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Factors Influencing African American Mothers' Adoption of Baby-Friendly Practices: Results of a Mixed-Methods Study

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF IN-TEXT FIGURES

ACKNOWLEDGEMENTS

This doctoral dissertation represents the culmination of a transformative personal journey. When I began the Medical University of South Carolina Ph.D. in Nursing Science program, I was full of hopes and dreams for "something more" in my professional nursing career, yet I lacked the self-confidence and belief to turn that vision into reality. Standing now at the end of the process, I have acquired the necessary scholarship and resources to develop a successful and fulfilling career as a nurse scientist. I cannot adequately express my gratitude for the opportunity to pursue this dream.

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ABSTRACT

Purpose

The purpose of this dissertation was to explore southeastern United States (U.S.) rural-dwelling African American Mothers' barriers and facilitators to adoption of Baby-Friendly practices and associated breastfeeding decisions. First, an integrative review was conducted to determine the impact in the U.S. of the Baby-Friendly Hospital Initiative (BFHI) on early infant health and breastfeeding outcomes. Next, a mixed-methods study was conducted to explore barriers and facilitators to Baby-Friendly practice adoption for southeastern U.S. rural-dwelling African American mothers. Finally, a directed content analysis approach was used to explore themes of maternal perceptions of Baby-Friendly practices and breastfeeding experiences based upon concepts from the BFHI using the Social Ecologic Model (SEM).

Problem

In the U.S., low rates of breastfeeding persist despite evidence that breast milk serves as optimal infant nutrition and provides protection from illnesses and diseases (APHA, 2007; Brenner & Buescher, 2011; CDC, 2014; DHHS, 2011; WHO, 2009)**.** African American mothers and low-income mothers have historically had low rates of breastfeeding initiation, duration, and exclusivity, yet little is known about factors contributing to this trend (CDC, 2014; Labbok, Taylor, & Nickel, 2013; DHHS, 2011; VanDevanter, Gennaro, Budin, Calalang-Javiera, & Nguyen, 2014). The BFHI is a World Health Organization (WHO) and United Children's Fund (UNICEF) sponsored curriculum to establish supportive environments and educational services that enhance mothers' initial breastfeeding experiences and to influence maternal decisions to initiate and maintain breastfeeding (APHA, 2007; CDC, 2013; Philipp & Radford, 2006; Saadeh,

1996, 2012; WHO, 2009). A review of the research literature revealed no published studies that explored southeastern U.S. rural-dwelling African American mothers' perceptions of barriers and facilitators to adoption of Baby-Friendly practices, including associated breastfeeding decisions (Munn, Newman, Mueller, Phillips, & Taylor, 2016).

The specific aims of this dissertation were:

Aim 1: To determine the impact in the U.S. of the BFHI on early infant health and breastfeeding outcomes using an integrative review of the literature.

Aim 2: To determine factors influencing southeastern U.S. rural-dwelling African American mothers' adoption of Baby-Friendly practices and associated breastfeeding decisions using a convergent parallel mixed-methods design.

Aim 3: To explore the influence of barriers and facilitators to maternal adoption of Baby-Friendly practices, maternal perceptions, and experiences on breastfeeding decisions using a descriptive qualitative approach and directed content analysis with a group of both urban- and rural-dwelling southeastern U.S. African American mothers in a regional hospital serving a rural population.

Design and Theoretical Basis

A convergent parallel mixed-methods study design, informed by the SEM (McLeroy, Bibeau, Steckler, & Glanz, 1988) guided the collection of quantitative and qualitative data during a designated two-month time-period. Qualitative and quantitative data were collected and analyzed separately, then converged to gain a more comprehensive understanding of the barriers and facilitators to maternal adoption of Baby-Friendly practices for the study population.

Findings

Mothers who were African American and rural-dwelling had greater odds for non-adoption of Baby-Friendly practices relative to other groups (ORs = 5, 10 respectively, p-values ≤ 0.01). Mothers who received a lactation consult and had moderate or completed skin-to-skin contact had greater odds for adoption of Baby-Friendly practices relative to other groups (both OR ≥ 17.5, p-values <0.05). Directed content analysis revealed six themes: *maternal desire to breastfeed, infant state, maternal state, milk supply concerns, provider support, and access to breastfeeding equipment and support services*. Convergence of quantitative and qualitative data provided descriptive explanation of predictors of maternal adoption of Baby-Friendly practices and offered a comprehensive depiction of barriers and facilitators to participation in Baby-Friendly practices and successful breastfeeding for the population.

Conclusions

While lack of breastfeeding information, support, and equipment access hindered breastfeeding success, the presence of breastfeeding information, support, participation in maternal/infant bonding practices, and early breastfeeding increased maternal desire to breastfeed and resulted in greater breastfeeding success. These findings provide information for health care providers to effectively tailor Baby-Friendly practice implementation among rural dwelling and African American mothers and to increase their infant bonding and breastfeeding success.

Keywords: *Baby-Friendly practices, Baby-Friendly Hospital Initiative, breastfeeding, African American mothers, mixed-methods*

1. INTRODUCTION

1.1 Overview of the Dissertation

In the United States (U.S.), low rates of breastfeeding persist despite evidence that breast milk is imperative for optimal infant nutrition, essential immunological and anti-inflammatory benefits, and protection from illnesses and diseases (APHA, 2007; Brenner & Buescher, 2011; CDC, 2014; DHHS, 2011; WHO, 2009). Nevertheless, the decision to breastfeed is ultimately a mother's personal choice (APHA, 2007; Brenner & Buescher, 2011; CDC, 2014; Nommsen-Rivers & Dewey, 2009; Sullivan et al., 2010; DHHS, 2011). African American mothers and low-income mothers have historically had low rates of breastfeeding initiation, duration, and exclusivity resulting in disparities in infant morbidity and mortality; yet little is known about factors contributing to this trend (CDC, 2014; Labbok et al., 2013; DHHS, 2011; VanDevanter et al., 2014). Similarly, low rates of breastfeeding and geographic disparity exist for women living in rural areas of the country and in the southeastern U.S. (Sparks, 2010).

The Baby-Friendly Hospital Initiative (BFHI) is a World Health Organization (WHO) and United Children's Fund (UNICEF) sponsored guideline to establish supportive and educational environments that enhance mothers' initial infant bonding and breastfeeding experiences and influence maternal decisions to initiate and maintain breastfeeding (APHA, 2007; CDC, 2013; Philipp & Radford, 2006; Saadeh, 1996, 2012; WHO, 2009). Studies of breastfeeding among racial/ethnic minorities, mothers with low education levels, and low-income mothers have demonstrated that the BFHI positively affected breastfeeding decisions for disadvantaged mothers living in urban settings (Philipp et al., 2001; Vasquez & Berg, 2012). However, a review of the research literature revealed no published studies that explored rural-dwelling U.S. African American mothers' perceptions of barriers and facilitators to adoption of

Baby-Friendly practices, including associated breastfeeding decisions (Munn et al., 2016). This dissertation focused on investigating factors influencing African American mothers' adoption of Baby-Friendly practices, perceptions of Baby-Friendly practice participation, and subsequent breastfeeding experiences and decisions.

The specific aims of the dissertation were:

- **Aim 1:** To examine updated evidence for the impact of the BFHI in the U.S. on early infant health and breastfeeding outcomes to determine strengths and limitations of the initiative, along with gaps in services for U.S. mothers and infants using an integrative review of the literature.
- **Aim 2:** To determine factors influencing rural-dwelling African American mothers' adoption of Baby-Friendly practices and associated breastfeeding decisions using a convergent parallel mixed-methods study design through an investigation of the BFHI maternal support processes in a southeastern U.S. regional hospital serving a rural population.
- **Aim 3**: To explore the influence of barriers and facilitators to maternal adoption of Baby-Friendly practices, maternal perceptions, and experiences on breastfeeding decisions using a directed content analysis approach and concepts from the BFHI using the Social Ecological Model (SEM), for a group of both urban- and rural-dwelling southeastern U.S. African American mothers.

The overall objective of this study was to investigate the maternal support processes associated with the BFHI in a southeastern U.S. regional hospital serving a substantial rural population, and to identify the associated factors influencing African American mothers'

adoption of Baby-Friendly practices. Quantitative investigations sought to identify disparities in breastfeeding and factors contributing to low breastfeeding rates for mothers in disadvantaged groups. Qualitative explorations of both urban- and rural-dwelling African American mothers' perceptions helped to determine how implementation of Baby-Friendly practices influenced maternal breastfeeding decisions. The overarching question driving this proposal was: *What factors contribute to rural-dwelling U.S. African American mothers' adoption of Baby-Friendly practices and associated breastfeeding outcomes?* Findings from this exploration provide information for health care providers to tailor Baby-Friendly practice implementation for African American mothers effectively and to increase their infant bonding and breastfeeding success. The long-term goal of this research trajectory is to identify best breastfeeding promotion initiatives for African American mothers while offering insight into interventions that will support mothers, improve breastfeeding practices, improve maternal and infant health outcomes, and decrease healthcare expenditures from preventable illnesses and diseases in the southeastern U.S.

2. BACKGROUND AND PROBLEM STATEMENT

Maternal decisions to formula feed or to cease breastfeeding before infants are six months of age lead to increased healthcare costs by precluding the health benefits breastfeeding provides (Bartick, 2011; DHHS, 2011). Breastfeeding has been associated with providing immunologic and anti-inflammatory benefits that reduce infants' risk of common illnesses such as upper respiratory infections, otitis media, and pneumonia as well as the life threatening gastrointestinal condition, necrotizing enterocolitis (Brenner & Buescher, 2011; DHHS, 2011). Babies who are breastfed are less likely to develop asthma, and babies who receive breast milk for six months have a decreased risk of childhood obesity (DHHS, 2000, 2011). Additionally,

mothers who breastfeed have a decreased risk for breast and ovarian cancer. According to Bartick's (2011) estimates and the U.S. Surgeon General's report, families who follow exclusive breastfeeding recommendations can save between $1,200-$1,500 dollars in formula expenditures (DHHS, 2000, 2011). Furthermore, the U.S. could save up to $13 billion dollars in annual medical costs if 90% of families exclusively breastfed for six months.

While the number of infants who begin breastfeeding at birth is steadily improving and approaching Healthy People 2020 goals (goal 81.9%; actual 81.1%), racial/ethnic differences in breastfeeding initiation and duration remain (CDC, 2016a; CDC, 2016b; ODPHP, 2016). Additionally, breastfeeding rates for all racial/ethnic groups continue to decrease substantially by 6 months (goal 60.6%; actual 49%) and 12 months (goal 34.1%; actual 27%) (CDC, 2016a; ODPHP, 2016). In recent years, the gap between breastfeeding initiation and 6-month duration rates has narrowed between African American and White mothers, however African American mothers' breastfeeding rates remain approximately 50% lower than white mothers of similar income or education level (CDC, 2016b; DHHS, 2011). Evidence suggests that a combination of factors including cultural beliefs, maternal breastfeeding perceptions, lack of access to breastfeeding education resources, return to work issues, and lack of social support may contribute to lower rates of breastfeeding for these groups, with rural African American mothers having the greatest risk of low breastfeeding rates (Lynch, 2011; Sparks, 2010).

Studies of evidence-based methods to enhance breastfeeding rates and to decrease racial/ethnic health disparity in the U.S. are needed. Internationally, BFHI maternal support and breastfeeding promotion practices, demonstrated through implementation of the *Ten Steps to Successful Breastfeeding (Ten Steps*) and compliance with the WHO's *International Code of Marketing for Breast Milk Substitutes (The Code),* increased breastfeeding initiation and

exclusivity rates; however, the effect of Baby-Friendly practices on breastfeeding decisions in the U.S. is less clear (Atchan, Davis, & Foureur, 2013; Baby-Friendly USA, 2012b; CDC, 2014; DHHS, 2000; Munn et al., 2016; Perez-Escamilla & Chapman, 2012; Vasquez & Berg, 2012; WHO, 2009). Baby-Friendly practices are based on the premise that individual attitudes towards breastfeeding are largely influenced by breastfeeding education during the early prenatal period, positive birth and initial breastfeeding experiences, and continued provider support (Saadeh, 1996, 2012; Srinivas, Swiler, Marsi, & Taylor, 2014). However, uncertainty remains regarding how the underlying mechanisms and implementation of the initiative influence maternal breastfeeding perceptions, experiences, and decisions to initiate, maintain and exclusively breastfeed (Grossman, Chaudhuri, Fledman-Winter, & Merewood, 2012; Merewood, Mehta, Chamberlain, Philipp, & Bauchner, 2005; Perez-Escamilla & Chapman, 2012; DHHS, 2011; Vasquez & Berg, 2012). Additionally, no studies have reported mothers' breastfeeding perceptions, experiences, or decisions for disadvantaged women living in rural areas of the southeastern U.S., thus limiting knowledge of potential barriers and facilitators to breastfeeding for this population (Labbok et al., 2013).

This dissertation is significant as it addresses an important and multidimensional health promotion concern in the U.S.: improving mother/infant dyad bonding and health outcomes through improved rates of breastfeeding initiation, exclusivity, and duration (Brenner & Buescher, 2011; DHHS, 2011). The study focuses on U.S. southeastern rural-dwelling African American mothers, a group with the greatest risk for low breastfeeding rates and associated health disparity. Health care providers play an integral role in maternal breastfeeding education, support, and advocacy through the implementation of Baby-Friendly practices. Findings from this exploration will inform the health care provider's role in addressing maternal breastfeeding

support needs and effective tailoring of Baby-Friendly interventions for the study population in an effort to positively affect their breastfeeding outcomes.

3. GAPS IN KNOWLEDGE

While evidence supports the BFHI as a best practice standard, descriptions of causal mechanisms for the success of Baby-Friendly practices in improving breastfeeding outcomes are insufficient (DHHS, Munn et al., 2016; 2011; VanDevanter et al., 2014). "Potential causal mechanisms may include variation in practice delivery, variation in maternal attitudes and demographic variables, and how practice delivery influences maternal barriers or facilitators to acceptance of Baby-Friendly practices and breastfeeding" (Munn et al., 2016, p. 228). A lack of studies examining mothers' perceptions and experiences with breastfeeding in Baby-Friendly environments limits the capacity to determine how maternal Baby-Friendly perceptions and experiences influence breastfeeding decisions (VanDevanter et al., 2014). Additionally, the majority of evidence regarding breastfeeding outcomes in the U.S. resulted from retrospective observational survey design studies. Utilization of retrospective studies presents limitations in determining the influence of Baby-Friendly practices on health and breastfeeding outcomes (Edmonds & Kennedy, 2013; Melnyk & Morrison-Beady, 2012; Tappen, 2011). In addition to history, maturation, and participant report biases as threats to study validity, retrospective designs lack opportunity for prospective dialog to provide clarification of Baby-Friendly experiences and resultant influences on maternal perspectives.

