes • Make more pumps available, especially electric pumps for free/low price • Pump companies provide incentives to doctors • Be able to buy breast milk at the counter • Display more advertisements and images of BF to normalize BF • Promote healthy eating • Provide places (in public) for breastfeeding mothers • Provide parking spots for BF women

BF: breastfeeding

Table 7. Baby Friendly Hospital Initiative – 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 the skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within one hour of birth.
5. Show mothers how to breastfeed and how to maintain lactation, even if they are separated from their infants.
6. Give 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 pacifiers or artificial nipples to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or birth center.

Source: <http://www.babyfriendlyusa.org/about-us/baby-friendly-hospital-initiative/the-ten-steps>, retrieved on 4/18/2014

Table 8. Practices Compatible and Incompatible with BFHI Steps

Compatible Practices

Skin-to-skin (step 4) When, my daughter came out – I’m talking about right out ... as soon as they wiped her off, gave her... some shots, whatnot, they placed her on my chest, she latched on like that, no problem.... And it didn’t hurt, it weren’t no pain, it was just, it was like a beautiful first moment with my daughter. (mother who breastfed for less than three months)

Show mothers how to breastfeed (step 5) But then they [the hospital] had some lactation consultants come and help me with positioning and show me what I needed to do and how to hold the baby right and get the baby to latch on, so...The support in the room, there was nurses there and the... lactation consultant had come and my mom was there and was telling me what she went through, so, you know, they just kept telling me, “Don’t give up”, so I didn’t give up. (mother who breastfed for at least four months)

Show mothers how to breastfeed (step 5) I had a consultant come to me right when they brought me the baby after I had him, and showed me how to latch – get him to latch on – and when he’s not latching on, how to maneuver him around and to get him off it if he’s not on it correctly. They had somebody show us. (mother who breastfed for less than three months)

Rooming-in (step 7) My hospital, it was great, they kept my baby in the room with me, let me keep him all night, the only time they came and got him when they had to give him his shots or give him his bath, but, they was supportive with me and everything. (mother who breastfed for less than three months)

Refer mothers to post-discharge breastfeeding support (step 10) Well at the hospital they had given me a number ... a lactation consulting place where they have nurses that...specialize in it [breastfeeding]... and so when I had problems ...I guess maybe my skin around my breasts was getting like raw... I ended up calling them and they helped me because I didn’t know what to do at that point... So they gave me a lot of advice. (mother who breastfed for at least four months)

Incompatible Practices

No rooming in, bringing baby to feed on schedule, and giving baby a pacifier (steps 7, 8, and 9, respectively) I think they [hospital staff] actually made it harder for me [to breastfeed], and I felt like they were a little lazy...they didn’t want to bring my child out when she was hungry. I’m like, “Bring her to me when she’s hungry,” you know, I don’t mind, I don’t care what time it is...I want her to get in the swing of breastfeeding and getting her in the swing of getting comfortable with me. But they were lazy, they didn’t want to...They nagged me to give her a pacifier, I didn’t want her to have a pacifier. I mean, just, they went against things like that, even though I had a birthing plan, they still wanted to do what they wanted to do. (mother who breastfed for less than three months)

Supplementing breast milk with formula (step 6) Like if my baby couldn’t latch on, some of the nurses maybe would be impatient and just run and go get the little bottles, those formula, and it’s like okay, how’s he gonna learn, how to ever latch on if y’all gonna give him bottles, too? (mother who breastfed for at least four months)

Not initiating breastfeeding within first hour and not showing mother how to breastfeed (steps 4 and 5, respectively) They came to me in the hospital, What are you gonna do? You want to breastfeed? I said, “no”. I said I was thinking about bottle. They shut the door. So yeah, they gave me the WIC formula I needed...I went over to WIC and got that formula. (mother who only formula fed)

Table 9. Characteristics of the Study Sample by Infant Feeding Practice

Survey item	All participants no.(%) (N = 190)	Infant feeding type			Missing no.	p value: ANOVA or chi-square
		Formula only no.(%) (n=86)	BF < 3 mo. no.(%) (n= 52)	BF ≥ 3 mo. no.(%) (n=52)		
Age of mother (years), mean (SD)	23.4 (4.4)	23.4 (4.6)	22.7 (3.6)	24.1 (4.6)	0	0.25
Age of child (months), mean (SD)	17.4	18.5	16.4	16.4	0	0.19
Marital status, n	189	85	52	52	1	0.020*,**
Not married	180 (95.2)	84 (98.8)	50 (96.2)	46 (88.5)		
Married	9 (4.8)	1 (1.2)	2 (3.8)	6 (11.5)		
Household composition at birth of child						
Father of infant	96 (50.5)	39 (45.4)	29 (55.8)	28 (53.8)	0	0.42
Father or other adult living at home	162 (85.3)	71 (82.6)	47 (90.4)	44 (84.6)	0	0.45
One or more children <18	46 (24.2)	22 (25.6)	9 (17.3)	15 (28.8)	0	0.36
No other person	20 (10.5)	10 (11.6)	4 (7.7)	6 (11.5)	0	0.74
Education, n	187	86	50	51	3	0.0025*
No high school diploma	25 (13.4)	18 (20.9)	2 (4.0)	5 (9.8)		
High school diploma/GED	77 (41.2)	38 (44.2)	22 (44.0)	17 (33.3)		
Some college/technical	68 (36.4)	25 (29.1)	24 (48.0)	19 (37.2)		
College graduate or higher	17 (9.1)	5 (5.8)	2 (4.0)	10(19.6)		
Employment or school after birth of child						
Yes - employed	118 (63.1)	51 (60.7)	27 (52.9)	40 (76.9)	3	0.034*
Yes - in school	78 (42.9)	37 (45.1)	20 (40.0)	21 (42.0)	8	0.84
Timing of return to work, n	103	41	26	36	12	
Yes, 0 - 6 weeks	24 (23.3)	9 (22.0)	9 (34.6)	6 (16.7)		0.58
Yes, >6 - 12 weeks	38 (36.9)	15 (36.6)	8 (30.8)	15 (41.7)		
Yes, >12 weeks	41 (39.8)	17 (41.5)	9 (34.6)	15 (41.7)		
Annual household income, n	176	84	46	46	14	0.046*
<\$10,000	116 (65.9)	63 (75.0)	30 (65.2)	23 (50.00)		
\$10,000 - <\$20,000	34 (19.3)	11 (13.1)	8 (17.4)	15 (32.6)		
\$20,000 or more	26 (14.8)	10 (11.9)	8 (17.4)	8 (17.4)		
Prenatal care began, n	171	74	48	49	19	0.66
After 1st trimester or no prenatal care	28 (16.4)	11 (14.9)	7 (14.6)	10 (20.4)		
1st trimester	143 (83.6)	63 (85.1)	41 (85.4)	39 (79.6)		
Type of delivery, n	190	86	52	52	0	0.044*
Vaginal	125 (65.8)	62 (72.1)	36 (69.2)	27 (51.9)		
Cesarean	65 (34.2)	24 (27.9)	16 (30.8)	25 (48.1)		
Birthweight, n	183	83	50	50	7	0.81
% LBWT	32 (17.5)	13 (15.7)	10 (20.0)	9 (18.0)		
% not LBWT	151 (82.5)	70 (84.3)	40 (80.0)	41 (82.0)		
Newborn illness or condition, n	190	86	52	52	0	0.75
Yes	21 (11.0)	8 (9.3)	7 (13.5)	6 (11.5)		
No	169 (89.0)	78 (90.7)	45 (86.5)	46 (88.5)		
Mother smoked during infant's first year, n	190	86	52	52	0	0.037*
Yes	50 (26.3)	25 (29.1)	18 (34.6)	7 (13.5)		
No	140 (73.7)	61 (70.9)	34 (65.4)	45 (86.5)		
Other person smoking in household, n	189	85	52	52	1	0.71
Yes	57 (30.2)	24 (28.2)	18 (34.6)	15 (28.8)		
No	132 (69.8)	61 (71.8)	34 (65.4)	37 (71.2)		

*Indicates significance at $p \leq 0.05$.

**Fisher's exact test

BF = breastfeeding; FF = formula feeding; BM = breast milk; F = formula

Table 10. Skill and Environmental Factor Variables by Ecological Level and Incentives or Disincentives

Breastfeeding incentives	Formula-feeding incentives	Breastfeeding disincentives	Formula-feeding disincentives
Skills			
Perceived behavioral control (PBC)	I knew how to prepare formula I was determined to give formula FF was easy I was confident I could FF		
Intrapersonal			
Positive Breastfeeding Sentiment (PBS) Comfort with BF How long do doctors say you should breastfeed exclusively	Comfort with FF	Negative Breastfeeding Sentiment (NBS) My breast milk may be harmful to baby Discomfort with baby at breast Give up too much to BF Smoking postpartum Reasons to stop breastfeeding or not to breastfeed	Formula babies get sick more often FF more stressful than BF
Interpersonal			
Social and Professional Support (SPS) Someone close to me mostly BF I knew how to get help with BF Baby's dad helped with BF Living with dad of baby More help from family/friends when BF Living with father of child or other adult	Social and Professional Support (SPS) Someone close to me mostly fed formula I knew how to get help with formula Baby's dad helped with FF Living with father of child or other adult		

Breastfeeding incentives	Formula-feeding incentives	Breastfeeding disincentives	Formula-feeding disincentives
Institutional			
Healthcare providers: Timing of prenatal/pediatric care Doctor wanted her to BF Attended BF classes; received BF instruction Support for BF problems Hospital practices: 10 steps: (BF only) Breastfed in 1 st hour after baby was born, information on where to get help with BF, phone # to call if problems with BF, (All) Help or offer to help to start BF; baby held naked against bare skin WIC: WIC made it easy to BF; timing of first WIC visit; Perception of value of packages Type of WIC package first received Work policies: BF breaks, private place, flexible hours, paid leave	Healthcare providers: Distribution of free formula samples pregnancy/after birth Doctor wanted her to FF WIC: Distribution of free formula samples pregnancy/after birth; receipt of formula or partial breastfeeding package FF cheaper than BF WIC made it easy to give formula		
Community			
Plenty of places to BF in public		Difficult to BF in public	

Note: Socio-demographic variables: marital status, living arrangements, age of mother, smoking status, governmental support, education, occupation, and income.