While exposure to Baby-Friendly practice environments has proved effective in increasing breastfeeding rates for racial/ethnic minorities, mothers with lower education, and low-income mothers, no studies have explored breastfeeding impact results for rural-dwelling

mothers in the southeastern U.S. (Hawkins, Stern, Baum, & Gillman, 2014b; Labbok et al., 2013; Philipp et al., 2001; Vasquez & Berg, 2012).

Finally, few studies examined early infant health outcomes related to the BFHI. This is especially pertinent for late premature infants (34-36 weeks) who are at an increased risk for poor health and breastfeeding outcomes, and thus, need specialized breastfeeding support (Goyal, Attanasio, & Kozhimannil, 2014; Radtke, 2011). Results from both qualitative and quantitative explorations are needed to clarify which "Steps" of the BFHI lead to successful breastfeeding and infant health outcomes.

4. DESIGN AND METHOD

Findings from the integrative review of the impact of the BFHI in the U.S. on early infant health and breastfeeding outcomes provided a basis for current knowledge, gaps in the literature, and a framework for the design of the dissertation study. The parallel convergent mixed-methods study was informed using components from Creswell & Plano Clark (2011) to gain a comprehensive understanding of factors affecting southeastern U.S. rural-dwelling African American mothers' adoption of Baby-Friendly practices. This design included the simultaneous collection and analysis of independent qualitative and quantitative data sets, followed by merging and synthesizing of the data to produce a more comprehensive understanding of factors that influence maternal adoption of Baby-Friendly practices and breastfeeding decisions (Cresswell, Klassen, Plano Clark, & Clegg Smith, 2011; Cresswell & Plano Clark, 2011).

Quantitative data collection occurred retrospectively through review of the facility's electronic medical records (EMR) and included measures of maternal participation in the *Ten Steps*, maternal demographic information, infant variables, delivery variables, and breastfeeding outcomes for all eligible mother/infant dyads. Both bivariate descriptive analysis and logistic

regression analysis were used to identify predictors of maternal adoption of Baby-Friendly practices. For the qualitative phase, guided by a descriptive qualitative approach (Neergaard, Olesen, Anderson, & Sondergaard, 2009; Sandelowski, 2000), the PI conducted in-depth interviews with a subset of African American mothers. Rural-dwelling mothers were included in the subset to adequately explore barriers and facilitators to adoption of Baby-Friendly practices for a rural African American population. Additionally, data from the interviewed mothers collected as part of the quantitative portion, including documented participation in the Ten Steps were linked with their perceptions of Ten Steps participation reported during the in-depth interviews. Qualitative data were analyzed using directed content analysis and further described in a qualitative manuscript using key concepts from an ecological conceptual model of the BFHI. Converging the data produced narratives that provided clarity and explanation to quantitative predictors of maternal adoption of Baby-Friendly practices.

5. KEY CONCEPTS AND DEFINITIONS

This dissertation was focused on investigating the influences of practices associated with the BFHI for rural-dwelling African American mothers, using both quantitative and qualitative methods. To accurately measure and determine the influence of the BFHI, concepts associated with program implementation warrant explanation.

5.1 Baby-Friendly Practices Defined

While the BFHI is an international program, Baby Friendly USA is responsible for Baby-Friendly facility accreditation in the U.S. (Baby-Friendly USA, 2012a). Successful acquisition of Baby-Friendly status requires facilities to follow a 4-phase designation process (4D pathway) involving changes in institution "policies, curriculum, action plans, quality improvement projects, staff training, and competency verification" (Baby-Friendly USA, 2012a,

para 3; Nyqvist et al., 2013), as well as a site interview during a certification visit. The 4D pathway requires nurses to commit to the Baby-Friendly philosophy, as operationalized through the *Ten Steps to Successful Breastfeeding* (Baby-Friendly USA, 2012a, 2012b; 1998). The *Ten Steps* document outlines the systematic changes necessary to support mothers and to influence breastfeeding attitudes through practices designed to educate and support mothers, offer unrestricted mother/infant contact, and to encourage exclusive breast milk feedings and infant feeding on demand (Saadeh, 1996, 2012). An operational definition of Baby-Friendly practices can be obtained by examination of the *Ten Steps* document and the *Guidelines and Evaluation Criteria for Facilities Seeking Baby-Friendly Designation* (2010), followed by the collection of data on mothers' rates of breastfeeding initiation, exclusivity, and duration.

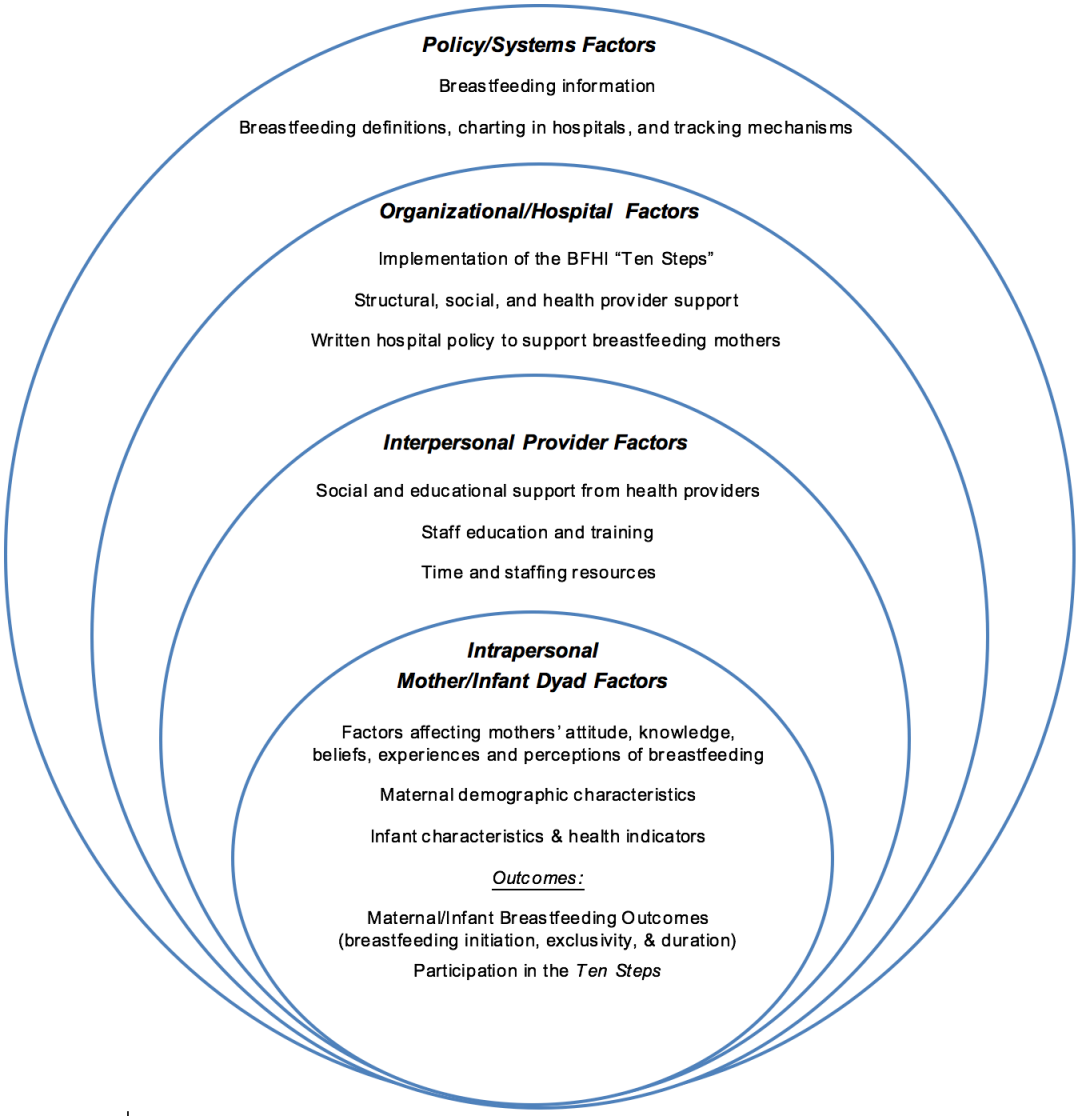
The *Ten Steps to Successful Breastfeeding* are*:*

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.

6. THEORETICAL FRAMEWORK

The Social Ecological Model provides a theoretical framework to explain how multi-level factors affect mothers' breastfeeding attitudes and influence maternal breastfeeding decisions and participation in Baby-Friendly practices (McLeroy et al., 1988; Philipp et al., 2001; Philipp & Radford, 2006; WHO, 2009). The SEM provides insight on how factors at the

intrapersonal, interpersonal, environment, and policy level interact within social environments to influence health behavior and outcomes (Glanz & Bishop, 2010; McLeroy et al., 1988; Rimer & Glanz, 2005). Application of the SEM to the BFHI explains how breastfeeding outcomes are influenced by factors on multiple levels, including the patient (mother/infant dyad), provider, organization, and system. Examination of the interaction of multiple factors within the social environment, beyond the influence of a single level factor, provides deeper understanding of a phenomenon and offers insights to create effective and innovative solutions. Thus, an ecological conceptual model of the BFHI was employed to guide this exploration. Additionally, key concepts from the ecological conceptual model of the BFHI were utilized to create themes from maternal narratives for the qualitative directed content analysis.



BFHI = Baby-Friendly Hospital Initiative
SEM = Social Ecological Model
"Ten Steps" = 'Ten Steps to Successful Breastfeeding'

7. BRIEF OVERVIEW OF THE MANUSCRIPTS

The *first manuscript* of the dissertation presents an integrative review of the literature on the impact of the BFHI on early infant health and breastfeeding outcomes in the U.S. The integrative review is broad, encompassing both empirical and theoretical literature, as well as experimental and non-experimental studies. Whittemore and Knafl (2005) note that, "well-done integrative reviews present the state of the science, contribute to theory development, and have direct applicability to practice and policy" (Whittemore & Knafl, 2005, p. 546). This methodology provided a rigorous means to identify the problem, determine the literature sampling approach via five databases, critically appraise the data, analyze, and organize the data into a matrix table format, and then to organize data into an ecological conceptual model according to levels and factors of the BFHI (Munn et al., 2016). Examination of outcomes, along with strengths and weaknesses of factors at each level, provided evidence to describe the current state of knowledge about the impact of the BFHI on breastfeeding and early infant health outcomes, as well as gaps and limitations in the body of knowledge associated with BFHI outcomes. Findings from the integrative review informed the design of the mixed-methods dissertation study and guided the development of the ecological conceptual model of the BFHI. Results from the study can inform systematic modification of breastfeeding policies and initiatives associated with Baby-Friendly practices on multiple levels (Munn et al., 2016).

The second manuscript of the dissertation presents the results of the mixed-methods study conducted to determine factors influencing rural-dwelling African American mothers' adoption of Baby-Friendly practices. A convergent parallel mixed-methods design was applied to collect both qualitative and quantitative data from mothers who experienced Baby-Friendly practices and delivered healthy, full-term infants in April and May of 2016. Infants were delivered in a

southeastern U.S. regional medical facility that serves a substantial rural population. Medical record review of 234 mother/infant dyads provided data to determine if those who participated in more than half of the *Ten Steps* had improved breastfeeding initiation, exclusivity and duration. Logistic regression was conducted to determine whether maternal demographic/clinical characteristics were predictive of adoption of Baby-Friendly practices. Sixteen African American mothers participated in in-depth interviews conducted to explore perceptions and experiences with Baby-Friendly practices. Rural-dwelling mothers were included in this subset to gain understanding of barriers and facilitators to Baby-Friendly practice adoption specific to a rural African American population. Directed content analysis was conducted to identify themes. Results of the analysis of the two data sets were converged to enhance understanding of mothers' barriers and facilitators to adoption of Baby-Friendly practices. Findings from the study revealed that implementation of mother/infant bonding practices of skin-to-skin contact, rooming in, and early breastfeeding enhanced maternal desire to breastfeed, while lack of both breastfeeding education and access to equipment and services hindered maternal breastfeeding success.

The *third manuscript* presents detailed results from the qualitative portion of the mixed-methods study. A qualitative descriptive approach guided the study, and directed content analysis was conducted to identify themes and to validate the ecological conceptual model of the BFHI. Six themes were identified, including *maternal desire to breastfeed, infant state, maternal state, milk supply concerns, provider support, and access to breastfeeding equipment and support services.* Themes were categorized by levels of the BFHI conceptual model to offer a more comprehensive understanding of the interaction of factors leading to Baby-Friendly practice adoption. Powerful maternal narratives provided a greater depth of understanding of mothers' barriers and facilitators to participation in Baby-Friendly practices and breastfeeding success.

Mothers reported both frustration with barriers to Baby-Friendly participation and enjoyment with successful participation and successful breastfeeding. Maternal/infant bonding practices of skin-to-skin contact, rooming in, and early breastfeeding enhanced maternal desire to breastfeed, while lack of breastfeeding education and access to equipment and services hindered breastfeeding success.

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1.1 The Impact in the United States of the Baby-Friendly Hospital Initiative on Early Infant Health and Breastfeeding Outcomes

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Abstract

Studies were examined to evaluate the impact of the Baby-Friendly Hospital Initiative (BFHI) on breastfeeding and early infant health outcomes in U.S. populations. Using the Social Ecological Model as a guiding theoretical framework, results were categorized into four interrelated multilevel factors: (1) maternal/infant dyad factors, (2) provider factors, (3) hospital organizational factors, and (4) policy/systems factors. Results from the review support the BFHI's success in facilitating successful breastfeeding initiation and exclusivity. Breastfeeding duration also appears to increase when mothers have increased exposure to Baby-Friendly practices, but deficiencies in breastfeeding tracking mechanisms have limited reliable breastfeeding duration data. Of the 10 steps of the BFHI, step 3, prenatal education and step 10, postnatal breastfeeding support are the most difficult steps to implement; however, those steps have the potential to significantly impact maternal breastfeeding decisions. The underlying mechanisms by which Baby-Friendly practices contribute to maternal breastfeeding decisions remain unclear; thus, studies are needed to examine mothers' experiences and perceptions of Baby-Friendly practices. Additionally, studies are needed to investigate the impact of the BFHI for women living in rural areas and in southeastern regions of the United States. Finally, studies are needed to examine early infant health outcomes related to the BFHI, especially for late premature infants (34–36 weeks) who are most vulnerable to poor outcomes and are in need of specialized breastfeeding support. Results from future qualitative and quantitative explorations could clarify how the delivery of Baby-Friendly practices leads to successful breastfeeding and infant health outcomes.

Background

EXCLUSIVE BREAST MILK FEEDING is the recommended diet for term and premature neonates to provide optimal infant nutrition, essential immunological and anti-inflammatory benefits, and protection from illness and diseases.[1] Nevertheless, the decision to breastfeed is ultimately a mother's personal choice.[1,2–6] In 2011, *The Surgeon General's Call to Action to Support Breastfeeding* included results from Bartick and Reinhold's cost analysis, wherein the authors estimated that if 90% of U.S. families followed the recommended guidelines to breastfeed exclusively for at least 6 months, the United States would save 13 billion dollars annually on associated morbidity and mortality.[1,7] These costs and health savings qualify breastfeeding promotion efforts as clinical imperative.

Rates of breastfeeding in the United States are generally problematic, falling below Healthy People 2020 national breastfeeding goals for infants ever breastfed (goal = 81.9%, actual = 79.2%), infants breastfed at 6 months (goal = 60.6%, actual = 49.4%), infants breastfed at 12 months (goal = 34.1%, actual = 26.7%), and infants exclusively breastfed at 6 months (goal = 25.5%, actual 18.8%).[3–5,8,9] In 2001, the World Health Organization (WHO) and the United Children's Fund (UNICEF) launched the Baby-Friendly Hospital Initiative (BFHI) to establish supportive environments and educational services that enhance initial breastfeeding experiences for mothers and infants.[3,10,11] The overarching goal of the BFHI is to improve breastfeeding outcomes, including increased rates of breastfeeding initiation, breastfeeding exclusivity, and longer breastfeeding durations.[12–14] Hospitals and birthing centers gain Baby-Friendly designation status by demonstrating implementation of the *Ten Steps to Successful Breastfeeding* (Appendix A) and compliance with the WHO's *International Code of Marketing for Breast Milk Substitutes*.[11,16] The "Ten Steps" include 10 maternal support and breastfeeding promotion practices, and "The Code"

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includes limiting the advocacy and marketing of formula to new mothers, along with paying a fair market price for formula within the facility.[13,14,16]

Baby-Friendly practices are based on the premise that individual attitudes toward breastfeeding are largely influenced by breastfeeding education during the early prenatal period, positive birth and initial breastfeeding experiences, and continued provider support.[5,10,17] Internationally, in countries such as Scotland, Belarus, Switzerland, and Brazil, evidence suggests that Baby-Friendly practices positively influence breastfeeding rates on a local or national level.[18–23] However, documentation is fragmentary regarding the impact of the BFHI on early infant health outcomes and breastfeeding outcomes in the United States.[1,24–27] While studies suggest that Baby-Friendly practices increase breastfeeding initiation and exclusivity rates, there is a lack of reconciliation on breastfeeding duration rates and causal mechanisms related to the BFHI's success.[22,26,27] Additionally, evidenced-based guidelines for early infant health outcomes such as neonatal weight loss, hypoglycemia, hyperbilirubinemia, and hypothermia with respect to Baby-Friendly practices are inadequate.[24,28,29] This is especially pertinent for late preterm infants (34–36 weeks) who are vulnerable to dehydration and rehospitalization due to feeding difficulties related to prematurity. Furthermore, no reviews of early infant health outcomes and breastfeeding outcomes related to Baby-Friendly practices in U.S. settings were located through literature searches of five academic research databases. The purpose of this integrative review is to examine updated evidence for the impact of the BFHI in the United States on early infant health outcomes and breastfeeding outcomes to determine strengths and limitations of the initiative, along with gaps in service for U.S. mothers and infants. The results of the review will inform future breastfeeding promotion interventions tailored to reduce breastfeeding-related health disparities in the United States.

Social Ecological Model

The BFHI has no underlying theory guiding its design; however, the Social Ecological Model (SEM) is an appropriate theoretical framework to explain how Baby-Friendly practices influence breastfeeding outcomes on multiple levels. The SEM guides health promotion interventions through a theoretical understanding of the relationship of multiple factors at the intrapersonal, interpersonal, organizational, and policy levels and their influence on health and health behavior.[30,31] Examination of the interaction of multiple factors within the social environment, beyond the influence of a single level factor, provides deeper understanding of a phenomenon and offers insights to create effective and innovative solutions.[32]

Baby-Friendly practices include multidimensional and multilevel factors that affect mothers' social and environmental experiences.[31–33] As illustrated in Figure 1, application of the SEM to the BFHI explains how breastfeeding outcomes are influenced by factors on the patient (mother/infant dyad), provider, organizational, and systems levels.[31,32] Intrapersonal maternal/infant dyad factors are the base of the model and include factors affecting mothers' attitudes, knowledge, beliefs, experiences, and perceptions of breastfeeding. These factors directly influence mothers' breastfeeding self-efficacy and motivation to breastfeed, and thus, affect breastfeeding and early infant health outcomes.[5,34,35] Interpersonal provider factors mediate maternal attitudes and breastfeeding motivation and include social and educational support delivered by health providers.[34,35] Staff education and training, as well as adequate time and staffing resources to properly implement the "Ten Steps" are interpersonal provider level considerations.[26,30,36] Organizational hospital factors involve establishing a written hospital policy to support breastfeeding mothers, consistent organizational implementation of the "Ten Steps," and provision of structural, social, and health provider support throughout all stages of pregnancy.[26,30,36,37] Finally, policy/systems factors include the availability of breastfeeding information, and standardized breastfeeding definitions, charting, and tracking mechanisms.[26,27,30,37,38]

Baby-Friendly Practices Defined

Baby-Friendly USA is responsible for the initiative's implementation in the United States.[17] The 4D pathway to Baby-Friendly designation requires facilities to commit time, staff training expenses, and designation fee expenses.[17,39] This pathway is a four-phase designation process involving changes in institution "policies, curriculum, action plans, quality improvement projects, staff training, and competency verification",[17, para.3] as well as a site visit to determine whether the facility has implemented all standards necessary to be awarded Baby-Friendly status. Moreover, successfully following the 4D pathway requires nurses to commit to the Baby-Friendly philosophy, as operationalized through the *Ten Steps to Successful Breastfeeding*.[40,41] The "Ten Steps" document outlines the systematic changes necessary to support mothers and to influence breastfeeding attitudes.

As previously discussed, there is no specific underlying theory to support the tenets of the BFHI. Rather, the initiative was developed and launched by the WHO and UNICEF in 1991 after release of the Innocenti Declaration of 1990.[42,43] The Declaration called for national governments and healthcare organizations to develop maternity care policies and procedures that implement the "Ten Steps" and "reinforce all actions that protect, promote, and support breastfeeding",[42, para.6] Specific tools to aid implementation of the initiative were then developed through expert opinion and field testing.[43] Additional staff education materials, a site self-appraisal tool, and a site assessment tool were also developed to help determine a facility's adherence to the Baby-Friendly standards.

For the purposes of this review, *Baby-Friendly Practices are defined as breastfeeding promotion interventions in a birthing facility or hospital that align with the Ten Steps to Successful Breastfeeding.* An *operational definition of Baby-Friendly practices* can be obtained by examining the guidelines and evaluation criteria outlined by Baby-Friendly USA, collecting data to determine a facility's adherence to the criteria, and collecting data on maternal/infant health and breastfeeding outcomes.[17] This includes the number of Baby-Friendly practices experienced by mothers, rates of breastfeeding initiation, exclusivity, and duration, as well as early infant health outcomes of neonatal weight loss, hyperbilirubinemia, hypoglycemia, and hypothermia.[17]

FIG. 1. Conceptual model of an application of the Social Ecological Model to the Baby-Friendly Hospital Initiative. BFHI, Baby-Friendly Hospital Initiative; SEM, Social Ecological Model; Ten steps, ten steps to successful breastfeeding.

Methods

Integrative review method

The integrative review is a broad review encompassing both empirical and theoretical literature, as well as experimental and nonexperimental studies. Whittemore and Knafl note that, ''well-done integrative reviews present the state of the science, contribute to theory development, and have direct applicability to practice and policy''.[44, p.546] ''Methodological rigor''[p.548] for an integrative review is upheld by maintaining the structured process for including a ''formulation stage, a literature search stage, a data evaluation stage, a data analysis stage, and a presentation stage''.[44, p.548]

The problem identification stage for this review comprised discovery of the concept and population of interest, the context of the inquiry, and additional variables relevant to the investigation.[44] Second, determination of the literature sampling approach included five searched databases, literature from the past 5 years, other relevant studies identified through the ancestry method, and the general study inclusion/exclusion criteria. The data evaluation stage included critical appraisal of both empirical and theoretical reports and involved classification of the articles using the 2009 Oxford Scale for Levels of Evidence[45] for empirical studies and a Melnyk and Fineout-Overholt ranking scale[46] for qualitative studies. The data analysis stage included extraction of the data from the articles with the data ordered and organized into a matrix table format (available from author by request).[44] Finally, the Results section includes matrix data organized into a results table (Table 1) according to levels and factors of the BFHI associated with the SEM.

Literature search

A literature search for the review included identification of studies measuring early health outcomes and breastfeeding outcomes related to Baby-Friendly practices in U.S. settings using PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsychINFO, PsychARTICLES, and Scopus databases. The key term ''Baby Friendly Hospital Initiative'' was used for the initial search ($N=911$, all years; $N=385$; 2010–2015). A subsequent search included the field terms ''Baby-Friendly'' and ''United States'' yielded $N=187$ articles. Titles and abstracts were reviewed for mention of health and breastfeeding outcomes in U.S. settings.

Studies from years 2010 to 2015 were included if measures of health or breastfeeding outcomes were addressed and the

TABLE 1. BABY-FRIENDLY RESULTS BY SOCIAL ECOLOGICAL MODEL LEVEL 1

SEM level	SEM sublevel category	Study citation	Major findings	Conclusions/implications
I. Maternal infant dyad factors (intrapersonal level)	A. Maternal/infant breastfeeding outcome	Martens[18] Kramer et al.[21] Merewood et al.[25] Philipp et al.[50] Hawkins et al.[53,54] Perrine et al.[52]	Mothers giving birth in U.S. BF environments had increased breastfeeding initiation and exclusivity	Maternal exposure to BF practices in U.S. facilities increased breastfeeding initiation, duration and exclusivity
		Philipp et al.[50]	Landmark study for review Study site—BMC with many Black mothers (54–56%) with low education levels and low SES Breastfeeding initiation increased from 58% to 86.5% and exclusivity from 5.5% to 33.5% from pre to postdesignation	Maternal exposure to BF practices increased breastfeeding initiation and exclusivity in a racial/ethnically diverse and disadvantaged group
		Merewood et al.[25] Perez-Escamilla and Chapman[27] Labbok et al.[38] Merewood et al.[48] Hawkins et al.[53,54] Perrine et al.[52]	Breastfeeding duration appears to be positively affected by BF practices Results are difficult to track and quantify due to differences in breastfeeding definitions and hospital charting systems No unified state or national breastfeeding tracking system	BF practices appear to positively affect breastfeeding duration, but results are difficult to determine due to inconsistencies in charting and tracking systems
I. Maternal infant dyad factors (intrapersonal level)	B. Early infant health outcomes	Li et al.[36]	As number of maternal BF experiences increased, so did chances of longer breastfeeding durations	Studies support a dose–response relationship between BF practices and breastfeeding outcomes
		DiGirolamo et al.[47] Perrine et al.[52]	Perrine et al.[54]: Mothers exposed to six BF practices were 3×s more likely to reach prenatal breastfeeding goal compared to those experiencing less than 6
		Philipp et al.[50]	Philipp et al.[52]: If zero BF practices, mothers 13×s more likely to cease breastfeeding before 6 weeks
		Grossman et al.[24] Radtke[28] Goyal et al.[29] Merewood et al.[49] Merewood et al.[49]	Limited studies tracking data pertaining to early infant health outcomes	Evidence-based guidelines for early infant health outcomes with respect to BF practices are limited (e.g., neonatal weight loss, hypoglycemia, hyperbilirubinemia, and hypothermia)
			Extracted bili. levels and categorized (high, low, or not done) No discussion of bili. level assoc. to GA or breastfeeding rates Feeding problems (poor latch, sore nipples, and sleepy baby) assoc. with decreased breastfeeding duration	
		Radtke[28] Goyal et al.[29]	Late premature infants (34–36 weeks) are vulnerable to feeding related complications due to premature motor reflexes and insufficient milk supply Feeding problems are normal breastfeeding barriers, but could also be early indicators of potential health complications (e.g., hypoglycemia, hyperbilirubinemia)	
		Grossman et al.[24]	After delivery in BF facility, exclusively breastfeeding babies had only moderate weight loss and were not at risk for FTT or hospital readmission	
	C. Maternal perceptions	Vasquez and Berg[26] VanDevanter et al.[30]	Two studies reported on perceptions related to BF practices and breastfeeding Maternal perceptions are reported, but data were collected through provider interviews not maternal reports Mothers are eager to breastfeed, but challenges contribute to early breastfeeding cessation (perceived milk insufficiency, infant hunger, return to work issues, body image issues, sore nipples, and lack of breastfeeding education)	Lack of evidence of maternal perceptions of BF practices and associated breastfeeding outcomes Studies of maternal perceptions of BF practices are needed

(*continued*)

TABLE 1. (CONTINUED)

SEM level	SEM sublevel category	Study citation	Major findings	Conclusions/implications
II. Provider factors (interpersonal level)	None	DHHS[1]	Interpersonal support factors and maternal education by HCPs are essential for breastfeeding success	Dose–response relationship with staff training compliance with BF practices
		Brenner and Bueschner[5]		
		Vasquez and Berg[26]	Staff education and training are critical for successful implementation of BF practices	
		Crivelli-Kovack and Chung[37]	The more training HCPs received regarding BF practices, the more likely they would comply with BF practices and commit to BF philosophy	HCPs, including IBCLCs and physicians, are important to support mothers in BF experiences and breastfeeding success
		Li et al.[36]		
		VanDevanter et al.[30]	Perceptions of HCPs were that busy environments limited time for maternal education	
			Physicians reported a lack of self-efficacy with maternal breastfeeding education	
		Philipp et al.[50]	IBCLCs have a valuable role as maternal educators and support service providers for breastfeeding mothers	
			IBCLCs not required for BF designation but are included in the assessment process	
III. Hospital organizational factors (organizational level)	None	Vasquez and Berg[26]	The greater a facility's compliance with implementing BF practices ("Ten Steps"), the greater the rates of breastfeeding initiation and longer breastfeeding durations	Hospital establishment of a written breastfeeding policy and consistent implementation of BF practices is necessary to establish a BF culture and to improve breastfeeding outcomes
		DiGirolamo et al.[47]		
		Hawkins et al.[53,54]		
		Perrine et al.[52]		
		Crivelli-Kovack and Chung[37]	Written breastfeeding policy is particularly important to affect breastfeeding outcomes	
		Li et al.[36]	Written breastfeeding policy establishes facilities commitment to BF tenets	
		VanDevanter et al.[30]	Hospitals face limitations in implementation of step 3 (prenatal education classes) and Step 10 (postdischarge breastfeeding support)	
			Improved implementation of these steps could prove critical for improving breastfeeding outcomes	
		Labbok et al.[38]	Hospital inconsistencies in charting and breastfeeding definitions limited the ability to quantify and track breastfeeding outcomes	
IV. Systems factors (policy level)	None	Merewood et al.[25]	Breastfeeding definitions, charting, tracking, and reporting varied throughout the studies	Need for consistency in breastfeeding duration reporting and need for a national system to track breastfeeding outcomes
		Hawkins et al.[34]		
		Perrine et al.[52]	Population-based self-reporting surveys with retrospective designs provided information from mothers on breastfeeding duration	
		Perez-Escamilla and Chapman[27]		
			RMS, PRAMS, and IFPS II served to collect maternal information like socio-demographic factors and to compare breastfeeding duration rates to hospital reported rates and prenatal breastfeeding intention	
			Limitations in available data, self-report method, and sample diversity	

assoc., association; BF, Baby-Friendly; bili, Bilirubin; BMC, Boston Medical Center; FTT, failure to thrive; GA, gestational age; HCPs, healthcare providers; IBCLCs, International Board Certified Lactation Consultants; IFPS II, Infant Feeding Practices Study II; PRAMS, Pregnancy Risk Assessment Monitoring System; RMS, Ross Mothers Survey; SEM, Social Ecological Model; SES, socioeconomic status.

studies occurred in the United States. The ancestry method was used to extract frequently cited studies in the literature.[44] Five relevant studies conducted before 2010 were identified using this method.[25,47–50] These studies were conducted at Boston Medical Center and provided valuable evidence related to Baby-Friendly practices and breastfeeding outcomes in racially/ethnically diverse and low-income populations. Additionally, these studies provide evidence for the impact of Baby-Friendly practices in the neonatal intensive care unit (NICU). The final sample included two information sources on U.S. breastfeeding policy and 16 articles of original research on Baby-Friendly practices and associated health and breastfeeding outcomes. A flow chart for study inclusion is presented in Figure 2.