Table 11. Scales of the Revised BAPT (Gill, 2007)

PBS Scale	Disagree	Agree
1. Breastfeeding is more convenient than formula feeding.	1 2	3
4. Breast milk is healthy for the baby.	1 2	3
7. Breast milk is more nutritious than infant formula.	1 2	3
10. Breastfeeding makes you closer to your baby.	1 2	3
12. Breastfeeding is more economical than formula feeding.	1 2	3
19. Breastfeeding helps you bond with your baby.	1 2	3
20. Breastfeeding is better than formula.	1 2	3
NBS Scale	Disagree	Agree
2. Breastfeeding is painful.	1 2	3
3. Formula feeding allows the mother more freedom.	1 2	3
5. No one else can help feed the baby when you breastfeed.	1 2	3
6. It is difficult to breastfeed in public.	1 2	3
8. Breastfeeding makes your breasts sag.	1 2	3
9. Formula feeding is easier than breastfeeding.	1 2	3
11. Breastfeeding makes returning to work more difficult.	1 2	3
13. When you breastfeed you never know if the baby is getting enough milk.	1 2	3
14. Mothers who formula feed get more rest than breastfeeding mothers.	1 2	3
15. Breastfeeding is more time consuming than formula feeding.	1 2	3
16. Formula feeding lets the father become close to the baby.	1 2	3
17. Breastfeeding is messy.	1 2	3
18. Breastfeeding ties you down.	1 2	3
SPS Scale	Feed formula	Breastfeed
21. The baby's father thinks I should:	1 2	3
22. My mother thinks I should:	1 2	3
23. My mother-in-law thinks I should:	1 2	3
24. My sister thinks I should:	1 2	3
25. My doctor thinks I should:	1 2	3
PBC Scale	Disagree	Agree
26. I have the necessary skills to breastfeed.	1 2	3
27. I am physically able to breastfeed.	1 2	3
28. I know how to breastfeed.	1 2	3
29. I am determined to breastfeed.	1 2	3
30. I won't need help to breastfeed.	1 2	3
31. Breastfeeding is easy.	1 2	3
32. I am confident I can breastfeed.	1 2	3

Table 12. Breastfeeding Duration of Breastfeeding Women

Duration	Exclusive BF (n=96)			Any BF (n=104)		
	Timing of termination no. (%)	Cum. freq. termination (%)	Duration (%)	Timing of termination no. (%)	Cum. freq. termination (%)	Duration (%)
< 1 week	22 (22.9)	22.9	77.1	9 (8.6)	8.60	91.40
1 week - < 1 month	18 (18.8)	41.7	58.3	11 (10.6)	19.20	80.80
1 month - < 2 months	17 (17.7)	59.4	40.6	16 (15.4)	34.60	65.40
2 months - < 3 months	13 (13.5)	72.9	27.1	16 (15.4)	50.00	50.00
3 months - < 4 months	5 (5.2)	78.1	21.9	12 (11.5)	61.50	38.50
4 months - < 5 months	5 (5.2)	83.3	16.7	8 (7.7)	69.20	30.80
5 months - < 6 months	9 (9.4)	92.7	7.3	5 (4.8)	74.00	26.00
6 months	1 (1.0)	93.8	6.2	8 (7.7)	81.70	18.30
> 6 months	6 (6.2)	100.0	0.0	19 (18.3)	100.00	0.00

Table 13. Median Ages of Formula Supplementation, Exclusive and Any Breastfeeding by Breastfeeding Group

Type of feeding or supplementation (mths)	All breastfed infants	Infant feeding type	
		BF < 3 mo.	BF ≥ 3 mo.
Age of Formula Supplementation (n=94) Median (Interquartile range)	2 (0.23-3)	0.69 (0.66-2)	3 (2-5)
Duration of Exclusive Breastfeeding (n=96) Median (Interquartile range)	2 (0.23-4)	0.92 (0.06-2)	4 (2-5.5)
Duration of any breastfeeding (n=104)* Median (Interquartile range)	2.75 (1.0-6.0)	1.00 (.375-2.0)	6.0 (4-7.1)

*For women who had not stopped breastfeeding by the time of the interview (n=7), age of child was used as the duration of breastfeeding.

Table 14. Infant Feeding Intention by Infant Feeding Type

Measure/survey item	All participants no.(%) (N = 190)	Infant feeding type			Missing no.	p value: chi-square
		Formula Only no.(%) (n=86)	BF < 3 mo. no.(%) (n= 52)	BF ≥ 3 mo. no.(%) (n=52)		
BAPT scale, mean (SD)	17.6 (8.5)	12.3 (6.3)	20.4 (7.8)	24.1 (6.7)		<0.0001*
Intended feeding type, n	187	86	52	49	3	<0.0001*
BF only	73 (39.0)	17 (19.8)	25 (48.1)	31 (63.3)		
Mainly BF	26 (13.9)	1 (1.2)	12 (23.1)	13 (26.5)		
Only or mainly FF	75 (40.1)	63 (73.2)	10 (19.2)	2 (4.1)		
Unsure	13 (7.0)	5 (5.8)	5 (9.6)	3 (6.1)		
When decided to BF, n	104	NA	52	52	0	0.013*
During or before 2nd trimester	84 (80.8)		37 (71.2)	47 (90.4)		
During 3rd trimester or at birth	20 (19.2)		15 (28.8)	5 (4.8)		
During or before 2nd trimester (row %)	84		37 (44.0)	47 (56.0)		
During 3rd trimester or at birth (row %)	20		15(75.0)	5 (25.0)		
Intended duration of BF	90	NA	42	48	14	0.042*
< 6 months	27 (30.0)		18 (42.9)	9 (18.8)		
6+ months	63 (70.0)		24 (57.2)	39 (81.3)		
< 6 months (row %)	27 (30.0)		18 (66.7)	9 (33.3)		
6+ months (row %)	63 (70.0)		24 (38.1)	39 (61.9)		

*Indicates significance at $p \leq 0.05$.

BF = breastfeeding; FF = formula feeding; BM = breast milk; F = formula

Table 15. Breastfeeding and Formula Feeding Skills by Infant Feeding Type

Measure/survey item	All participants no.(%) (N = 190)	Infant feeding type			Missing No. (n=5)	p value: chi-square
		Formula only no.(%) (n=86)	BF < 3 mo. no.(%) (n= 52)	BF ≥ 3 mo. no.(%) (n=52)		
PBC scale, mean (SD)	5.2 (3.9)	3.2 (3.2)	5.9 (3.7)	8.3 (3.1)	0	<0.0001*
Additional breastfeeding skills (% agree)						
I knew how to get help if I had trouble BF	126 (67.4)	42 (50.6)	37 (71.2)	47 (90.4)	3	<0.0001*
I felt comfortable BF	83 (44.6)	15 (18.1)	25 (49.0)	43 (82.7)	4	<0.0001*
Formula feeding skills (% agree)**						
I knew how to prepare and give my baby F	160 (89.9)	78 (94.0)	48 (92.3)	34 (79.1)	12 (10)***	0.025*
I was determined to give my baby F	73 (42.0)	53 (64.6)	13 (27.1)	7 (15.9)	16(12)***	<0.0001*
FF was easy	143 (82.2)	76 (92.7)	43 (82.7)	24 (60.0)	16 (13)***	<0.0001*
I was confident I could FF	147 (85.0)	76 (95.0)	43 (84.3)	28 (66.7)	17 (14)***	0.0002*
I knew how to get help if I had trouble with F	155 (88.1)	75 (91.5)	45 (88.2)	35 (81.4)	14 (12)***	0.26
I felt comfortable giving my baby F	132 (74.6)	73 (88.0)	38 (74.5)	21 (48.8)	13 (11)***	0.0001*

*Indicates significance at $p \leq 0.05$.

**First four items from PBC sub-scale in Gill, Reifsnider, Lucke & Mann (2007) were adapted to formula feeding.

*** First number is total number missing. Number in parentheses indicates number responding "not applicable".

BF = breastfeeding; FF = formula feeding; BM = breast milk; F = formula

Table 16. Intrapersonal Attitudinal Factors by Infant Feeding Practices

Measure/survey item	All participants no.(%) (N = 190)	Infant feeding type			Missing no.	p value: chi-square
		Formula only no.(%) (n=86)	BF < 3 mo. no.(%) (n= 52)	BF ≥ 3 mo. no.(%) (n=52)		
PBS scale, mean (SD)	6.4 (3.7)	4.3 (3.3)	7.9 (3.0)	8.4 (3.2)	0	<0.0001*
NBS scale, mean (SD)	2.4 (1.9)	2.2 (2.0)	2.6 (1.9)	2.6 (1.9)	0	0.33
Additional intrapersonal factors (% agree)						
FF more stressful than BF	20 (10.9)	5 (6.2)	9 (17.6)	6 (11.5)	6	0.12
My BM could harm baby	19 (10.3)	11 (13.6)	6 (11.8)	2 (3.8)	6	0.18
Discomfort with baby sucking at breast	34 (18.7)	22 (27.8)	7 (13.7)	5 (9.6)	8	0.018*
FF babies are sick more often	66 (35.9)	21 (25.9)	20 (38.5)	25 (49.0)	6	0.024*
I had to give up eating/drinking	41 (22.5)	19 (24.4)	14 (26.9)	8 (15.4)	8	0.33
Recommended duration of exclusive BF					0	0.26
6 months (correct answer)	44 (23.2)	16 (18.6)	12 (23.1)	16 (30.8)		
Other answer (incorrect answer or blank)	146 (76.8)	70 (81.4)	40 (76.9)	36 (69.2)		

*Indicates significance at $p \leq 0.05$.