Results

Baby-Friendly Results by SEM Level table (Table 1) represents data extracted from 18 total sources and provides information on breastfeeding outcomes, early infant health outcomes, experiences and perceptions related to the BFHI, and the impact of hospital policy and environment on outcomes. Application of the SEM allowed for stratification of the extracted data into outcomes and factors at the maternal/infant dyad level, the provider level, the hospital/organizational level, and the systems level. Further codification of maternal/infant dyad factors produced three sublevel categories of maternal/infant breastfeeding outcomes, early infant health outcomes, and maternal perceptions. Presenting the results in this manner emphasizes the interrelatedness of factors within

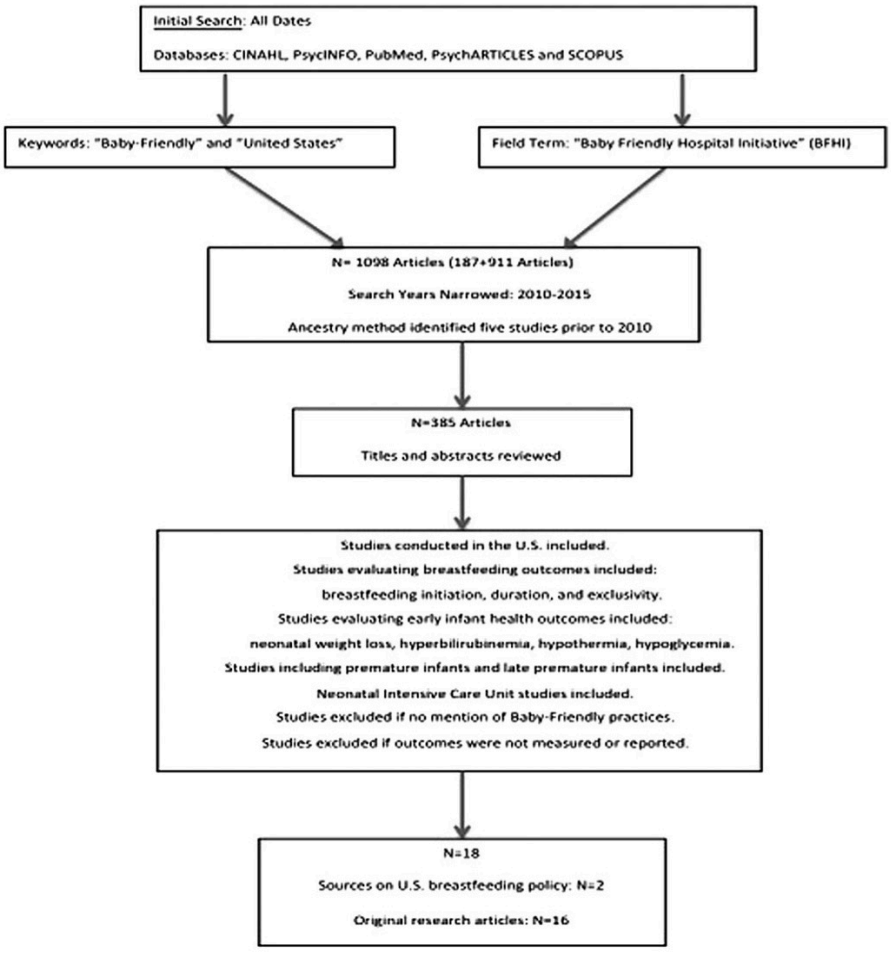

FIG. 2. Flowchart for study inclusion in review.

the BFHI, facilitates identifying strengths and weaknesses at each level, and presents evidence of the documented breastfeeding and early infant health outcomes at each level.

Summary of Findings/Implications for Future Practice

Maternal/infant dyad factors

Evidence is well documented from U.S. studies that have evaluated and supported the effectiveness of the BFHI for increasing rates of breastfeeding initiation and exclusivity.[25,26,49–54] Evidence also suggests that Baby-Friendly practices contributed to increased duration of breastfeeding, although these results should be interpreted with caution due to inconsistencies in charting and reporting of breastfeeding duration rates.[38,47,48,53,54] Studies including racial/ethnic minorities, mothers with lower education, and low-income mothers have demonstrated that the BFHI positively affects breastfeeding outcomes in disadvantaged groups.[26,50] However, no studies produced BFHI or breastfeeding impact results for women living in rural areas or southeastern regions of the United States.[38,54]

Evidence is limited for the impact of the BFHI on early infant health outcomes (neonatal weight loss, hyperbilirubinemia, hypoglycemia, and hypothermia). Baby-Friendly practices have been successful in the NICU environment, but late premature infants who remain in normal newborn nursing care may be more susceptible to a lack of appropriate breastfeeding support and may be at an increased risk for poor early infant health outcomes.[29,49,51]

While evidence supports implementation of the BFHI as a best practice standard, causal mechanisms for the success of Baby-Friendly practices in improving breastfeeding outcomes have not been identified.[1,30] Potential causal mechanisms may include variation in practice delivery, variation in maternal attitudes and demographic variables, and how practice delivery influences maternal barriers or facilitators to acceptance of Baby-Friendly practices and breastfeeding. Studies examining mothers' perceptions and experiences with breastfeeding in Baby-Friendly environments are lacking; thus, it is unclear how those Baby-Friendly experiences or perceptions influence breastfeeding decisions.[30]

Provider factors

The more training a healthcare provider received, the more likely the provider would comply with Baby-Friendly practices and commit to the Baby-Friendly philosophy.[26,30,37,50] All healthcare providers, including lactation consultants and physicians, are important to support mothers in Baby-Friendly experiences and breastfeeding success.

Hospital/organizational factors

The dose–response relationship of number of Baby-Friendly practices a facility implements for successful maternal/infant breastfeeding outcomes emphasizes the need for consistency in hospital organizational factor implementation.[26,37,47,52–54] Thus, there remains a need to emphasize consistent delivery of Baby-Friendly practices within facilities to ensure that mothers experience breastfeeding education and support across all maternal/infant stages.

Systems factors

The majority of evidence regarding breastfeeding outcomes in the United States is from retrospective observational survey design studies. History, maturation, and participant report biases present threats to validity when utilizing these retrospective self-report designs.[55–57] Prospective studies are needed ideally with participants randomized to breastfeeding promotion interventions to track associated breastfeeding initiation and duration rates.[1] Breastfeeding duration is difficult to track due to inconsistencies in charting and a lack of postdischarge breastfeeding tracking systems.[27] There is a need for a unified tracking system in the United States, as well as a need for standardization of breastfeeding definitions and breastfeeding-related charting in hospitals and birthing facilities.

Limitations

This review was limited to studies conducted in the United States, thus potentially missing lessons learned from studies conducted in other countries. Additionally, articles were only included if outcomes were reported or measured. Studies addressing barriers or facilitators to implementation of the BFHI, without mention of outcome measures, were not included in the current review. Therefore, exclusion criteria could have limited the availability of qualitative evidence to address BFHI implementation factors.

Conclusion

Data for this review provide valuable insights to inform systematic modification of breastfeeding policies and initiatives associated with Baby-Friendly practices on multidimensional and systems levels. Results from the review support the BFHI's success in facilitating successful breastfeeding initiation and exclusivity. Breastfeeding duration appears to increase when mothers have increased exposure to Baby-Friendly practices, but deficiencies in breastfeeding tracking mechanisms result in limited reliable breastfeeding duration data.

The underlying mechanisms by which Baby-Friendly practices contribute to maternal breastfeeding decisions remain unclear; thus, studies are needed to examine mothers' experiences and perceptions of Baby-Friendly practices. Additionally, studies are needed to address Baby-Friendly and breastfeeding barriers for women living in rural areas or in southeastern regions of the United States. Finally, studies are needed to examine early infant health outcomes related to the BFHI.

Prospective studies are needed that include breastfeeding promotion initiatives, explore maternal experiences and perceptions with Baby-Friendly practices, and track maternal breastfeeding decisions. Results from future qualitative and quantitative explorations could further clarify how the delivery of Baby-Friendly practices leads to successful breastfeeding and improved infant health outcomes.

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Appendix A

Ten Steps to Successful Breastfeeding:

1. Have a written breastfeeding policy that is routinely communicated to all healthcare staff.
2. Train all healthcare 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 1 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.

1.2. Factors Influencing African American Mothers' Adoption of Baby-Friendly Practices: A Mixed-Methods Study

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Abstract

Objective: This convergent parallel mixed-methods study explored southeastern United States (U.S.) rural-dwelling African American mothers' perceptions of barriers and facilitators to adoption of Baby-Friendly practices, including associated breastfeeding decisions.

Methods: Medical record review of 234 mother/infant dyads provided data to determine if those who participated in more than half of the *Ten Steps* had improved breastfeeding initiation, exclusivity and duration. Logistic regression was conducted to determine whether maternal demographic/clinical characteristics were predictive of adoption of Baby-Friendly practices. Qualitative methods included in-depth interviews with 16 mothers to explore perceptions and experiences with Baby-Friendly practices. Directed content analysis was conducted to identify themes. Results of the analysis of the two data sets were triangulated to enhance understanding of mothers' barriers and facilitators to adoption of Baby-Friendly practices.

Results: Rural-dwelling and African American mothers had greater odds for non-adoption of Baby-Friendly practices relative to other groups (ORs = 5, 10, respectively, p-values ≤ 0.01). Mothers who received a lactation consult and had moderate or completed skin-to-skin contact had greater odds for adoption of Baby-Friendly practices relative to other groups (both OR ≥ 17.5, p-values <0.05). Directed content analysis revealed six themes: maternal desire to breastfeed, infant state, maternal state, milk supply concerns, provider support, and access to breastfeeding equipment and support services.

Conclusion: Implementation of mother/infant bonding practices of skin-to-skin contact, rooming in, and early breastfeeding enhanced maternal desire to breastfeed, while lack of both breastfeeding education and access to equipment and services hindered maternal breastfeeding success.

Introduction

In the United States (U.S.), low rates of breastfeeding persist despite evidence that breast milk serves as optimal infant nutrition and provides protection from illnesses and diseases [1-5]. In 2011, the U.S. Surgeon General released a *Call to Action to Support Breastfeeding,* wherein healthcare providers were challenged to meet the multifaceted support and education needs of breastfeeding mothers [5]. Nevertheless, maternal choice ultimately determines breastfeeding decisions [1, 2, 4-7]. While the number of infants who begin breastfeeding at birth is approaching Healthy People 2020 goals (goal 81.9%; actual 81.1%), rates continue to decrease substantially at 6 months (goal 60.6%; actual 49%) and 12 months (goal 34.1%; actual 27%) [8, 9]. Thus, mothers are not successfully maintaining breastfeeding at home and in the community environment.

African American mothers and low-income mothers have historically had low rates of breastfeeding initiation, duration, and exclusivity resulting in disparities in infant morbidity and mortality; yet little is known about factors contributing to this trend [1, 5, 10, 11]. African American mothers have 50% lower breastfeeding rates than White mothers of similar income or education level [5]. Evidence also indicates that income and education level have a positive association with breastfeeding [5, 12]. Low-income women who qualify for Women, Infants, and Children (WIC) services and those with less than a high school education have lower breastfeeding rates than women of higher education and income levels. Similarly, geographic disparity exists, as evidenced by low rates of breastfeeding for women living in rural areas of the country and in the southeastern U.S. [13]. Evidence suggests that a combination of factors including cultural beliefs, maternal breastfeeding perceptions, lack of access to breastfeeding education resources, return to work issues, and lack of social support may contribute to lower rates of breastfeeding for these

groups, with rural African American mothers having the greatest risk of low breastfeeding rates [13, 14].

In 2001, the World Health Organization (WHO) and the United Children's Fund (UNICEF) launched the Baby-Friendly Hospital Initiative (BFHI) to establish supportive environments and educational services that enhance mothers' initial breastfeeding experiences and influence maternal decisions to initiate, maintain, and exclusively breastfeed for longer durations [3, 4, 15-18]. Hospitals and birthing centers achieve Baby-Friendly designation status by demonstrating implementation of the *Ten Steps to Successful Breastfeeding* and compliance with the WHO's *International Code of Marketing for Breast Milk Substitutes* [3, 19]. The "Ten Steps" include ten maternal support and breastfeeding promotion practices, and "The Code" includes limiting the promotion and marketing of formula to new mothers, along with paying a fair market price for formula within the centers [20]. Baby-Friendly practices are based on the premise that individual attitudes towards breastfeeding are largely influenced by breastfeeding education during the early prenatal period, positive birth and initial breastfeeding experiences, and continued provider support [18, 21]. Successful acquisition of the Baby-Friendly status requires facilities to follow a 4-phase designation process (4D pathway) involving changes in institution "policies, curriculum, action plans, quality improvement projects, staff training, and competency verification" [22, para 3, 23], as well as a site interview during a certification visit from the U.S. Baby-Friendly accreditation body, Baby-Friendly USA [22]. The 4D pathway requires nurses to commit to the Baby-Friendly philosophy, as operationalized through the *Ten Steps to Successful Breastfeeding* (Appendix A) [22, 24, 25]. The *Ten Steps* document outlines the systematic changes necessary to support mothers and to influence breastfeeding attitudes through practices designed

to educate and support mothers, offer unrestricted mother/infant contact, and to encourage exclusive breast milk feedings and infant feeding on demand [17, 18].

While international studies suggest that Baby-Friendly practices increase breastfeeding initiation and exclusivity rates in other countries, the impact of the BFHI on breastfeeding practices in the U.S. is less clear [1, 24, 26-29]. Currently, there are few published studies that describe mothers' perceptions and experiences with Baby-Friendly practices. This knowledge gap hinders understanding the factors that contribute to maternal adoption of the Baby-Friendly practices and breastfeeding initiation, exclusivity, and duration [10, 26, 30, 31]. Studies of breastfeeding among racial/ethnic minorities, mothers with lower education, and mothers with low-income have demonstrated that the BFHI positively affected breastfeeding decisions for disadvantaged mothers living in urban settings [27, 32]. However, no studies have reported breastfeeding perceptions, experiences, or decisions for disadvantaged mothers living in rural areas of the southeastern U.S., thus limiting knowledge of potential barriers and facilitators to breastfeeding for this population [11].

Our mixed-methods study supports an important and multidimensional health promotion and maintenance concern in the U.S.: improving mother/infant dyad bonding and health outcomes through improved rates of breastfeeding initiation, exclusivity, and duration [2]. The goal of the study was to investigate the maternal support processes associated with the BFHI in a southeastern U.S. regional hospital serving a substantial rural population [33, 34]. Quantitative investigation sought to identify disparities in breastfeeding and factors contributing to low breastfeeding rates for mothers in disadvantaged groups. Additionally, qualitative explorations of mothers' perceptions of BFHI practices helped to determine how the BFHI influences breastfeeding decisions. Findings from this exploratory study will inform the health care

provider's role in addressing maternal breastfeeding support needs and in the effective tailoring of Baby-Friendly interventions. The overarching question driving this mixed-methods study was: *What factors contribute to southeastern U.S. rural dwelling African American mothers' adoption of Baby-Friendly practices and associated breastfeeding outcomes?*

Methods

Design

We applied a convergent parallel mixed-methods design to explore rural African American mothers' experiences with Baby-Friendly environments, perceptions of Baby-Friendly practices, barriers and facilitators to adoption of Baby-Friendly practices, and associated breastfeeding decisions [35]. This design included the simultaneous collection and analysis of independent qualitative and quantitative data sets, followed by merging and synthesizing of the data to produce a more comprehensive understanding of factors that influence maternal adoption of Baby-Friendly practices and breastfeeding decisions[36]. Institutional Review Board (IRB) approval was obtained prior to initiation of any research procedures.

Participants

For the quantitative phase of the study, the PI conducted a retrospective review of medical records to extract de-identified data for eligible mother/infant dyads whose delivery occurred during April and May of 2016. The facility services approximately 180 deliveries per month. Study expectations were to collect data from approximately 150 to 200 eligible maternal/infant dyads. Records were excluded for mothers who were: unable to breastfeed due to maternal or infant complications, HIV positive, taking prescribed or recreational substances contraindicated with breastfeeding, referred to the Department of Social Services, or non-English speaking. For the qualitative component of the study, a purposeful criterion sampling strategy

guided recruitment of 20 urban- and rural-dwelling African American mothers who delivered their infants at the facility during the same two-month data abstraction time-period for in-depth interviews. The mothers were recruited, consented, and enrolled while on the Postpartum unit of the facility. Upon enrollment, the PI examined their medical records to assess for study eligibility, extracted data, and scheduled interviews with the mothers for one to two weeks post-discharge.

Table 1: Inclusion and Exclusion Criteria for the Study

Inclusion Criteria	Exclusion Criteria
Mother: - age 18 years and older - African American (Qualitative only)	Mother: - unable to breastfeed due to illness or complication with delivery - prescribed medications or taking recreational substances contraindicated with breastfeeding - diagnosis of HIV - Department of Social Services involvement - Non-English speaking
Infant: 38 weeks gestation and older	Infant: - admitted to the NICU - congenital abnormalities that prevent breastfeeding or require admission to the NICU - died

Data Collection

Quantitative data collection occurred retrospectively through review of the facility's electronic medical records (EMR) and included measures of maternal participation in the *Ten Steps*, maternal demographic information, infant characteristics such as gestational age and birth weight, delivery information, and breastfeeding outcomes for all eligible mother/infant dyads. During the qualitative phase, the PI conducted in-depth interviews with a subset of mothers for whom participation in the *Ten Steps* was obtained from their medical records and then linked with their perceptions of *Ten Steps* participation reported during the in-depth interviews.

Measures

Maternal Demographic and Maternal/Infant Clinical Characteristics. General maternal demographic information as well as variables describing paternal involvement, number of children, rurality, employment, and education level were obtained. *Rurality* was determined by using the Office of Management and Budget (OMB) definition of Metropolitan, Micropolitan, and Nonmetro areas, along with the U.S. Department of Agriculture (USDA), Economic Research Division's rural-urban commuting area (RUCA) codes, which classify U.S. census tracts using measures of population density, urbanization, and daily commuting [37, 38].

Maternal clinical characteristics included mode of delivery, planned infant feeding method, prior breastfeeding experience, lactation consult, day of the week and shift of delivery, unit census for Labor and Delivery and Postpartum, length of hospital stay, and four skin-to-skin contact variables. Based upon prior studies, the amount of skin-to-skin contact for the participants was categorized as follows: (1) no skin-to-skin initiation, (2) less than 15 minutes = minimal, (3) 15-44 minutes = moderate, (4) =>45 minutes = completed [39-44]. Additional categories included infants whose skin-to-skin contact was interrupted prior to the first breastfeeding (most often for only a few minutes for normal newborn care) and infants whose skin-to-skin contact was delayed after birth (delayed< 1 hour or delayed >1 hour) most often due to cesarean delivery. Infant clinical characteristics included birth weight, gestational age, 1 and 5 minute APGAR scores, and initial temperature, blood glucose, and bilirubin levels.

Maternal Participation in Baby-Friendly Practices was operationalized through the *Ten Steps* and is documented in the EMR as maternal infant feeding practices and interactions. The PI determined participation in the *Ten Steps* by using the Baby-Friendly Hospital Initiative Evaluation Criteria, and a chart review tool developed by EMPower Breastfeeding Enhancing

Maternity Practices (EMPower) (Appendix B) [45, 46]. EMPower was created through a Centers for Disease Control and Prevention (CDC) funded contract (Contract # HHSD2002013M53890B/200-2014-F-60917) and is a "hospital-based quality improvement initiative focusing on maternity practices leading to Baby-Friendly designation" [46, para. 1]. Maternal participation in each of the *Ten Steps* was dichotomized to measure mothers who participated in more than half of the *Ten Steps* and mothers who participated in fewer than half of the *Ten Steps*. This categorization aligns with the CDC's October 2015, report of U.S. hospitals' adherence to the *Ten Steps*, wherein data from the Maternity Practices in Infant Nutrition Care (mPINC) survey was collected from "all birth facilities in all states, the District of Columbia, and territories" [47, para. 2] to characterize birthing facilities' adherence to Baby-Friendly practices.

Breastfeeding initiation, duration, and exclusivity. *Breastfeeding initiation* was defined as a dichotomous variable: did or did not initiate breastfeeding. *Time until breastfeeding initiation* was defined as the length of time in minutes after delivery until breastfeeding was initiated and served as a continuous measure for breastfeeding initiation. *Breastfeeding exclusivity* was defined as infant feedings of only breast milk and was reported and analyzed as both a dichotomous variable (yes/no) and as a continuous variable (length of exclusivity). The amount of formula given to breastfed infants was also collected to determine proportions of breast milk received. *Breastfeeding duration* was reported based on total length of time mothers fed their infants any breast milk.

Qualitative Interview. The PI visited participants retained in the qualitative phase of the study. These visits occurred in the participants' homes and consisted of in-depth interviews using a semi-structured interview guide (Appendix C) to elicit open dialog about their delivery and

breastfeeding experiences. In adherence to the tenets of a qualitative descriptive approach and directed content analysis, the questions began as open-ended and broad [48]. An example of a broad question was: "What types of Baby-Friendly practices did you participate in during your hospital stay?" Follow-up questions and probes were more direct to explore each specific Baby-Friendly practice and mothers' perceived experiences with each practice. The PI used direct questions and probes to guide the mother to identify barriers and facilitators, from an ecological perspective, to participation in Baby-Friendly practices and breastfeeding [48, 49]. All interviews were audio recorded and transcribed.

Data analysis

Statistical analysis. For the quantitative data analysis, data were exported from the REDCap database to SPSS version 24 [50]. The primary analysis used all available data retrieved from the medical records of each mother/infant dyad. Data were screened for missing values, outliers, potential coding errors, and normality. Any missing values were excluded only from tests involving that variable.

Descriptive statistics were computed for maternal demographic and maternal/infant clinical characteristics for all mother/infant dyads and by group: mothers participating in ≤5 of the *Ten Steps* versus >5 of the *Ten Steps* (Table 2). Frequencies were calculated and reported for all categorical variables. Continuous variables were assessed for normality and were reported as means with standard deviations. Independent t-tests and Chi-square tests were used to determine differences between the two groups as appropriate. For race, insurance type, and education level, categories with very few participants were collapsed to strengthen the accuracy of the Chi-square analysis. Group differences were reported using 95% confidence intervals and alpha set at 0.05 to determine statistical significance.

Logistic regression was conducted to explore which maternal demographic and clinical characteristics predicted maternal adoption of Baby-Friendly practices (participation in ≤5 vs. > 5 Baby-Friendly Steps). Variables with p-values<0.2 from bivariate analysis were included in subsequent models in sets: one set included demographic features and one set clinical characteristics. Only variables that were significant in the two models were included in the final model. Multicollinearity between the variables was assessed and data were screened for outliers using Mahalanobis' distance [51]. All tolerance statistics were greater than 0.1 indicating that multicollinearity was not a problem, and no cases were classified as potential outliers. One case contained missing data and was deleted listwise.

Qualitative analysis. Qualitative analyses of interview data were conducted using NVivo11 qualitative software and directed content analysis [48, 49, 52-54]. In-depth interviews were transcribed verbatim and were reviewed by the PI and another team member for discovery and confirmation of themes. The descriptive qualitative approach is complimentary to mixed-methods research and is of value to this exploration because focus of the approach is to provide observations and explanations of participant experiences with minimal interpretation [53, 54]. This approach allows the investigator to "stay closer to the data" [54, para. 7] and to provide a clearer descriptive summary of events. The directed approach of analysis is structured in nature with a goal to "validate or extend conceptually a theoretical framework or theory" [48, p. 1281]." The directed approach was used based upon key concepts from the BFHI using the Social Ecological Model (SEM) (Appendix D) and themes were developed based upon the following levels: policy/systems factors, organizational/hospital factors, intrapersonal provider factors, and intrapersonal mother/infant dyad factors [49]. Focused coding further solidified themes and identified major topic areas [48]. Additionally, after the in-depth interview, maternal/infant demographic and

delivery data were linked with qualitative interview data using pseudonyms to protect the mothers' identities. The data were examined for congruence or discrepancies between maternal reports of Baby-Friendly practices versus what was charted in the medical record.

Qualitative and quantitative data were collected, stored and analyzed separately, and then the data were merged to provide a more comprehensive understanding of the interaction of mothers' Baby-Friendly experiences and perceptions as well as maternal breastfeeding decisions. Trends in breastfeeding initiation, duration and exclusivity, as well as trends according to demographic characteristics are presented for quantitative data. Qualitative data are presented as categorized themes and were used to further explain trends in quantitative data.

Results

Sample

Nearly 900 medical records were screened, with a total of 234 eligible mother/infant dyads for the final sample. Maternal race included 38.9% African American, 54.7% White, and 6.4% other. The mean age for all mothers was 27.4 (SD=5.4) years: the majority of mothers was single (52.1%) and rural-dwelling (56%), half (50%) were unemployed, nearly half (46.6%) had a high school education or less, and almost as many (107/234; 45.7%) mothers had private insurance as had Medicaid (116/234; 49.6%) **(Table 2).**

Table 2: Maternal Demographics for all Mothers

Variable	Overall (n=234)
Age, mean (SD)	27.4 (5.4)
Race, n (%)	
White	128 (54.7)
Black or African American	91 (38.9)
Hispanic/Latino	1 (0.4)
Asian	2 (0.9)
Other	12 (5.1)
Marital Status, n (%)	
Married	110 (47.0)
Single	122 (52.1)
Paternal Involvement, n (%)	

Table 2: Maternal Demographics for all Mothers	
Variable	**Overall (n=234)**
Yes	186 (79.0)
No	25 (10.7)
Unknown	23 (9.8)
Insurance Type, n (%)	
Private Insurance	107 (45.7)
Medicaid	116 (49.6)
Self Pay	6 (2.6)
Multi-Type	5 (2.1)
Rurality, n (%)	
Rural	131 (56.0)
Urban	103 (44.0)
Employment, n (%)	
Employed	83 (35.5)
Unemployed	117 (50.0)
Unknown	34 (14.5)
Education, n (%)	
Less than High School	11 (4.7)
High School Graduate	98 (41.9)
Some college	6 (2.6)
College Degree (Associate's or Bachelor's)	77 (32.9)
Postgraduate Education	19 (8.1)
Unable to Determine	23 (9.8)

The qualitative portion of the study included 16 African American mothers, a sub-sample of the quantitative sample (n=234), with a mean age of 28 (SD=5) years and ranging in age from 20-36 years. Half (50%) of the mothers were married, were employed, had a high school education or less and had Medicaid insurance, and more than half (56.3%) of the mothers were rural-dwelling.

Bivariate analysis

Maternal demographics, maternal clinical characteristics, and infant clinical characteristics were analyzed overall and by level of participation in the *Ten Steps* (participation in ≤5 vs. > 5 Baby-Friendly Steps). Mothers who participated in more than five Baby-Friendly steps were predominantly White (84; 66.1%, p=0.001), married (77; 61.1%, p<0.001), had private insurance (76; 59.8%, p<0.001), lived in an urban area (68; 53.5%, p=0.001), were employed (60; 47.2%, p<0.001), and had some college education, a college degree or

postgraduate education (71; 55.9%, p<0.001) (Table 3). Additionally, the majority of mothers who participated in more than five Baby-Friendly steps planned to breastfeed (112; 88.2%, p<0.001) and had a lactation consult (120; 94.5%, p<0.001), and almost half participated in moderate or completed skin-to-skin contact (99; 42.3%, p<0.001). No statistical differences were observed between the groups for the infant clinical characteristics. Additional details of variables included in the logistic regression analysis (p-values< 0.2) are reported in **Table 3**. A full version of Table 3 is located in the online supplemental material.