BF = breastfeeding; FF = formula feeding; BM = breast milk; F = formula

Table 17. Primiparous Mothers' Reasons not to Initiate Breastfeeding (n=86)

Reasons	n (%)
Lactation/medical	
Pain/anticipated pain	11 (12.8)
My baby had trouble sucking/latching on	6 (7.0)
Milk or anticipated milk supply	6 (7.0)
Post-partum pain	2 (2.3)
Baby health problems	2 (2.3)
Lifestyle	
I thought breastfeeding would be too time-consuming/no time	5 (5.8)
Comfort/preference/confidence	
I wasn't comfortable with the idea/didn't like it	12 (14.0)
I didn't want to breastfeed	7 (8.1)
No reason/never thought about it	5 (5.8)
I didn't know how to breastfeed/scared to do it wrong	5 (5.8)
I didn't think I could breastfeed	1 (1.2)
Formula	
Prefer formula	2 (2.3)
Formula more compatible with going back to work	1 (1.2)
Perceived contraindications to breastfeeding	
I smoked	7 (8.1)
History of drugs	1 (1.2)
I take medications	1 (1.2)
Perceived resource issues	
I didn't have a pump	1 (1.2)
Work	
Return to work	8 (9.3)
Concerned that baby would get too attached when I had to return to work	1 (1.2)
Other reasons	
Influence of others	1 (1.2)
Other reason	1 (1.2)

Table 18. Top Ten Reasons Women Discontinued Breastfeeding, by Breastfeeding Group

Reasons to discontinue breastfeeding	All BF women		BF<3		BF≥3	
	%	Rank	%	Rank	%	Rank
Perceived insufficient milk	32.7	1	28.8	5	36.5	1
Problems with breasts or nipples	32.7	1	40.4	2	25.0	2
Baby had trouble sucking or latching on	28.8	3	44.2*	1	13.5*	6
Painful breastfeeding	25.0	4	38.5*	3	11.5*	7
Trouble getting milk flow to start	23.1	5	30.8	4	15.4	3
Trouble with the breast pump or didn't get enough milk by pumping	20.2	6	25.0	6	15.4	3
Easier to give baby formula	15.4	7	25.0*	6	(5.8)*	
Greater comfort giving formula	11.5	8	21.2*	8	(1.9)*	
Not wanting to breastfeed in public	10.6	9	(11.5)		9.6	8
Breastfeeding was too tiring	10.6	9	17.3*	10	(3.8)*	
Breastfeeding was too inconvenient	10.6	9	(13.5)		7.7	10
Breast milk alone did not satisfy baby	10.6	9	(11.5)		9.6	8
Other reasons	(9.6)		(1.9)*		17.3*	
I did not like breastfeeding	(9.6)		19.2*	9	(0)*	
Not wanting or not being able to pump at work	(9.6)		(3.8)*		15.4*	3
My baby didn't gain enough weight or lost too much weight	(7.7)		(7.7)		7.7	10
I wanted to smoke again or smoke more	(8.6)		(9.6)		7.7	10

*Difference between two breastfeeding groups is significant at $p \leq 0.05$

() Indicates not a top ten reason for that breastfeeding group

Table 19. Social and Professional Support Factors by Infant Feeding Practices

Measure/survey item	All participants no.(%) (N = 190)	Infant feeding type			Missing no.	p value: chi-square
		Formula only no.(%) (n=86)	BF < 3 mo. no.(%) (n= 52)	BF ≥ 3 mo. no.(%) (n=52)		
SPS scale, mean (SD)	3.6 (2.4)	2.6 (2.1)	4.0 (2.2)	4.9 (2.3)	NA	<0.0001*
Additional breastfeeding support (% agree)						
Baby's dad helped with BF	53 (51.0)	NA	25 (48.1)	28 (53.8)	0	0.56
Someone close to me BF	83 (44.4)	29 (34.9)	21 (40.4)	33 (63.5)	3	0.0041*
Knows how to get help with BF	126 (67.4)	42 (50.6)	37 (71.2)	47 (90.4)	3	<0.0001*
Receive more help from family and friends when I BF	44 (24.2)	6 (7.7)	17 (32.7)	21 (40.4)	8	<0.0001*
Received help from at least 1 person for BF problems	53 (51.0)	NA	29 (55.8)	24 (46.2)	0	0.33
Formula feeding support (% agree)						
My baby's father wanted me to FF	38 (20.3)	24 (27.9)	9 (18.4)	5 (9.6)	3	0.0325*
My mother wanted me to FF	45 (23.9)	32 (37.2)	8 (15.7)	5 (9.8)	2	0.0004*
Baby's dad's mother wanted me to FF	25 (13.7)	18 (21.7)	5 (10.2)	2 (4.0)	8	0.0114*
Closest friend/family member wanted me to FF	37 (20.0)	26 (30.6)	9 (18.0)	2 (4.0)	5	0.0009*
Baby's dad helped with FF	130 (78.3)	62 (79.5)	42 (84.0)	26 (68.4)	24 (21)**	0.20
Someone close to me FF	124 (71.7)	58 (73.4)	32 (62.8)	34 (79.1)	17 (15)**	0.19
Knows how to get help with FF	155 (88.1)	75 (91.5)	45 (88.2)	35 (81.4)	14 (12)**	0.26

*Indicates significance at $p \leq 0.05$.

** First number is total number missing. Number in parentheses indicates number responding "not applicable".

BF = breastfeeding; FF = formula feeding; BM = breast milk; F = formula

Table 20. Environmental Factors: Health Care Utilization and Practices by Infant Feeding Type

Survey item	All participants no.(%) (N = 190)	Infant feeding type			Missing no.	p value: chi-square
		Formula only no.(%) (n=86)	BF < 3 mo. no.(%) (n= 52)	BF ≥ 3 mo. no.(%) (n=52)		
BF classes						
Did not attend	108 (56.8)	58 (67.4)	26 (27.4)	24 (46.2)	0	0.025*
Attended before pregnancy	21 (11.0)	4 (4.6)	6 (11.5)	11 (21.2)	0	0.011*
Attended during pregnancy	56 (29.5)	21 (24.4)	17 (32.7)	18 (34.6)	0	0.37
Attended in hospital/place of birth	21 (11.0)	7 (8.1)	6 (11.5)	8 (15.4)	0	0.42
Attended after discharge	19 (10.0)	4 (4.6)	5 (9.6)	10 (19.2)	0	0.022*
BF instruction on how to breastfeed your baby						
Did not receive	37 (19.5)	33 (38.4)	1 (1.9)	3 (5.8)	0	<0.0001*
Received before pregnancy	29 (15.3)	7 (8.1)	8 (15.4)	14 (26.9)	0	0.012*
Received during pregnancy	79 (41.6)	31 (36.0)	23 (44.2)	25 (48.1)	0	0.34
Received in hospital/place of birth	84 (44.2)	23 (26.7)	30 (57.7)	31 (59.6)	0	<0.0001*
Received after discharge	28 (14.7)	2 (2.3)	11 (21.2)	15 (28.8)	0	<0.0001*
Receipt of free formula pre- or postpartum						
Received free formula	146 (76.8)	66 (76.7)	41 (78.8)	39 (75.0)	0	0.90
Physician practices (% Yes or % checked)						
Offered/gave free formula samples	33 (17.4)	10 (11.6)	9 (17.3)	14 (26.9)	0	0.071
My doctor wanted me to BF	142 (76.3)	50 (59.5)	44 (88.0)	48 (92.3)	4	<0.0001*
My doctor wanted me to FF	12 (6.4)	10 (11.9)	1 (2.0)	1 (1.9)	4	0.025*,**
Timing of 1st pediatric visit	179	81	49	49	11	0.1726
1 week or less	111 (62.0)	50 (61.7)	35 (71.4)	26 (53.1)		
>1 week	68 (38.0)	31 (38.3)	14 (28.6)	23 (46.9)		
Breastfeeding problems						
Women with breastfeeding problems	57 (54.8)	NA	32 (61.5)	25 (48.1)	0	0.17
Receipt of help with breastfeeding problems (n=57)						
Received help that didn't help any problems	13 (23.6)	NA	11 (35.5)	2 (8.3)	2	0.0013*
Received help that helped some of problems	35 (63.6)	NA	20 (64.5)	15 (62.5)		
Received help that helped all problems	7 (12.7)	NA	0 (0.0)	7 (29.2)		
Experience with BFHI practices***						
4. Held baby skin-to-skin	123 (66.5)	46 (54.8)	35 (70.0)	42 (82.4)	5	0.0037*
4. BF in 1st hour after birth	78 (75.7)	NA	37 (72.6)	41 (78.8)	1	0.46
5. HCP helped/offered to help start BF	132 (79.5)	51 (69.9)	41 (87.2)	40 (87.0)	24	0.024*
6. Other liquids not given to baby	69 (67.6)	NA	35 (70.00)	34 (65.4)	2	0.62
6. Not given or offered free formula	83 (43.7)	36 (41.9)	23 (44.2)	24 (46.2)	0	0.88
7. Rooming-in (not >1 hour in another room)	68 (66.7)	NA	30 (60.0)	38 (73.1)	2	0.16
9. Baby not given pacifier	35 (34.3)	NA	21 (41.2)	14 (27.4)	2	0.14
10. Given information on where to get help with BF	100 (97.1)	NA	52 (100.0)	48 (94.1)	1	0.08
Other hospital practices						
I was given a phone number to call for bf problems	96 (94.1)	NA	47 (94.0)	49 (94.2)	2	0.96
I was given a phone number for 24-hr help	74 (76.3)	NA	35 (72.9)	39 (79.6)	7	0.44

*Indicates significance at $p \leq 0.05$.