Table 3: Maternal demographics, maternal clinical characteristics, and infant clinical characteristics overall and by level of participation in the Ten Steps

Variable		Mothers participating in Ten Steps		*p*-value
	Overall (n=234)	≤5 steps (n=107)	> 5 steps (n=127)	
Maternal Demographics				
Age, mean (SD)	27.4 (5.4)	26.2 (4.9)	28.5 (5.6)	0.001
Race, n (%)				<0.001[i]
White	128 (54.7)	44 (41.1)	84 (66.1)	
Black or African American	91 (38.9)	59 (55.1)	32 (25.2)	
Hispanic/Latino	1 (0.4)	1 (0.9)	0 (0)	
Asian	2 (0.9)	0	2 (1.6)	
Other	12 (5.1)	3 (2.8)	9 (7.1)	
Marital Status, n (%)				<0.001
Married	110 (47.0)	33 (31.1)	77 (61.1)	
Single	122 (52.1)	73 (68.9)	49 (38.9)	
Paternal Involvement, n (%)				<0.0001
Yes	186 (79.0)	72 (67.3)	114 (89.8)	
No	25 (10.7)	18 (16.8)	7 (5.5)	
Unknown	23 (9.8)	17 (15.9)	6 (4.7)	
Insurance Type, n (%)				<0.001[ii]
Private Insurance	107 (45.7)	31 (29)	76 (59.8)	
Medicaid	116 (49.6)	69 (64.5)	47 (37.0)	
Self Pay	6 (2.6)	2 (1.9)	4 (3.1)	
Multi-Type	5 (2.1)	5 (4.7)	0 (0.0)	
Rurality, n (%)				0.001
Rural	131 (56.0)	72 (67.3)	59 (46.5)	
Urban	103 (44.0)	35 (32.7)	68 (53.5)	
Employment, n (%)				<0.001
Employed	83 (35.5)	23 (21.5)	60 (47.2)	
Unemployed	117 (50.0)	66 (61.7)	51 (40.2)	
Unknown	34 (14.5)	18 (16.8)	16 (12.6)	
Education, n (%)				<0.001[iii]
Less than High School	11 (4.7)	8 (7.5)	3 (2.4)	
High School Graduate	98 (41.9)	57 (53.3)	41 (32.3)	
Some college	6 (2.6)	1 (0.9)	5 (3.9)	

Table 3: Maternal demographics, maternal clinical characteristics, and infant clinical characteristics overall and by level of participation in the Ten Steps

Variable		Mothers participating in Ten Steps		*p*-value
	Overall (n=234)	≤5 steps (n=107)	> 5 steps (n=127)	
Maternal Demographics				
College Degree (Associate's or Bachelor's)	77 (32.9)	28 (26.2)	49 (38.6)	
Postgraduate Education	19 (8.1)	2 (1.9)	17 (13.4)	
Unable to Determine	23 (9.8)	11 (10.3)	12 (9.4)	
Maternal Clinical Characteristics				
Mode of Delivery, n (%)				0.197
Vaginal	146 (62.4)	62 (57.9)	84 (66.1)	
Cesarean Section	88 (37.6)	45 (42.1)	43 (33.9)	
Planned Feeding Method, n (%)				<0.001[iv]
Plans to Breastfeed	152 (65)	40 (37.4)	112 (88.2)	
Plans to Bottle Feed	57 (24.4)	53 (49.5)	4 (3.1)	
Undecided Feeding Method	4 (1.7)	3 (2.8)	1 (0.8)	
Unable to Determine	21 (9.0)	11 (10.3)	10 (7.9)	
Prior Breastfeeding Experience, n (%)				<0.001
Yes	42 (17.9)	2 (1.9)	40 (31.5)	
No	88 (37.6)	35 (32.7)	53 (41.7)	
Unable to Determine	104 (44.4)	70 (65.4)	34 (26.8)	
Skin-to-Skin Initiation, n (%)				<0.001
Yes	148 (63.2)	42 (40.8)	106 (84.8)	
No	80 (34.2)	61 (59.2)	19 (15.2)	
Unable to Determine	6 (2.6)	4 (3.7)	2 (1.6)	
Type of Skin-to-Skin Contact, n (%)	***n = 154***[v]			<0.001[vi]
Minimal (< 15 minutes)	33 (21.4)	27 (58.7)	6 (5.6)	
Moderate, no breastfeeding (15-44 min.)	4 (2.6)	3 (6.5)	1 (0.9)	
Moderate, breastfeeding (15-44 min.)	39 (25.3)	6 (13.0)	33 (30.6)	
Completed, no breastfeeding (=> 60 min.)	2 (1.3)	1 (2.2)	1 (0.9)	
Completed, breastfeeding (=> 45 min.)	70 (45.5)	5 (10.9)	65 (60.2)	
Unable to determine from chart	6 (3.9)	4 (8.7)	2 (1.9)	
Skin-to-skin Interrupted, n (%)	***n = 154***			0.032
Yes	97 (63.0)	32 (69.6)	65 (60.2)	
No	51 (33.1)	10 (21.7)	41 (38.0)	
Unable to Determine	6 (3.9)	4 (8.7)	2 (1.9)	
Delayed skin to skin, n (%)	***n = 154***			0.029
No (Immediate)	112 (72.7)	34 (73.9)	78 (72.2)	
Yes (Delayed < 1 hour)	17 (11.0)	1 (2.2)	16 (14.8)	
Yes (Delayed > 1 hour)	19 (12.3)	7 (15.2)	12 (11.1)	
Unable to Determine	6 (3.9)	4 (8.7)	2 (1.9)	
Lactation Consult, n (%)				<0.001

Table 3: Maternal demographics, maternal clinical characteristics, and infant clinical characteristics overall and by level of participation in the Ten Steps				
Variable		**Mothers participating in Ten Steps**		***p*-value**
	Overall (n=234)	**≤5 steps (n=107)**	**> 5 steps (n=127)**	
Maternal Demographics				
Yes	143 (61.1)	23 (21.5)	120 (94.5)	
No	91 (38.9)	84 (78.5)	7 (5.5)	
Shift of Delivery, n (%)				0.088
First Shift (07:00-14:59)	127 (54.3)	60 (56.1)	67 (52.8)	
Second Shift (15:00-22:59)	70 (29.9)	36 (33.6)	34 (26.8)	
Third Shift (23:00-06:59)	37 (15.8)	11 (10.3)	26 (20.5)	
Infant Clinical Characteristics				
Initial Bilirubin, mean (min - max)	5.9 (0.5-11.5)	5.6 (0.5-11.5)	6.1 (0.9-10.9)	0.069

[i] P-value obtained for 3 categories: White, Black or African American, & Other (Hispanic/Latino, Asian)

[ii] P-value obtained for 3 categories: Private Insurance, Medicaid, & Other (Multi-Type, Self-Pay)

[iii] P-value obtained for 3 categories: High School or Less, More than High School (Some College, College Degree or Postgraduate Education), & Unknown

[iv] P-value obtained for 3 categories: Plans to Breastfeed, Plans to Bottle Feed, & Unknown (Undecided feeding method, Unknown)

[v] Analysis based upon mothers who initiated skin to skin contact (n = 148) and those where skin to skin contact could not be determined (n = 6) = Total (n = 154).

[vi] P-value obtained for 4 categories: Minimal (<15 Minutes), Moderate (15-44 min.) [Moderate, Breastfeeding (15-44 min., Moderate, no Breastfeeding (15-44 min.)], Completed (=>45 min.) [Completed, Breastfeeding (=> 45 min.), Completed, no Breastfeeding(>60 min.)] & Unable to Determine

Breastfeeding outcomes. All mothers who participated in more than five steps initiated breastfeeding compared to less than half of the mothers in the ≤5 steps group (100% vs. 41%, p<0.001). Additionally, almost 75% of the mothers who participated in more than five steps exclusively breastfed in the hospital compared to only 9% in the ≤5 steps group (74.8% vs. 9.3%, p<0.001). Mothers in the >5 steps group exclusively breastfed for longer [14.8 mean hours (SD=16.5) vs. 2.7 mean hours (SD=18.3), p<0.001] and gave their infants an average of 5 times more breast milk feeds than mothers in the ≤5 steps group [15 mean feeds (SD=10) vs. 3 mean feeds (SD=5, p<0.001]. In contrast, mothers in the ≤5 steps group gave their infants almost twice the number of formula feedings than mothers in the >5 steps group [11 mean feeds (SD=5) vs. 6 mean feeds (SD=5), p<0.001] **Table 5.**

Table 5: Breastfeeding Outcomes				
Variable		Mothers participating in Ten Steps		*p*-value
	Overall (n=234)	≤5 steps (n=107)	> 5 steps (n=127)	
Breastfeeding Initiation, n (%)				<0.001
Yes	171 (73.1)	44 (41.1)	127 (100.0)	
No	63 (26.9)	63 (58.9)	0 (0.0)	
Exclusive Breastfeeding (includes infants given medically indicated supplements), n (%)				<0.001
Yes	105 (44.9)	10 (9.3)	95 (74.8)	
No	129 (55.1)	97 (90.7)	32 (25.2)	
Exclusive Breastfeeding Hours, mean (SD)	10.4 (18.0)	2.7 (18.3)	14.8 (16.5)	0.001
In-Hospital Breastfeeding Duration, mean (SD). ***n = 225***[vii]	47.8 (15.0)	46.6 (14.2)	48.7 (15.7)	0.770
Breastfeeding Duration Hours, mean (SD) (n=8)	11.6 (11.9)	7.5 (5.8)	23.8 (20.4)	0.088
Mean number of formula feeds, mean (SD)	8.9 (5.7)	11 (5)	6 (5)	<0.001
Mean number of breast milk feeds, mean (SD)	7.8 (9.6)	3 (5)	15 (10)	<0.001

[vii] Length of hospital stay used as a proxy for in-hospital breastfeeding duration. Analysis based upon mothers who continued breastfeeding at hospital discharge. Exclusions include mothers who ceased breastfeeding in the hospital (n =8) and (n=1) missing case.

Predictors of maternal adoption of Baby-Friendly practices

In bivariate analysis age, marital status, insurance type, maternal employment, education level, and planned feeding method were statistically significantly associated with adoption of Baby-Friendly steps: mothers in the >5 steps group were older (28.5 vs. 26.2, p=0.001), married (61.1% vs. 31.1%, p<0.001], had private insurance (59.8% vs. 29%, p<0.001), were employed (47.2% vs. 21.5%, p<0.001), had greater than high school education (55.9% vs. 29%, p<0.001) and planned to breastfeed (88.2% vs. 37.4%, p<0.001). However, these relationships did not hold in the multivariate analysis. Variables retaining significance from the maternal demographics logistic regression analysis included: race, rurality, and education level (Table 6 in the on-line supplemental material). Variables retaining significance in the clinical characteristic logistic model included: prior breastfeeding experience, lactation consult, and type of skin-to-skin contact (Table 7 in on-line supplemental material).

The final regression analysis included 233 cases. The overall model fit of the combined maternal demographic and clinical characteristic predictors indicated a well-fitting model (-2 Log Likelihood = 95.84), and the model was statistically reliable in distinguishing maternal adoption of Baby-Friendly practices ($\chi 2$ (13) = 225.27, $p < 0.001$). The model correctly classified 91.8 % of the cases. Regression coefficients are presented in **Table 8**. *Wald* statistics indicated that the variables of race, rurality, type of skin-to-skin contact and lactation consult significantly predicted maternal adoption of Baby-Friendly practices. For ease of interpretation, odds ratios of less than 1 were inverted by dividing by 1 to reflect the odds for non-adoption of Baby-Friendly practices. In the final multivariate model, Black or African American mothers had 5 times greater odds for non-adoption of Baby-Friendly practices (OR = 5 determined as [1/0.2]; p = 0.004, 95% CI [1.7, 10]) compared to White mothers. Though not statistically significant, mothers with prior breastfeeding experience had 6.5 times greater odds for adoption of Baby-Friendly practices (OR= 6.5; p=0.06, 95% CI [0.7, 56.6]) relative to mothers with no prior breastfeeding experience. Mothers of rural residence had 10 times greater odds for non-adoption of Baby-Friendly practices (OR=10 [1/0.10]; p=0.001, 95% CI [2.0, 10.0]) relative to urban residing mothers. Mothers who received a lactation consult had 68.5 times greater odds for adoption of Baby-Friendly practices (OR=68.5; p<0.001, 95% CI [16.4, 284.9]) relative to those who did not receive a consult. Mothers who had moderate skin-to-skin contact had 17.5 times greater odds (OR=17.5; p=<0.001, 95% CI [4.0, 76.5]) and mothers who completed skin-to-skin contact had 66.5 times greater odds (OR=66.5; p=<0.001, 95% CI [10.4, 425.6]) of participation in Baby-Friendly practices relative to mothers who had no skin-to-skin contact.

Table 8 Associations between Maternal Demographic/Clinical Characteristics and Adoption of Baby-Friendly Practices (modeling odds for adoption of Baby-Friendly Practices)						
	n(%)	**OR**	**95% CI**	***Wald* Statistic**	**df**	**p-value**
Race				8.9	2	0.01
White *(Reference Category)*	127 (54.5)					
Black or African American	91 (39.1)	0.2	0.1 – 0.6	8.2	1	0.004
Other	15 (6.4)	0.9	0.1 – 5.4	0.1	1	0.89
Education				2.2	2	0.3
High School or Less *(Reference Category)*	109 (46.7)					
More than High School	101 (43.3)	0.4	0.1 – 1.5	1.9	1	0.2
Unknown	23 (9.9)	1.5	0.2 – 12.6	0.1	1	0.74
Rurality						
Rural	130 (55.8)	0.1	0.1 - 0.5	10.1	1	0.001
Urban *(Reference Category)*	103 (44.2)					
Lactation Consult						
Yes	143 (61.3)					
No *(Reference Category)*	90 (38.6)	66.5	16.4 – 284.9	33.7	1	<0.001
Prior Breastfeeding Experience				5.7	2	0.06
Yes	42 (18.2)	6.5	0.7 – 56.6	2.9	1	0.09
No *(Reference Category)*	86 (37.2)					
Unknown	103 (44.6)	0.5	0.1 – 1.5	1.7	1	0.37
Type of Skin-to-Skin Contact				29.7	4	<0.001
No Initiation *(Reference Category)*	80 (34.3)					
Minimal (< 15 minutes)	32 (13.7)	0.19	0.1 - 1.0	3.9	1	0.05
Moderate (15-44 min.)	43 (18.5)	17.5	4.0 – 76.5	14.5	1	<0.001
Completed (=> 45 min.)	72 (30.9)	66.5	10.4 – 425.6	19.7	1	<0.001
Unable to determine	6 (2.6)	2.9	0.2 – 42.0	0.6	1	0.44

Qualitative maternal descriptions of Baby-Friendly practices

After initial and focused coding from the qualitative interviews, six main themes related to maternal adoption of Baby-Friendly practices emerged: maternal desire to breastfeed, infant state, maternal state, milk supply concerns, provider support, and access to breastfeeding equipment and services. All themes correlated to levels within the conceptual model of the BFHI (Appendix D), and added strength to the validity of model structure, with themes providing relevance at the mother/infant dyad intrapersonal, interpersonal provider, organizational/hospital, and policy/systems factor levels. Study findings provided explanation of existing model elements; thus, qualitative themes (in bold and italics) were added to clarify the relationship between model factors.

Mother/infant dyad intrapersonal level themes

Maternal desire to breastfeed

Maternal desire to breastfeed emerged as a theme that was comprised of several components. Mothers spoke of the importance of infant health, feelings of maternal/infant bonding associated with the Baby-Friendly practices of early skin-to-skin contact, rooming in, and early breastfeeding, and family support as being key aspects driving their motivations to breastfeed.

Health benefits of breast milk

All mothers reported wanting their infants to be healthy, and they reported belief that providing breast milk would help to ensure their infant's health.