**Fisher's exact test

***Adapted from Chalmers et al.'s (2009) Maternity Experiences Survey. Numbers refer to steps of the BFHI.

Table 21. Institutional and Community Factors by Infant Feeding Practices

Survey item	All participants no.(%) (N = 190)	Infant feeding type			Missing no.	p value: chi-square
		Formula only no.(%) (n=86)	BF < 3 mo. no.(%) (n= 52)	BF ≥ 3 mo. no.(%) (n=52)		
WIC						
Perceived WIC practices (% agree)						
WIC makes it easy to FF	151 (85.3)	73 (89.0)	46 (88.5)	32 (74.4)	13 (10)**	0.07
WIC makes it easy to BF	72 (38.9)	15 (18.5)	20 (38.5)	37 (71.2)	5	<0.0001*
FF is cheaper than BF	24 (13.0)	10 (5.4)	10 (19.2)	4 (7.8)	6	0.22
BF was cheaper than FF (PBS)	123 (66.8)	40 (50.0)	39 (75.0)	44 (84.62)	6	<0.0001*
Offered or gave free formula samples	34 (17.9)	16 (18.6)	10 (19.2)	8 (15.4)	0	0.85
Received help from WIC employee	34	2	16	16		
Type of package first received	183	84	49	50	7	
Full BF	33 (18.0)	5 (6.0)	4 (8.2)	24 (48.0)		
Partial BF	32 (17.5)	2 (2.4)	13 (26.5)	17 (34.0)		
Formula	118 (64.5)	77 (91.7)	32 (65.3)	9 (18.0)		
Most valuable package (% rating "1")*	178	78	48	52	12	
Full BF	64 (43.5)	15 (26.8)	10 (23.3)	39 (81.2)		<0.0001*
Partial BF	15 (10.5)	3 (5.4)	6 (13.3)	6 (14.3)		0.27
Formula	99 (57.2)	60 (73.2)	32 (68.1)	7 (15.9)		<0.0001*
Timing of 1st postpartum WIC visit	172	77	49	46	18	
1 week or less	52 (30.2)	27 (35.1)	14 (28.6)	11 (23.9)		0.25
>1 week or 2 weeks	26 (15.1)	15 (19.5)	6 (12.2)	5 (10.9)		
3 or more weeks	94 (54.6)	35 (45.4)	29 (59.2)	30 (65.2)		
Work/School						
Employment/school after birth of child						
Yes - employed	118 (63.1)	51 (60.7)	27 (52.9)	40 (76.9)	3	0.034*
Yes - in school	78 (42.9)	37 (45.1)	20 (40.0)	21 (42.0)	8	0.84
Return to work (n=118)	103	41	26	36	15	
Returned to work ≤ 6 weeks	24 (23.3)	9 (22.0)	9 (34.6)	6 (16.7)		0.58
Returned to work >6 - 12 weeks	38 (36.9)	15 (36.6)	8 (30.8)	15 (41.7)		
Returned to work > 12 weeks	41 (39.8)	17 (41.5)	9 (34.6)	15 (41.7)		
Weekly hours of work/school (n=145)	134	62	33	39	11	
Worked/studied under 20 hrs/week	37 (27.6)	20 (32.3)	8 (24.2)	9 (23.1)		0.66
Worked/studied 20-39 hours/week	62 (46.3)	29 (46.8)	14 (42.4)	19 (48.7)		
Worked/studied 40+ hours/week	35 (26.1)	13 (21.0)	11 (33.3)	11 (28.2)		
Work policies (n=118) (% yes)***						
Breaks to pump/BF	40 (34.5)	8 (15.7)	9 (34.6)	23 (59.0)	2	
Private place to pump or BF	46 (40.0)	12 (25.5)	10 (38.5)	24 (63.2)	3	
Flexible work schedule	50 (43.5)	15 (30.0)	11 (42.3)	24 (61.5)	3	
Paid maternal/family leave	45 (38.8)	19 (37.2)	9 (34.6)	17 (43.6)	2	
Work attitudes (n=190) (% agree)						
BF made returning to work difficult	43 (23.5)	16 (20.0)	12 (23.1)	15 (29.4)	7	0.46
Public (% agree)						
Find plenty of places to BF in public	43 (23.6)	9 (11.5)	11 (21.2)	23 (44.2)	8	<0.0001*
It was difficult to BF in public	73 (39.9)	32 (40.0)	23 (44.2)	18 (35.3)	7	0.65

*Indicates significance at $p \leq 0.05$.

** First number is total number missing. Number in parentheses indicates number responding "not applicable".

***22-42 women (19.0% - 36.2%) indicated that they did not know whether their work place had these practices/policies.

Table 22. Multinomial Logistic Regression: Comparison of Positive Deviant Group with Formula Feeding Mothers and Mothers who Breastfed for Less than Three Months

Levels and Variables	Multinomial simple logistic regression						Multinomial multiple logistic regression by level						Multinomial multiple logistic regression						Final multinomial multiple logistic regression						
	BF ≥ 3 (1) vs FF (0)			BF ≥ 3 (1) vs BF < 3 (0)			BF ≥ 3 (1) vs FF (0)			BF ≥ 3 (1) vs BF < 3 (0)			BF ≥ 3 (1) vs FF (0)			BF ≥ 3 (1) vs BF < 3 (0)			BF ≥ 3 (1) vs FF (0)			BF ≥ 3 (1) vs BF < 3 (0)			
	Odds ratio	95% CI		Odds ratio	95% CI		Odds ratio	95% CI		Odds ratio	95% CI		Odds ratio	95% CI		Odds ratio	95% CI		Odds ratio	95% CI		Odds ratio	95% CI		
	L	U		L	U		L	U		L	U		L	U		L	U		L	U		L	U		
Socio-demographic																									
Marital status (married vs not married (ref))	11.24	1.28	100.00	3.24	0.63	16.67	7.04	0.77	62.50	2.70	0.55	13.16													
Education (ordinal - college to no high school graduation (ref))	2.04	1.26	3.32	1.27	0.80	2.01	1.66	0.96	2.87	1.03	0.59	1.80													
Household income (ordinal - \$20,000 to <\$10,000 (ref))	1.72	1.06	2.80	1.27	0.76	2.11	1.26	0.75	2.14	1.11	0.61	2.02													
Mom not smoking in 1st year (not smoking vs smoking (ref))	2.63	1.05	6.62	3.40	1.28	9.09	1.94	0.74	5.08	3.13	1.11	8.85	3.91	1.13	13.51	4.98	1.57	15.87	4.33	1.52	12.35	5.56	2.06	15.15	
Intention																									
Intention to only BF (BF only vs not only BF (ref))	6.90	3.14	15.15	1.84	0.83	4.07	6.90	3.14	15.15	1.84	0.83	4.07	0.88	0.20	3.83	1.04	0.27	3.98							
Skills																									
Breastfeeding																									
PBC scale	1.54	1.34	1.75	1.21	1.08	1.36	1.29	1.09	1.52	1.09	0.94	1.26	1.25	1.01	1.55	1.20	0.97	1.48	1.49	1.28	1.75	1.18	1.03	1.36	
Knew how to get help if had trouble BF (agree vs disagree/neutral (ref))	9.35	3.34	26.32	3.83	1.27	11.63	1.60	0.41	6.17	1.91	0.51	7.19													
Felt comfortable BF (agree vs disagree/neutral (ref))	21.74	8.77	55.56	5.03	2.02	12.50	4.26	1.55	11.76	2.48	0.86	7.14	1.68	0.34	8.20	1.17	0.25	5.38							
Formula feeding																									
Knew how to prepare and give baby F (agree vs disagree/neutral (ref))	0.23	0.07	0.79	0.30	0.08	1.12	1.81	0.33	9.90	0.73	0.13	4.07													
Determined to give my baby F (agree vs disagree/neutral (ref))	0.11	0.04	0.26	0.55	0.20	1.48	0.28	0.09	0.86	0.96	0.30	3.07	0.51	0.10	2.53	1.35	0.25	7.35							
FF was easy (agree vs disagree/neutral (ref))	0.12	0.04	0.34	0.29	0.11	0.79	0.41	0.10	1.81	0.52	0.12	2.29													
Confident I could FF (agree vs disagree/neutral (ref))	0.10	0.03	0.34	0.35	0.13	0.96	0.68	0.14	3.34	1.10	0.21	5.88													
Felt comfortable giving my baby F (agree vs disagree/neutral (ref))	0.13	0.05	0.32	0.33	0.14	0.77	0.41	0.14	1.20	0.48	0.15	1.55													
Environmental factors																									
Intrapersonal																									
PBS scale	1.43	1.23	1.65	1.06	0.92	1.23	1.43	1.22	1.67	1.04	0.89	1.20	1.05	0.85	1.31	0.85	0.69	1.05							
Felt uncomfortable with baby sucking at breast (agree vs disagree/neutral (ref))	0.28	0.10	0.81	0.65	0.20	2.16	0.23	0.07	0.74	0.62	0.18	2.10	0.36	0.06	2.04	0.68	0.13	3.65							
FF babies got sick more often than BF babies (agree vs disagree/neutral (ref))	2.79	1.34	5.85	1.54	0.71	3.37	1.10	0.46	2.63	1.50	0.64	3.48													
Interpersonal																									
SPS scale	1.58	1.33	1.88	1.17	0.99	1.38	1.45	1.21	1.73	1.15	0.95	1.35	1.23	0.90	1.69	1.08	0.81	1.44							
Someone very close to me mostly BF her baby (agree vs disagree/neutral (ref))	3.26	1.58	6.71	2.56	1.16	5.65	2.12	0.96	4.69	2.27	1.00	5.13	2.60	0.66	10.31	2.86	0.86	9.52							
Got more help from family and friends when BF (agree vs disagree/neutral (ref))	7.81	3.00	20.00	1.39	0.63	3.11	4.69	1.63	13.51	1.11	0.47	2.60	2.60	0.31	7.46	0.54	0.14	2.06							
Institutional - healthcare																									
Type of delivery (C-section vs vaginal (ref))	2.39	1.16	4.90	2.08	0.93	4.65	2.82	1.27	6.25	2.17	0.95	4.98	7.75	1.60	37.04	5.52	1.35	22.73	3.56	1.32	9.62	2.87	1.05	7.81	
BF class before pregnancy (checked vs not checked (ref))	5.49	1.65	18.18	2.06	0.70	6.06	2.23	0.55	9.09	1.26	0.32	5.00													
BF class post discharge	4.88	1.45	16.39	2.24	0.71	7.09																			
BF instruction before pregnancy (checked vs not checked (ref))	4.15	1.55	11.11	2.02	0.77	5.35	3.66	0.94	14.29	1.98	0.55	7.09													
BF instruction in the hospital (checked vs not checked (ref))	4.05	1.95	8.40	1.08	0.50	2.36	4.35	1.88	10.00	1.28	0.54	3.03	2.11	0.67	6.67	1.00	0.34	2.93							
BF instruction post discharge	16.95	3.70	76.92	1.51	0.62	3.70																			
Baby held naked (Yes vs No (ref))	3.81	1.64	8.86	1.97	0.77	5.07	3.39	1.36	8.43	2.16	0.80	5.82	2.23	0.56	8.85	1.55	0.45	5.40							
Hospital HCP helped or offered to help BF (Yes vs No (ref))	2.90	1.08	7.83	0.97	0.29	3.26	1.19	0.38	3.69	0.59	0.15	2.42													
Institutional - work																									
Employment after birth of child (No vs Yes (ref))	0.47	0.22	1.02	0.34	0.15	0.80	0.47	0.22	1.02	0.34	0.15	0.80	0.80	0.19	3.34	0.36	0.10	1.37							
Institutional - WIC																									
WIC made it easy for women to BF (agree vs disagree/neutral (ref))	10.99	4.83	25.00	3.97	1.74	9.01	5.99	2.52	14.29	2.07	0.82	5.24	1.62	0.47	5.52	1.09	0.33	3.60							
Did not value formula package the most	0.06	0.02	0.16	0.08	0.03	0.21	0.17	0.03	0.94	0.36	0.08	1.67													
Valued full BF package the most (Ranked most valuable vs not most valuable (ref))	14.71	6.06	35.71	13.70	5.10	37.04	8.93	3.53	22.22	11.49	4.33	31.25	9.17	2.26	37.04	18.52	4.90	71.43	14.93	4.83	45.45	16.13	5.26	50.00	
Community																									
Could find plenty of places to BF in public (agree vs disagree/neutral (ref))	5.99	2.53	14.29	2.94	1.25	6.90	5.99	2.53	14.29	2.94	1.25	6.90	0.96	0.21	4.50	2.02	0.55	7.35							

Bolded numbers indicate significance at p ≤ 0.05.

F= formula; FF=formula fed/feeding; BF=breastfed/breastfeeding; HCP=health care provider

Table 23. Proposed Study Recommendations to Mayor’s Breastfeeding Taskforce

Stage	Recommendations			
	Self-Efficacy	Not Smoking	Cesarean-section	WIC packages
Preconception (male and female children, teens and adults of childbearing age)	<ul style="list-style-type: none"> Strengthen collective breastfeeding self-efficacy by providing models (e.g. breastfeeding images) and increasing opportunities to breastfeed in public 	<ul style="list-style-type: none"> Discourage tobacco use Promote use of effective tobacco cessation programs 		
Pregnancy	<ul style="list-style-type: none"> Assess level of breastfeeding self-efficacy at WIC and prenatal care clinics Tailor interventions to increase breastfeeding self-efficacy of expectant mothers and primary support persons according to assessed levels Pair women with high and low levels of breastfeeding self-efficacy for breastfeeding support through infancy 	<ul style="list-style-type: none"> Promote breastfeeding and tobacco cessation during pregnancy and postpartum 		<ul style="list-style-type: none"> Increase WIC breastfeeding incentives and support and reduce or eliminate formula feeding incentives Educate women on WIC breastfeeding incentives and support Provide education and skills training for expectant mothers and primary support persons

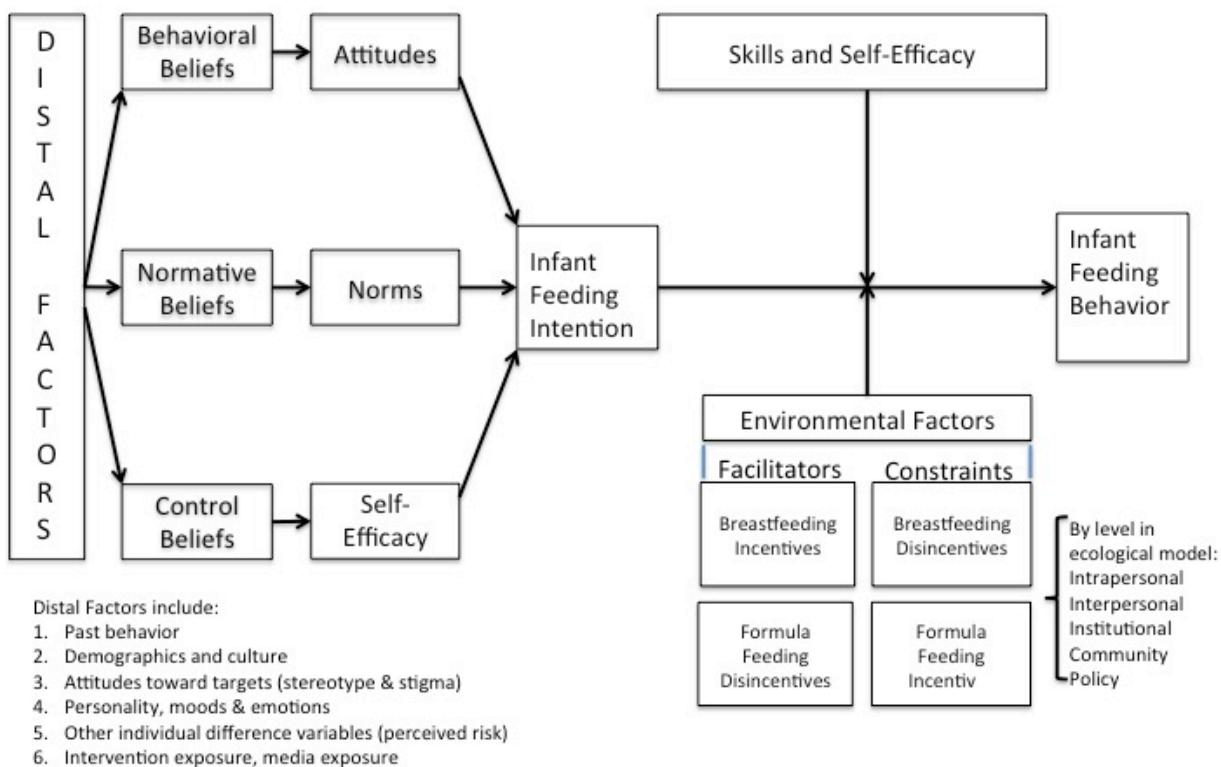
Stage	Recommendations			
	Self-Efficacy	Not Smoking	Cesarean-section	WIC packages
Birth	<ul style="list-style-type: none"> Strengthen breastfeeding instruction and support, tailored to level of breastfeeding self-efficacy 	<ul style="list-style-type: none"> Promote smoking cessation and prevention of postpartum smoking relapse Promote breastfeeding to prevent postpartum smoking relapse and not smoking to extend breastfeeding 	<ul style="list-style-type: none"> Assess whether longer hospital stay is associated with breastfeeding duration Pilot and evaluate longer hospital stay (or outpatient services) for mother's and partner's greater mastery of breastfeeding prior to discharge 	<ul style="list-style-type: none"> Consider providing breastfeeding incentives to WIC women in hospital
Postpartum	<ul style="list-style-type: none"> Develop and strengthen community breastfeeding role models to enhance breastfeeding self-efficacy Improve pediatricians' and community support for breastfeeding mothers, including peer support models 	<ul style="list-style-type: none"> Provide support to women to cease or not relapse to smoking 		<ul style="list-style-type: none"> Augment and improve WIC breastfeeding incentives and support, including early postpartum home visits Reduce or eliminate formula feeding incentives

Appendix B

Figure

Figure 1.

Modified Integrated Model for Infant Feeding Intention and Behavior



APPENDIX C

Screening Tool for Mothers – Infant Feeding Focus Groups

Thanks very much for your interest in the focus groups on infant feeding and especially for taking the time to call us. You can help us improve the health of children in Richmond City.

The focus groups are just group discussions where we ask you and other mothers questions about how moms feed their babies and your experience with feeding your baby. It will take place in a library or other public place that is easy to reach and at a convenient time.

Do you have any questions about the focus groups?

Okay, I do have a few questions to ask you. We need to know a little about you to help us decide whether you meet the criteria for participation and also to see which might be the best focus group for you. It should only take a few minutes of your time.

Are you ready?