"I think it's the best thing I can give my baby. It's coming from me...That's kind of my turn-off for formula, because now it's like, you don't know what they're putting in that stuff."

Bonding from rooming in, early breastfeeding, and skin-to-skin contact

Mothers who participated in rooming in, early breastfeeding, and skin-to-skin contact reported feeling deep attachment to their infants and attributed their desire and motivation to breastfeed with those feelings of attachment.

> *I did not want her and when the first moment I laid eyes on her you get that feeling of like, "Oh my gosh I'm a mother again." I fell for her. When I got that skin to skin contact with her it made me feel more like, "Okay I'm ready for this and… it's a new beginning." I feel like it might help some women out because it's not uncommon… for women to feel the way I felt during my pregnancy. I feel that if they did* (have skin-to-skin contact) *that maybe it might change their perspective like it changed mine about having another child.*

Family support

Mothers felt that family support was essential to their breastfeeding success. They reported that breastfeeding was difficult to manage alone, and that they would have ceased breastfeeding without the support of family to help care for their infant, care for themselves, and manage household duties and responsibilities.

"I can't imagine if it was just me and I was trying to do everything... I would have given up."

One mother had no skin-to-skin contact, no lactation consult, and went home with no paternal or family involvement. Lack of family support was a contributing factor to her ceasing breastfeeding while in the hospital.

> *I think that just with it not working at the hospital, where I had access to people to really teach me, just made me just not want to keep trying, because I knew when I was coming home and I was on my own….so I just decided just to let my dream go pretty much and just deal with what it is. I have to bottle feed. He has to eat.*

Infant state

Mothers who participated in skin-to-skin contact often described feelings of infant bonding, of infants having a calm state or disposition, and of their infants crying very little during and after participation in Baby-Friendly practices.

> *I guess it felt kind of natural, because like I said they're just born and you want to…get that bond. I think we really have a strong bond, even with him, because as you can see now, he's just kind of calm there, laying around, looking around, and I think that might have helped, just that first instant contact.*

Maternal state

While mode of delivery was not a significant predictor of maternal adoption of Baby-Friendly practices in the binary logistic regression model, mothers who had a Cesarean delivery voiced concerns over pain and being sleepy or "fuzzy" after delivery. Additionally, three mothers could not remember their first breastfeeding attempt and reported information that was inconsistent with the medical record.

> *I felt like it really wasn't what I was expecting just because I was in so much pain I couldn't really, I don't know. I couldn't really learn like I wanted to because I was in pain, and I was just ... Yeah. I was on pain medicine, I really was kind of out of it.*

Milk supply concerns

Concern over milk supply was the most common barrier to breastfeeding discussed by the mothers. Mothers described frustration with milk supply taking several days to establish after infant delivery, and they reported feeling worry over infant hunger during that time-period. Mothers also described feeling excited and validated in their breastfeeding efforts once they reached lactogenesis stage II and their breast milk "came in" [55].

> *The supply. That's the only thing. Once my chest did get hard, I'm like, "Okay."... Then I got the pump and I was like, "Yay! I've got breast milk. Oh my gosh. I'm like a cow. Look at me. …The fact that I can actually feed my child.*

Of the interviewed breastfeeding mothers, 62.5% (10/16) chose to supplement with formula in the hospital due to milk supply concerns. At 1-2 weeks post discharge, seven of these mothers were still successfully breastfeeding, with one mother exclusively breastfeeding at home.

Interpersonal provider level themes

Provider support

Provider support was either a barrier or facilitator to maternal breastfeeding success. Provider support was divided into two categories: 1) prenatal education and 2) in-hospital lactation consult/support. Very few mothers reported exposure to breastfeeding or Baby-Friendly practice education prior to infant delivery, and only two mothers reported receiving information from a physician. Mothers often reported that their physician asked about an infant feeding preference but did not provide any breastfeeding information.

> *"He asked me if wanted to breastfeed or bottle feed, and I said I'm going to try to breast, but that's it."*

Mothers who had prior knowledge of breastfeeding either performed their own research, went to prenatal or breastfeeding classes, or found out information from family or friends who had breastfed. This was true of all mothers with no discrimination between education level or socioeconomic status.

Lactation consultation was a significant predictor of adoption of Baby-Friendly practices in the logistic regression model, and many of the interviewed mothers attributed their breastfeeding success to the education, physical assistance, and emotional support provided by lactation consultants.

> *I told her the issues that I was having, that after that first time that he wasn't really latching, or he wasn't latching correctly, and… I actually went through and tried to get him to latch, and she talked to me about how to hold him and how to tell if he was latching properly or not.*

In contrast, mothers who did not receive a lactation consult in the hospital struggled to breastfeed successfully. Veritably, two of the interviewed mothers who did not receive a visit from lactation ceased breastfeeding prior to hospital discharge.

> *"I would have liked to get some help. It was something I needed at that point because that whole afternoon and the whole day that he wasn't eating anything and I was worried."*

Organizational/hospital and Policy/systems level themes

Access to breastfeeding equipment and support services

Mothers with access to a breast pump or to post-discharge lactation services were able to breastfeed with more success than those who had limited access to breastfeeding equipment or services. Mothers with access to services upon discharge were successfully breastfeeding at home, including five mothers who were exclusively breastfeeding at 1-2 weeks post-discharge.

> *I had lactation coming the next day…She showed me what to do and that was it. I knew what I was doing from then on...(*at the WIC office)*…They were ecstatic…They were*

happy passing that pump over. They do rental pumps. They give you supplies. I said, "I'm going to try to breastfeed. I'll be back tomorrow."...They mentor, try to get you at least breastfeed for two weeks before you decide to get a pump.

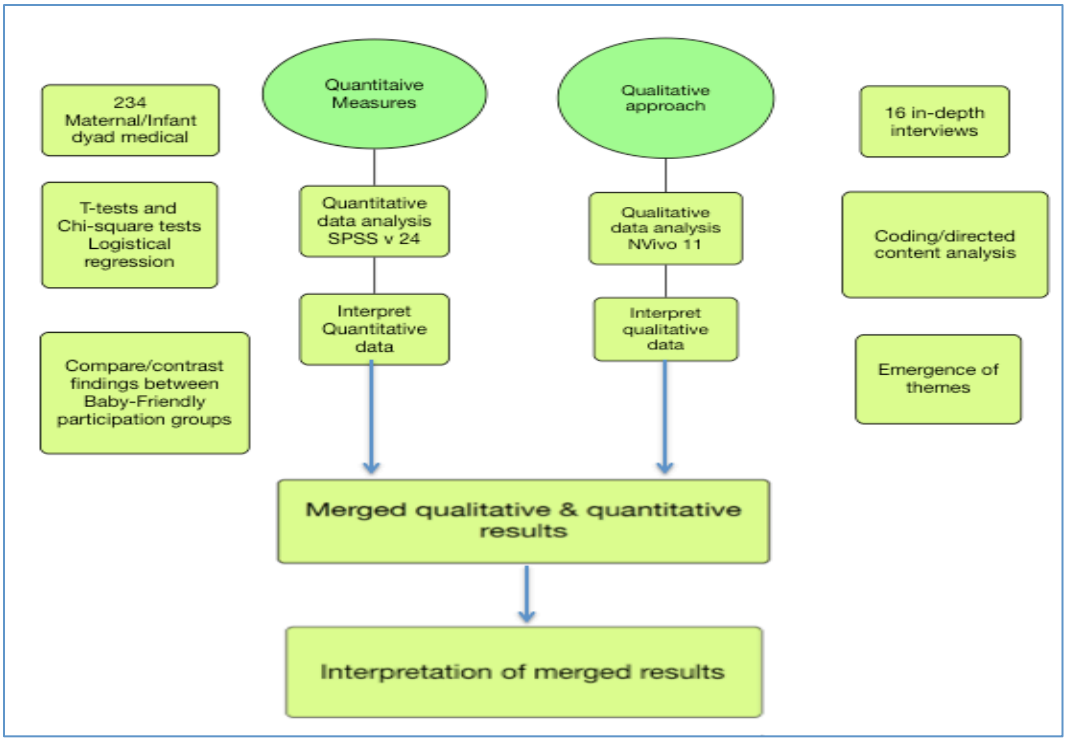
In contrast, mothers without access to an electric pump struggled to breastfeed successfully. Some mothers reported confusion with how to obtain a breast pump from local resource centers.

I actually want to still try the pump, I just didn't know how to get the pump, because the hospital said I would have to bring it back…actually the breastfeeding lady from WIC. She's the one that actually told me that I would have to give it to a parent that's in need ... If a child is in NICU or something like that.

Converging the Data

This mixed-methods study was designed to contribute understanding of the associations of maternal Baby-Friendly experiences and perceptions and maternal breastfeeding decisions. To reach this understanding, we converged the data by merging and synthesizing qualitative and quantitative results [35, 36]. The process by which the two data streams were collected, analyzed, and merged is presented in (Figure 1).

Figure 1. Model of study flow components



The data were merged using a comparison matrix that contained quantitative predictors of maternal adoption of Baby-Friendly practices, along with qualitative narratives that helped provide explanation for the quantitative findings **(Table 9).** Some narratives offered more direct explanation of quantitative predictors than others; however, examination of the narratives aided in the analysis and formulation of an overall interpretation to address factors affecting African American mothers' adoption Baby-Friendly practices [35, 36].

Race

Race was a significant predictor of maternal adoption of Baby-Friendly practices. All qualitative participants were African American mothers who had 5 times greater odds for non-adoption of Baby-Friendly practices relative to White mothers (p=0.004). While maternal narratives did not indicate how race personally affected their Baby-Friendly participation or breastfeeding decisions, 56.3% (9/16) mothers offered potential reasons African American mothers may decide not to breastfeed. Reasons included a lack of breastfeeding information and support, frustration with breastfeeding coupled with a lack of information on the health benefits, mothers viewing formula as an "easy fix", and young mothers unwilling to give up their current lifestyle.

Rurality

Over half of the interviewed mothers 56.3% (9/16) were rural-dwelling versus 43.8% (7/16) urban-dwelling. Narratives from the mothers were not definitive in explaining why the model predicted 10 times greater odds for non-adoption of Baby-Friendly practices for rural dwelling mothers (p= 0.001). 81.8% (9/11) of rural dwelling mothers felt their residential location and distance from the lactation resource center did not hinder their breastfeeding efforts. However, one of the mothers who denied distance being a factor for her breastfeeding decisions

stated that a lack of breastfeeding classes at the local rural hospital may preclude other mothers from gaining pertinent prenatal breastfeeding information.

Education Level

Education level was not found to be a predictor of maternal adoption of Baby-Friendly practices. In contrast to current evidence linking higher levels of maternal education to increased rates of breastfeeding, our model predicted that mothers with greater than high school levels of education had 2.5 times greater odds for non-adoption of Baby-Friendly practices relative to mothers with a high school education or less, though results were not statistically significant ($p=0.34$) [5, 32]. These paradoxical results are potentially due to maternal self-report of education level to Labor and Delivery staff upon admission to the facility. Additionally, maternal education level was difficult to discern or was missing in some records; thus, the records were coded as "unknown". Maternal narratives contrasted with quantitative results and supported evidence that mothers with greater education levels have additional sources of breastfeeding support. One mother with postgraduate education (some Master's level classes) had a former college roommate who is now an obstetrician to turn to for breastfeeding advice. Other mothers with postgraduate education had workplace environments supportive of pumping, and thus, had no concerns with continued breastfeeding upon return to work.

Prior Breastfeeding Experience

Mothers with prior breastfeeding experience reported their first breastfeeding efforts as "learning experiences" and as more difficult than their current breastfeeding efforts. Mothers also reported that their breastfeeding confidence increased as they gained more breastfeeding experience, either over time or by breastfeeding multiple children. This supports the model prediction that mothers with prior breastfeeding experience had 6.5 times greater odds for

adoption of Baby-Friendly practices relative to mothers who had no prior breastfeeding experience (p=0.06).

Type of skin-to-skin contact

Mothers who did not participate in skin-to-skin contact reported disappointment in not having the skin-to-skin experience, while mothers who participated in skin-to-skin contact reported the practice as a bonding experience that enhanced their desire to breastfeed. One mother reported that participating in skin-to-skin to contact facilitated her desire to become "a mother again". She reported that she did not want her baby until she saw the baby for the first time and had skin-to-skin contact. This mother felt the skin-to-skin experience changed her "perspective" on "having another child". These powerful narratives support the model prediction that mothers who had moderate skin-to-skin contact had 17.5 times greater odds and mothers who had completed skin-to-skin contact had 66.5 times greater odds of participation in Baby-Friendly practices compared to mothers who had no skin-to-skin contact ($p<0.001$).

Lactation consult

Maternal reports of breastfeeding support and education explain the model prediction that mothers who received a lactation consult had 68.5 times greater odds relative to those who did not receive a consult for adoption of Baby-Friendly practices ($p<0.001$). Mothers reported that all or most of their breastfeeding information and support was provided during a lactation consultation in the hospital. Mothers reported making decisions to both initiate and continue breastfeeding based upon lactation support.

Discussion

This mixed-methods study provided a unique and comprehensive assessment of barriers and facilitators to African American mothers' adoption of Baby-Friendly practices. The merged

data analysis provided a robust depiction of maternal Baby-Friendly perspectives and indicators of breastfeeding decisions. These indicators and predictors were demonstrated through quantitative model predictors, qualitative themes, and converged qualitative/quantitative data analysis.

Quantitative demographic predictors of race and rurality align with prior evidence that breastfeeding rates are lower in disadvantaged groups [11, 27, 28]. Likewise, mothers who adopted Baby-Friendly practices were more likely to have increased breastfeeding initiation and exclusivity. Rural-dwelling and African American mothers were less likely to participate in Baby-Friendly practices and less likely to have resultant breastfeeding success. Clinical indicators of prior breastfeeding experience, skin-to-skin contact, and lactation consultation proved most impactful in influencing maternal adoption of Baby-Friendly practices and breastfeeding success. Maternal in-depth interviews provided powerful narratives demonstrating rich depictions of how these clinical experiences affected maternal adoption of Baby-Friendly practices and breastfeeding decisions.

Our qualitative data added to the breadth of understanding of maternal Baby-Friendly experiences and breastfeeding decisions of mothers in our study. Interviewed mothers reported that bonding practices of skin-to-skin contact, rooming in, and early breastfeeding enhanced their desire to breastfeed. This evidence aligns with DeChateau's and Phillips' observations of early skin-to-skin contact and breastfeeding, wherein sessions with as little as 15 minutes of skin-to-skin contact positively affected maternal infant bonding through increased maternal confidence in caring for the infant [40, 41]. Our quantitative and qualitative results supported these findings and demonstrated the importance of maternal adoption of Baby-Friendly maternal/infant bonding practices for breastfeeding success.

A theme of calm infant state emerged through maternal reports of Baby-Friendly experiences. Moore et al. and Bystrova et al. reported associations of early skin-to-skin contact with calm infant state as manifested through improved neonatal physiological responses, decreased infant crying immediately after birth, and improved infant self-regulation of behavior at one year of age [39, 56]. Likewise, in our study, mothers who participated in early skin-to-skin contact and breastfeeding reported that their infants were very calm and cried very little. Mothers attributed the infants' calm state to early skin-to-skin contact and early bonding.