1. Can you tell me how you found out about the focus group?
2. Where do you live?
 - a. Richmond City
 - b. Henrico
 - c. Chesterfield
 - d. Other

(If not Richmond City, then thank the caller and let her know that the focus group is just for Richmond City residents)

3. Do you have one child under 24 months?
- Yes
 - No

(If answer is b., then thank the caller and let her know that the focus group is just for mothers with one child under 24 months.)

4. What is your age?

(If answer is 17 or less, then thank the caller and let them know that the focus group is just for mothers who are eighteen and over.)

5. What is your race? Mark one or more races to indicate what this person considers herself to be.
- American Indian or Alaska Native
 - Asian
 - Black or African American
 - Native Hawaiian or Other Pacific Islander
 - White

(If answer is anything other than Black or African American, then thank the caller and let her know that the focus group is just for mothers who are Black or African American)

6. What is your ethnicity?
- Hispanic or Latino
 - Not Hispanic or Latino

(If answer is Hispanic or Latino, then thank the caller and let her know that the focus group is for mothers who are not Hispanic or Latino)

7. Do you receive any government assistance such as Medicaid, WIC, Food Stamps or anything else from the government?
- No
 - Yes, list:

(If it government assistance that is determined via income eligibility, then okay to proceed. Otherwise, thank participant and say that this is focus group only for those who receive government assistance).

The following question is about your child

8. During your baby's first year of life, did your or your baby's doctor tell you that you must not breastfeed your baby due to a medical reason?
- Yes
 - No

If yes, please check the reason:

- Health condition of baby
- Health condition or illness of mother
- Medications taken by mother
- Other reason: _____

(If Yes, and the reason is due to a, b, or c, then thank the mother and tell her that the focus group is only for those without a medical reason not to breastfeed. If a reason is d, consult the list of WHO acceptable exclusions. If not on this list, proceed with the remaining questions.)

Thank you for answering my questions. We thank you again for your interest in the focus group. We would very much welcome your participation.

Now I just have a few more quick questions to see which focus group is the best fit for you and to have your contact information.

9. Please give me your name, phone number, email address and other contact information where I can reach you in the next month.
- Name:
 - Phone number:
 - Email address:
 - Other contact:
10. Please tell me the name of the neighborhood where you live: _____

11. What are the times of day or week when you are not available for a focus group?

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
9-12							
12-5							
5-8							

12. Do you work outside the home either full-time or part-time?

- a. Yes
- b. No

13. If yes, on average, how many hours per week do you work outside of the home? _____

The next questions are about your child

14. When your child was born, did you breastfeed your child or did you give him or her formula?

- a. Breastfed
- b. Formula

15. How old was the child when you stopped breastfeeding?

We are also conducting focus groups with fathers and are trying to find fathers to participate. Do you think the father of your child would be interested in participating in a separate focus group just for fathers?

- a. Yes
- b. No
- c. Maybe

If yes, or maybe, please have mother obtain permission to give you the name and contact information of the father or else have the father call or email you.

THANK YOU for your patience! We are at the end of our questions. We will be in touch with you in the next few weeks to set up the focus group. Thank you again for your participation!

APPENDIX D

Infant Feeding Focus Group Demographic Questionnaire

Dear Focus Group Participant,

We ask that you answer the following questions that tell us more about you. Please know that these questions will only be reported together with other responses. Your name is not collected so it will not be used when we report this information. Thank you.

Instructions: For questions requiring a check mark, please choose only one answer.

1. What is your age? _____ years
2. What is your marital status?
 - a. Married
 - b. Never married
 - c. A member of an unmarried couple
 - d. Widowed
 - e. Separated
 - f. Divorced
3. Including yourself and your baby, how many people regularly live in your household?

4. Please indicate whether you are:
 - a. U.S.-born
 - b. Born outside the U.S.
5. What is your employment status?
 - a. Work for someone else full-time
 - b. Work for someone else part-time
 - c. Self-employed, full-time
 - d. Self-employed, part-time
 - e. Unemployed
 - f. A full-time homemaker

6. Please indicate your highest level of education
- a. Never attended school or only attended kindergarten
 - b. Grades 1 through 8
 - c. Grades 9 through 12, not a high school graduate
 - d. High school graduate or GED
 - e. Less than two years of college or technical school
 - f. Two to four years of college or technical school, not a college graduate
 - g. College graduate or higher
7. Are you a student?
- a. No
 - b. Yes, full-time
 - c. Yes, part-time
8. What is your annual household income?
- a. Less than \$10,000
 - b. \$10,000 to less than \$20,000
 - c. \$20,000 to less than \$35,000
 - d. \$35,000 to less than \$50,000
 - e. \$50,000 to less than \$75,000
 - f. \$75,000 or more
9. How much did your baby weigh at birth? _____ lbs. _____ ozs.
10. Was your baby born pre-term?
- a. Yes
 - b. No
11. Did your child have any illnesses at birth?
- a. Yes, please state: _____
 - b. No
12. What type of milk was the first milk given to your newborn baby?
- a. Breast milk
 - b. Formula
 - c. Don't know, not sure
13. How old was your baby when you first gave him/her formula?
- a. _____ days (if younger than 2 weeks) or _____ weeks or _____ months
 - b. I did not give my baby formula
14. Did you ever breastfeed your baby or feed your baby your pumped milk?
- a. Yes. Please continue to question 15.
 - b. No. Thank you. You have completed the questionnaire.

15. Have you completely stopped breastfeeding and pumping milk for your baby?

- a. Yes
b. No

16. How old was your baby when you completely stopped breastfeeding and pumping milk?

- a. _____ days (if younger than 2 weeks) or _____ weeks or _____ months

APPENDIX E

Formula Groups Focus Group Guide

Have all consents done individually as each mother arrives. Make sure that's it's okay to record and ask if there are any objections.

Introduction: Welcome. Thanks for coming. My name is _____ and I'm the moderator for this discussion group. We invited you to come to talk with us about how we feed our babies. You are all new mothers and we'd like to hear about your experience and your thoughts about feeding babies. There are no wrong or right answers. We'd just like to know your thoughts and feelings. And I'm not an expert on this – I am just trained in asking questions. Do you have any questions?

Ground rules: Respect, one at a time, hear all opinions, confidentiality.

Please write your initials on one of the nametags I'm passing around. We think our questions are easy to answer and will not make you feel uncomfortable. But we don't collect your names during this study so we ask that you just use your initials.

General icebreaker: We'd like to go around the room so that you can all introduce yourselves to each other. Please let us know your initials and tell us one thing about your baby and one thing about being a new mother.

Introductory/Transition Questions:

I'd like you to imagine - or picture in your mind - a mother in her twenties feeding her baby with a bottle. Her baby is not yet 6 months old. She's giving her baby formula and she only gives her baby formula. You can picture or imagine seeing her anywhere you want. Think about where she is. Who is she with? What is around her? What does she do for a living? How old is her baby?

I'm going to pass around paper and pencils to help you think about this mother. You can draw or jot down some thoughts about this imagined woman.

Now let's talk about each of your imagined mothers.

Describe her: who is she with, where you see her, what is around her, what does she do for a living and how old is her baby. Now tell me:

- What do you think made her start to give her baby formula?
- What does she think is good about formula? How does she feel about giving her baby formula? What's easy about formula-feeding?
- Can you tell me some of the problems she might face with giving her baby formula? What gets in the way?

Now imagine a mother in her twenties breastfeeding her baby. She only breastfeeds her baby – no formula. You can use the other piece of paper to draw or jot down some words, or both. Think about where she is. Who is she with? What is around her? What does she do for a living? How old is her baby?

Let's talk about each imagined mother.

Describe her: who is she with, where you see her, what is around her, what does she do for a living and how old is her baby. Now tell me:

- What do you think made her start breastfeeding her baby?
- What is good about breastfeeding? What makes it easy to breastfeed?
- What are some problems she might face with breastfeeding? What gets in the way?
- How might she deal with things that get in the way?

Key Questions:

Now let's talk about your own experience with feeding your baby.

- Before your baby was born, how did you think you'd feed your newborn baby? (If appropriate - How long did you plan to breastfeed?)
- What made you decide to give your baby formula?
- What were some of the things that influenced you?

Now I'd like to hear about your experiences with formula.

- How comfortable did you feel giving your baby formula (breastfeeding – if appropriate)?
- What made it easy for you to give your baby formula?

- What made it difficult for you to give your baby formula?
- What about your family or those closest to you – in what way did they make it easy or difficult to give formula?
- What about when you were in the hospital? What did the hospital staff do to make it easier to give your baby formula? What did they do that got in the way of giving formula?
- What about doctors or nurses or aides? How did these people make it easier or more difficult to give your baby formula?
- What about WIC? What did WIC do to make it easier or more difficult to give your baby formula? In what way?
- What about work? Did those you work with make it easier or more difficult to give your baby formula? What about your employer? How did they make it easier or more difficult?
- Is there anyone else in your community – like child-care providers, church, resource centers – that make it easier or more difficult to give your baby formula?

Let's talk a little about breastfeeding

- What could have made it easier for you to choose to breastfeed?
- What made it difficult for you to breastfeed? What got in the way? (probe as needed with the following)
 - What did dads, family members and friends do?
 - What did doctors' offices or health clinics do?
 - What about the hospital?
 - What about WIC?
 - What about home visitors or other community advocates?
 - What about work?
 - What about public places in general?

Now I'd like to hear about what can be done in Richmond to make it easier for women to only breastfeed for the first six months.

- Imagine you have a magic wand or have hit the lotto and can do things to make it easier for women to only breastfeed for the first six months. What would you do?
 - What should dads, family members and friends do?
 - What do you think doctors' offices or health clinics should do?
 - What about the hospital?

- What about WIC?
- What about home visitors or other community advocates?
- What about work?
- What about public places in general?

Now I'm going to hand you each a piece of paper. I'd like you to write down the one most important thing you would change to make it easier for women to only breastfeed. Please tell us what that one thing is and hand in the piece of paper before you leave.

That question concludes our focus group. [Summarize some of the things heard, the range of opinions]. Thank you very much for coming. Your participation today has helped us understand better how women feed their babies and the choices they make.

APPENDIX F

Breastfeeding Groups Focus Group Guide

Have all consents done individually as each mother arrives. Make sure that's it's okay to record and ask if there are any objections.

Introduction: Welcome. Thanks for coming. My name is _____ and I'm the moderator for this discussion group. We invited you to come to talk with us about how we feed our babies. You are all new mothers and we'd like to hear about your experience and your thoughts about feeding babies. There are no wrong or right answers. We'd just like to know your thoughts and feelings. And I'm not an expert on this – I am just trained in asking questions. Do you have any questions?

Ground rules: Respect, one at a time, hear all opinions, confidentiality.

Please write your initials on one of the nametags I'm passing around. We think our questions are easy to answer and will not make you feel uncomfortable. But we don't collect your names during this study so we ask that you just use your initials.

General icebreaker: We'd like to go around the room so that you can all introduce yourselves to each other. Please tell us your initials and one thing about your baby and one thing about being a new mother.

Introductory/Transition Questions:

I'd like you to imagine - or picture in your mind - a mother in her twenties feeding her baby with a bottle. Her baby is not yet 6 months old. She's giving her baby formula and she only gives her baby formula. You can picture or imagine seeing her anywhere you want. Think about where she is. What is around her? Who is she with? What does she do for a living? How old is her baby?

I'm going to pass around paper and pencils to help you think about this mother. You can draw or jot down some thoughts about this imagined woman.

Now let's talk about each of your imagined mothers.

Describe her: who is she with, where you see her, what is around her, what does she do for a living and how old is her baby, where you see her and who she's with. Now tell me:

- What do you think made her start to give her baby formula?
- What does she think is good about formula? How does she feel about giving her baby formula? What's easy about formula-feeding?
- Can you tell me some of the problems she might face with giving her baby formula? What gets in the way?

Now imagine a mother in her twenties breastfeeding her baby. She only breastfeeds her baby – no formula. You can use the other piece of paper to draw or jot down some words, or both. Think about where she is. Who is she, where is she and who is she with? What is around her? What does she do for a living? How old is the baby?

Let's talk about each imagined mother.

- Describe her: who is she with, where you see her, what is around her, what does she do for a living and how old is her baby, who she is, where you see her and who she's with. Now tell me:
- What do you think made her start breastfeeding her baby?
- How does she feel about breastfeeding her baby?
- What is good about breastfeeding? What makes it easy to breastfeed?
- What are some problems she might face with breastfeeding? What gets in the way?
- How might she deal with things that get in the way?

Key Questions:

Now let's talk about your own experience with feeding your baby.

- Before your baby was born, how did you think you'd feed your newborn baby?
- How long did you plan to breastfeed?
- What were some of the things that influenced you? What were you told about feeding your baby and who told you this?

Now, once your baby was born:

- How comfortable did you feel breastfeeding?
- When you were breastfeeding, what made it easy for you to breastfeed your baby?

- What got in the way of breastfeeding your baby?
- Tell me about stopping. What made you stop breastfeeding?
- Did you have anyone help you when you had problems with breastfeeding? If so, who and how did they help you?
- What about your family or those closest to you – in what way did they make it easy or difficult to breastfeed?
- What about when you were in the hospital? What did the hospital staff do to make it easier to breastfeed? What did they do that got in the way of breastfeeding?
- What about doctors or nurses or aides? How did these people make it easier or more difficult to breastfeed?
- What about WIC? What did WIC do to make it easier or more difficult to breastfeed?
- What about work? What did your employer or work place do to make it easier or more difficult to breastfeed?
- Is there anyone else in your community – like child care providers, church, resource centers – that make it easier or more difficult to breastfeed?
- Are there any public places that you go to where you feel comfortable breastfeeding? What about places where you feel bad breastfeeding?

Now I'd like to hear about your experiences with formula.

- How comfortable did you feel giving your baby formula?
- What made you decide to give your baby formula?
- What made it easy for you to give your baby formula?
- What made it difficult for you to give your baby formula?
- What about your family or those closest to you – in what way did they make it easy or difficult to give formula?
- What about when you were in the hospital? What did the hospital staff do to make it easier to give your baby formula? What did they do that got in the way of giving formula?

- What about doctors or nurses or aides? Did any of these people make it easier or more difficult to give your baby formula?
- What about WIC? Did WIC make it easier or more difficult to give your baby formula? In what way?
- What about at work? Did people at your workplace make it easier or more difficult to give your baby formula?
- Is there anyone else in your community – like child-care providers, church, resource centers – that make it easier or more difficult to give your baby formula?

Now I'd like to hear about what can be done in Richmond to make it easier for more women to only breastfeed for the first six months.

Imagine you have a magic wand or have hit the lotto and can do things to that will make it easier for women to only breastfeed for the first six months. What would you do?

- What should dads, family members and friends do?
- What do you think doctors' offices or health clinics should do?
- What about the hospital?
- What about WIC?
- What about home visitors or other community advocates?
- What about work?
- What about public places in general?

Now I'm going to hand you each a piece of paper. I'd like you to write down the one most important thing you would change to make it easier for women to only breastfeed. Please tell us what that one thing is and hand in the piece of paper before you leave.

That question concludes our focus group. [Summarize some of the things heard, the range of opinions]. Thank you very much for coming. Your participation today has helped us understand better how women feed their babies and the choices they make.

APPENDIX G

Infant Feeding Survey

Important: This survey asks you questions about you and your first-born child who is at least six months and less than three years old.

SECTION 1: This section asks you about how you wanted to feed your baby and how you actually fed your baby

1. Right before your first baby was born, how did you think you would feed your new baby in the first month? (check only one answer)
 - Only breastfeed (baby would not be given formula)
 - Only formula-feed (go to question 3)
 - Mainly breastfeed
 - Mainly formula-feed
 - Unsure

2. How long did you intend to breastfeed your first child? _____
3. At birth or when you were pregnant with your first child, did a doctor tell you not to breastfeed for medical reasons?
 - Yes
 - No, go to question 5

4. Why did the doctor tell you not to breastfeed? _____

5. Was your first child ever breastfed or fed breast milk through a bottle?
 - Yes. Please skip next question and go to question 7 on next page.
 - No

6. What made you decide not to breastfeed? Please give all reasons you can think of.

If you never breastfed, skip next section. Please go to Section 3, question 16 on page 6.

SECTION 2: This section asks you questions about breastfeeding your first-born child

7. How old was your baby when he or she first had formula? _____

She was never given formula.

8. This question is about the first thing that your baby was given other than breast milk or formula – like juice, cow’s milk, baby food, or anything else, even water.

How old was your baby the first time he or she had any other liquid or solid, not counting vitamins, minerals or medicines? _____

I have not given my baby any other liquids or solids (except vitamins or medicines)

9. How old was your baby when he or she completely stopped breastfeeding or was no longer fed breast milk? _____

I have not completely stopped breastfeeding and pumping milk

10. This question asks about things that may have happened at the hospital or place where your first baby was born.

	Yes	No	Don't Know
I breastfed in the first hour after my baby was born.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liquids were given to my baby other than breast milk.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby spent more than an hour in another room and away from me in the first 24 hours.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was given a pacifier to suck on.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was given information on where to get help with breastfeeding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was given a phone number to call if I had problems with breastfeeding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was given a phone number to call or text at any time of day or night in case I had problems with breastfeeding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. When did you decide to breastfeed?

- Before I became pregnant
- During the first three months of pregnancy
- During the middle three months of pregnancy
- During the last three months of pregnancy
- Once my baby was born

12. Did you have any problems or difficulties while breastfeeding your first child? Please think about any problems such as not having enough milk, latching on, pain, quitting smoking, or figuring out how to fit breastfeeding into your life.

- Yes, I had problems or difficulties
- No, I did not have any problems or difficulties.

Skip next 2 questions. Go to question 15 on next page

13. Did you ask **anyone** for help with **any** of the problems or difficulties you had with breastfeeding? And did you get the help? (Please check all that apply and answer questions in both columns “asked for help” and “got help”)

	Asked for help		Got help	
	Yes	No	Yes	No
From a health care professional (e.g. doctor, nurse, midwife, lactation consultant)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
From a WIC peer counselor or other WIC employee	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
From a lay health adviser or counselor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
From breastfeeding support group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
From the baby's father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
From another family member or friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
From someone else	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. Did the help you received work?

- No, it didn't help any of my problems
- Yes, it helped **some** of my problems
- Yes, it helped **all** of my problems

15. Why did you **stop breastfeeding** your first baby or pumping milk for your baby (please check all that apply)?
- I have not stopped breastfeeding my baby or pumping milk
 - I had problems with my breasts or nipples (like sore, cracked, leaking, overfull, infected)
 - My baby had trouble sucking or latching on
 - Someone else wanted to feed the baby
 - Breastfeeding was too painful
 - I had trouble getting the milk flow to start
 - My baby didn't gain enough weight or lost too much weight
 - Breastfeeding was too tiring
 - It was easier to give my baby formula
 - Pumping milk no longer seemed worth the effort that it required
 - Breastfeeding was too inconvenient
 - I could not or did not want to pump or breastfeed at work
 - I couldn't handle my other duties
 - I did not like breastfeeding
 - I wanted or needed someone else to feed my baby
 - I did not want to breastfeed in public
 - I felt more comfortable giving my baby formula
 - Breast milk alone did not satisfy my baby
 - I wanted to smoke again or smoke more
 - I didn't want to have to watch what I ate and drank
 - I wanted my body back to myself
 - I got free formula from WIC
 - I wanted to be able to leave my baby for several hours at a time
 - My baby was old enough that the difference between breast milk and formula no longer mattered.
 - I didn't have enough milk
 - I was sick or had to take medicine
 - I had trouble with the breast pump or I didn't get enough milk by pumping
 - My baby lost interest in nursing or began to wean him or herself
 - I had some other reason(s):
-

SECTION 3: This section asks you questions about classes or help you may have received with feeding your first child.

16. Did you attend any classes that discussed breastfeeding your baby? Please check all that apply.

- No
- Yes, before I was pregnant
- Yes, while I was pregnant
- Yes, while still in the hospital or place where I gave birth
- Yes, after I left the hospital or place where I gave birth

17. Did you receive any instruction on how to breastfeed (for example, on alternating breasts, how often to feed, how to tell your baby is having enough milk)? Please check all that apply.

- No
- Yes, before I was pregnant
- Yes, while I was pregnant
- Yes, at the hospital or place where I gave birth
- Yes, after I left the hospital or place where I gave birth

18. When you were in the hospital (or place where you gave birth), did your health care providers help you or offer to help you start breastfeeding?

- No
- I don't know

19. The first time you held your first baby, did you hold your baby naked against your bare skin?

- Yes
- No
- I don't know

20. Were you given or offered any free formula samples during pregnancy or after you had your first baby? Please check all that apply.

- No, I was not given any free formula samples while pregnant or after I had the baby
- Yes, at the doctor's office
- Yes, at the hospital or place where I gave birth
- Yes, at WIC
- Yes, somewhere else (please say where: _____)

21. What type of package was the first WIC package you received?

- Full breastfeeding package
- Partial breastfeeding package
- Formula-feeding package

22. How valuable are the new WIC packages for baby?

In the spaces below, put a "1" next to the package you think is the most valuable, a "2" by the next most valuable package, and a "3" by the least valuable package.

- ___ Full breastfeeding package
- ___ Partial breastfeeding package
- ___ Formula-feeding package

SECTION 4 – This section asks about your experiences with feeding your first-born child. We also ask about your opinions and opinions of those close to you.

23. Think back to your baby's first two months. For each of the following individuals, indicate how they wanted you to feed your first baby.

	Formula Feed	Not sure/ no opinion	Breast-feed
The baby's father wanted me to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My mother wanted me to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My closest mother-in-law or mother of the baby's dad wanted me to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My closest female friend or family member wanted me to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My doctor wanted me to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. Again, think back to your baby's first two months. Please check the box that most closely describes how you felt about each statement below

Statement	Disagree	Neutral	Agree
I had the necessary skills to breastfeed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was physically able to breastfeed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I knew how to breastfeed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was determined to breastfeed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't need help to breastfeed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was easy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was confident I could breastfeed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I knew how to get help if I had trouble with breastfeeding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt comfortable breastfeeding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Someone very close to me mostly breastfed her baby.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WIC made it easy for women like me to breastfeed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby's dad helped me with breastfeeding my baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

25. Please check the box that most closely describes how you felt during your baby's first two months.

Statement	Disagree	Neutral	Agree
Breastfeeding was more convenient than formula-feeding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was painful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formula-feeding allowed mothers more freedom.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breast milk was healthy for the baby.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No one else could help feed the baby when you breastfeed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It was difficult to breastfeed in public.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breast milk was more nutritious than infant formula.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding made your breasts sag.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formula-feeding was easier than breastfeeding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding made you closer to your baby.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding made returning to work more difficult.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was cheaper than formula-feeding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When you breastfed you never knew if the baby was getting enough milk.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mothers who formula-fed got more rest than breastfeeding mothers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was more time consuming than formula-feeding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formula-feeding let the father become close to the baby.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was messy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding tied you down.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding helped you bond with your baby.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was better than formula.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formula-feeding was more stressful than breastfeeding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For me, formula-feeding was cheaper than breastfeeding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Statement	Disagree	Neutral	Agree
My breast milk could harm or might not be good for my baby.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt uncomfortable having a baby sucking at my breast.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formula-fed babies got sick more often than breastfed babies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could find plenty of places to breastfeed comfortably in public.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had to give up too much, like eating or drinking whatever I wanted, when breastfeeding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I got more help from family and friends when I breastfed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

26. Think back to your child's first two months. Please check the box that most closely describes how you felt. Please answer this question even if you only breastfed your baby.

	Disagree	Neutral	Agree	Not Applicable
I knew how to prepare and give my baby formula.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was determined to give my baby formula.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Formula-feeding was easy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was confident I could formula-feed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I knew how to get help if I had trouble with formula.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt comfortable giving my baby formula.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Someone very close to me fed her baby mostly formula.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WIC made it easy for women like me to give formula to my baby.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby's dad helped me with giving my baby formula	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

27. How long do doctors say a mother should feed a baby nothing but breast milk, that is, with no added liquids or foods? _____

SECTION 5: This section asks about going to school or to work for pay.

28. Did you work for pay or go to school while you were pregnant with your first child? What about since the birth of your baby?

	Yes	No
I worked for pay while I was pregnant	<input type="checkbox"/>	<input type="checkbox"/>
I went to school while I was pregnant	<input type="checkbox"/>	<input type="checkbox"/>
I went to work for pay after my baby was born	<input type="checkbox"/>	<input type="checkbox"/>
I went to school after my baby was born	<input type="checkbox"/>	<input type="checkbox"/>

If you did not return to work after your baby was born, skip questions 28 and 29 and go to Section 6, question 30.

29. Think back to when you first worked for pay or went to school after your baby was born.
- How old was your first baby when you went to work? _____
 - How old was your first baby when you went to school? _____
 - How many hours per week did you usually work or study? If you did both, please add both together.
 - Under 20 hours per week of work or school
 - 20 -39 hours per week of work or school
 - 40 or more hours per week of work or school

30. At your primary place of work, is there a formal policy to:

	Yes	No	Don't Know
Let women take breaks to breastfeed or pump their milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Offer women a private place to breastfeed or pump milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Offer a flexible work schedule, such as additional break time for new mothers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Offer paid maternal (maternity) or paid family leave	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION 6: This last section asks you general questions about you and your baby.

31. When was your first-born baby due (month/day/year)?

32. When was your first baby born (month/day/year)?

33. How much did your first baby weigh at birth?

34. How was your new baby delivered?

- Vaginally
 Cesarean delivery (C-section)

35. Did your baby have any illnesses or conditions at birth?

- Yes, please say what they were: _____
 No

36. How many weeks or months pregnant were you when you had your first visit for prenatal care?

- I didn't get prenatal care

37. How old was your baby when you took him or her for the first doctor's visit, whether for a check up, shots, or because of illness?

38. How old was your first-born child when he or she first received WIC benefits?

39. Besides you and your baby, please state who regularly lived in your household when your first baby was born (check all that apply):

- Dad of the baby
 Another adult or adults
 One or more children under 18 years
 No other person

40. Please say whether you were enrolled in the following programs during pregnancy or whether you or your child was enrolled after the birth of your child. (check all that apply):

	While Pregnant	After Birth	
		You	Your child
Medicaid or FAMIS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WIC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TANF	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SNAP (Food Stamps)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CHIP (Child Health Involving Parents)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Healthy Families	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, please list _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

41. What is your marital status?

- Married
- Never married
- Widowed
- Separated or divorced

42. At any time during your baby's first year, did you smoke?

- Yes
- No
- Don't know

43. Does anybody else who lives in your house smoke?

- Yes
- No
- Don't know

44. How old are you? _____ years

45. Please check your highest level of education

- Grade 8 or less
- Grades 9 through 12, not a high school graduate
- High school graduate or GED
- Some college or technical school
- College graduate or higher

46. What is your race?

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White

47. What is your ethnicity?

- Hispanic or Latino
- Not Hispanic or Latino

48. Please indicate whether you were:

- Born in the U.S.
- Born outside the U.S.

49. What is your main occupation? _____

50. What is your annual household income (that is, total yearly income of all household members. Include any income from all sources – employment, self-employment, etc.)?

- Less than \$10,000
- \$10,000 to less than \$20,000
- \$20,000 to less than \$35,000
- \$35,000 to less than \$50,000
- \$50,000 or more

Before you return the survey, please go back and make sure you have completed all questions.

Thank you for your time and contribution to the
health of children in Richmond!

Vita

Cecilia Eykyn Barbosa was born on October 28, 1955 in New York City, New York, and is a citizen of the USA and Brazil. She graduated from the American International School in Vienna, Austria in 1973. She received a Bachelor of Arts in Biology from Smith College, Northampton, Massachusetts in 1977. She completed a graduate program in public health at the Universidade de São Paulo, São Paulo, Brazil. She received Master of Public Health and Master of City Planning degrees from the University of California at Berkeley, California in 1982 and 1984, respectively. She was a program analyst at the Sarasota County Public Health Unit, Sarasota, Florida from 1984 to 1985. From 1985 to 1994, she was Health Planning Consultant and Director, Planning and Evaluation, Division of Maternal and Child Health at the Virginia Department of Health. From 1994 to 2000, she was Director, Division of Child and Adolescent Health at the Virginia Department of Health, Richmond, Virginia. From 2001 to the present, she has been Principal and Owner, cBe consulting, in Richmond, Virginia. Leadership training included the Collaborative Leaders Program of Virginia, Institute for Educational Leadership, Washington, D.C. (1994) and Leadership Metro Richmond (2008) in Richmond, Virginia. She has served on the Mayor of Richmond's Breastfeeding Commission and Taskforce from 2011 to the present. She is fluent in French, Portuguese, and Spanish.