Impaired maternal state was an important barrier to early skin-to-skin contact, bonding, and breastfeeding for mothers. Mothers who were recovering from Cesarean sections reported difficulties with learning how to breastfeed and with bonding during early skin-to-skin contact due to post-operative pain and feeling drowsy or "fuzzy" from the effects of medications. Additionally, some mothers could not remember their first breastfeeding attempt and reported information that was inconsistent with the medical record, suggesting that their memory of the events was altered or unclear due the medication effects. Findings suggest an increased need for maternal/infant hospital provider training to enhance maternal adoption of Baby-Friendly practices for mothers delivering by Cesarean section.

Interviews revealed maternal concern over a lack of milk supply and infant hunger, leading to maternal choice to provide infants with formula supplementation while in the hospital. However, many of these mothers were successfully breastfeeding at home once their milk "came in" and they reached stage II lactogenesis [55]. These findings suggest that mothers are often able to successfully provide breast milk at home, even after they appear to be making the choice to formula feed in the hospital. However, breastfeeding success at home is highly predicated upon breastfeeding assistance and support received in the hospital through lactation consultation.

Baby-Friendly tenets mandate that all maternal/infant care providers deliver maternal breastfeeding education, assistance, and support; however, routine lactation consult is not a requirement for Baby-Friendly designation [45]. This is a significant finding regarding the implementation of Baby-Friendly practices because of the impact lactation consultation had on mothers in both quantitative and qualitative portions of the study. One interviewed mother who did not have a lactation consult in the hospital attempted to breastfeed at home once her milk "came in", but was unsuccessful. This mother did not receive breastfeeding education, support, and assistance through lactation consultation while in the hospital and attributed a lack of support to her breastfeeding cessation.

Nearly all interviewed mothers reported a lack of prenatal breastfeeding education, with a notable lack of breastfeeding education originating from the mothers' physicians. This was a considerable barrier to maternal knowledge of breastfeeding and Baby-Friendly practices. Consequently, mothers received the majority of their breastfeeding information and support through lactation consultation during hospitalization. Mothers with access to post-discharge breastfeeding resources and equipment were able to sustain breastfeeding with more success than those with a lack of access to resources. Additionally, maternal confusion about access to breast pumps upon discharge suggests that clarification of post-discharge breastfeeding support processes and resources are needed.

Limitations

There were a number of limitations in the study. Medical record documentation of Baby-Friendly practices was sometimes difficult to determine. The medical record often had only approximations of breastfeeding times and skin-to-skin times rather than exact times. For this reason, skin-to-skin contact was delineated into categories when time could be reasonably

approximated. Additionally, pacifier use and rooming in was not documented with enough distinction in the medical record to determine participation. Although all interviewed mothers reported rooming in with their infants, we were conservative in our estimates and coded all mothers as non-participatory in Step 7 (Rooming in) and Step 9 (no use of pacifiers). Prior breastfeeding experience, maternal education level, and maternal employment were also missing from some charts, leading to a large number of mothers in an "unknown" category. The missing data potentially diminished these variables' significance in the regression model's prediction of maternal adoption of Baby-Friendly practices.

Qualitative limitations include potential selection bias, participant loss to follow up, and potential maternal report bias. We recruited and enrolled purposefully after mothers voiced interest in study participation. Two enrolled mothers had infants who were younger than the 38 weeks gestation criteria (37.4 and 37.5 weeks gestation). These mothers expressed interest in participation, and the infants were feeding well with no poor clinical indicators. Thus, the mothers were included in the study with appropriate protocol deviations filed. While 20 mothers were enrolled in the study, only 16 provided an in-depth interview. Potentially useful data were lost to follow up with the four participants who did not have an in-depth interview. Additionally, mothers may have reported socially desirable breastfeeding rates to the PI due to the breastfeeding promotion nature of the investigation.

Conclusion

Study findings indicated that rural-dwelling southeastern U.S. African American mothers had greater odds of non-adoption of Baby-Friendly practices and had less resultant breastfeeding success than White mothers. Quantitative predictors of adoption of Baby-Friendly practices provided associations of clinical indicators that early skin-to-skin contact and lactation

consultation increase maternal odds for adoption of Baby-Friendly practice and resultant successful breastfeeding. Qualitative reports introduced themes that provided insights and enriched the understanding of why particular indicators hindered or facilitated maternal Baby-Friendly practice adoption for the study population. While a lack of breastfeeding information, support, and equipment access hindered breastfeeding success, the presence of breastfeeding information, support, participation in maternal/infant bonding practices, and early breastfeeding increased maternal desire to breastfeed and resulted in greater breastfeeding success. These findings offer information for health care providers to effectively tailor Baby-Friendly practice implementation for rural-dwelling African American mothers and to increase their infant bonding and breastfeeding success.

Funding

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Appendix A

The *Ten Steps to Successful Breastfeeding* are*:*

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.

Appendix B
EMPower Chart Review Form

EMPower Chart Review Form

A	Was the infant ever breastfed or fed breast milk?	☐ Yes ☐ No ☐ Unable to determine from chart
B	Was the infant ever given formula or water?	☐ Yes ☐ No ☐ Unable to determine from chart
C	Was the delivery a vaginal delivery?	☐ Yes ☐ No *(Skip to D)* Was infant placed skin to skin within 5 minutes of birth, uninterrupted and continuous until first breastfeeding or at least 1 hour if formula fed? ☐ Yes *(Proceed to E)* ☐ No *(Proceed to E)* ☐ Unable to determine from chart *(Proceed to E)*
D	If delivery was by Cesarean section:	For this Cesarean section: was infant placed skin to skin as soon as the mother was responsive and alert, uninterrupted and continuous until first breastfeeding or at least 1 hour if formula fed? ☐ Yes ☐ No ☐ Unable to determine from chart
E	*(Answer only if A=YES)* Was the mother was taught hand expression?	☐ Yes ☐ No ☐ Unable to determine from chart
F	*(Answer only if A=YES)* Did the mother receive assistance with breastfeeding?	☐ Yes ☐ No ☐ Unable to determine from chart
G	Was baby out of the mother's room >1 hour/day?	☐ Yes ☐ No ☐ Unable to determine from chart
H	Did mother receive education about feeding infant on demand/cue?	☐ Yes ☐ No ☐ Unable to determine from chart
I	*(Answer only if A=YES)* Did the infant use a pacifier? (Do not include those used only for a surgical procedure)	☐ Yes ☐ No ☐ Unable to determine from chart

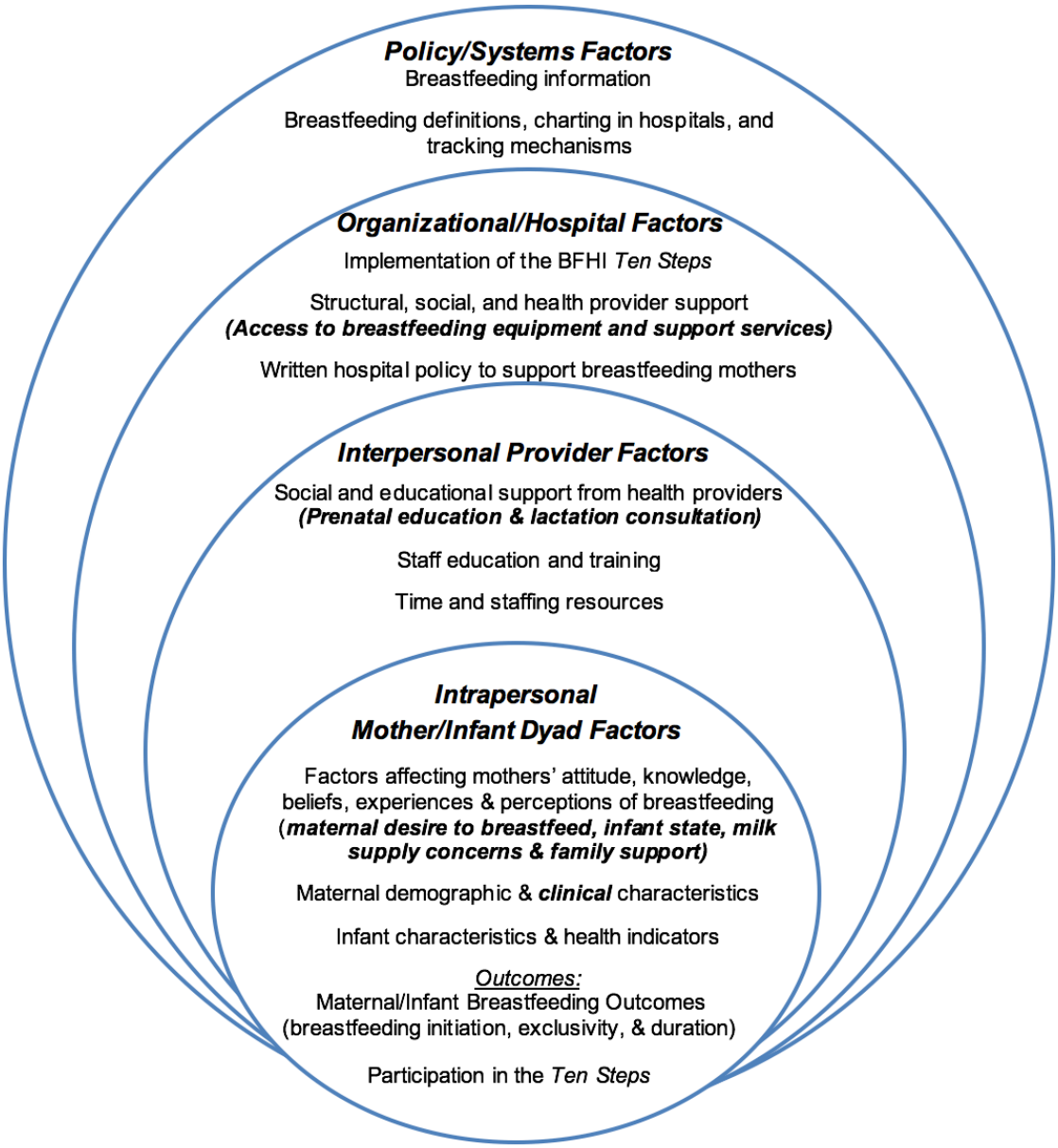
J	*(Answer only if A=YES)* Was the infant ever fed by bottle? (Do not include cup feeding without a nipple/teat.)	☐ Yes ☐ No ☐ Unable to determine from chart
K	Did mother receive education on infant feeding support on discharge?	☐ Yes ☐ No ☐ Unable to determine from chart
L	Please only answer the following if your hospital has affiliated prenatal clinic: Did mother receive prenatal breastfeeding education?	☐ Hospital does not have an affiliated prenatal clinic *(Skip to M)* ☐ Yes ☐ No ☐ Unable to determine from chart
M	Mother's Ethnicity Mother's Race	Hispanic ☐ Yes ☐ No Race *(Check all that apply)* ☐ White ☐ Black ☐ Asian Hawaiian/Pacific Islander ☐ Native American Indian/Alaska Native ☐ Other

Appendix C

Semi-Structured Interview Questions:

1. Tell me about your recent labor and delivery experience.
2. What types of baby-friendly practices did you participate in during your hospital stay?
3. What were your feelings about breastfeeding and baby-friendly practices prior to your hospital stay?
4. What were your experiences with initiating breastfeeding?
5. What were your experiences with breastfeeding after discharge?
6. What factors helped you with breastfeeding?
7. What factors hindered you with breastfeeding?
8. Describe your feelings about breastfeeding or baby-friendly practices after participating in baby-friendly practices.
9. What concerns do you have as you continue to breastfeed at home? Or what feeding concerns do you have now that you have ceased breastfeeding?

Appendix D. Conceptual Model of the BFHI using the SEM



BFHI = Baby Friendly Hospital Initiative,
SEM = Social Ecological Model,
"Ten Steps" = "Ten Steps to Successful Breastfeeding"

Tables for use as online supplementary materials

Table 3. Maternal demographics, maternal clinical characteristics, and infant clinical characteristics overall and by level of participation in the Ten Steps

Variable		Mothers participating in Ten Steps		*p*-value
	Study population n=234	≤5 steps (n=107)	> 5 steps (n=127)	
Maternal Demographics				
Age, mean (SD)	27.4 (5.4)	26.2 (4.9)	28.5 (5.6)	0.001
Race, n (%)				<0.001[viii]
White	128 (54.7)	44 (41.1)	84 (66.1)	
Black or African American	91 (38.9)	59 (55.1)	32 (25.2)	
Hispanic/Latino	1 (0.4)	1 (0.9)	0 (0)	
Asian	2 (0.9)	0	2 (1.6)	
Other	12 (5.1)	3 (2.8)	9 (7.1)	
Marital Status, n (%)				<0.001
Married	110 (47.0)	33 (31.1)	77 (61.1)	
Single	122 (52.1)	73 (68.9)	49 (38.9)	
Paternal Involvement, n (%)				<0.0001
Yes	186 (79.0)	72 (67.3)	114 (89.8)	
No	25 (10.7)	18 (16.8)	7 (5.5)	
Unknown	23 (9.8)	17 (15.9)	6 (4.7)	
Insurance Type, n (%)				<0.001[ix]
Private Insurance	107 (45.7)	31 (29)	76 (59.8)	
Medicaid	116 (49.6)	69 (64.5)	47 (37.0)	
Self Pay	6 (2.6)	2 (1.9)	4 (3.1)	
Multi-Type	5 (2.1)	5 (4.7)	0 (0.0)	
Number of Living Children, n (%)				0.550
1	83 (35.5)	33 (31.1)	50 (39.4)	
2	87 (37.2)	42 (39.6)	45 (35.4)	
3	41 (17.5)	19 (17.9)	22 (17.3)	
>4	22 (9.4)	12 (11.3)	10 (7.9)	
Rurality, n (%)				0.001
Rural	131 (56.0)	72 (67.3)	59 (46.5)	
Urban	103 (44.0)	35 (32.7)	68 (53.5)	
Employment, n (%)				<0.001
Employed	83 (35.5)	23 (21.5)	60 (47.2)	
Unemployed	117 (50.0)	66 (61.7)	51 (40.2)	
Unknown	34 (14.5)	18 (16.8)	16 (12.6)	
Education, n (%)				<0.001[x]
Less than High School	11 (4.7)	8 (7.5)	3 (2.4)	
High School Graduate	98 (41.9)	57 (53.3)	41 (32.3)	
Some college	6 (2.6)	1 (0.9)	5 (3.9)	
College Degree (Associate's or Bachelor's)	77 (32.9)	28 (26.2)	49 (38.6)	
Postgraduate Education	19 (8.1)	2 (1.9)	17 (13.4)	
Unable to Determine	23 (9.8)	11 (10.3)	12 (9.4)	
Maternal Clinical Characteristics				
Mode of Delivery, n (%)				0.197
Vaginal	146 (62.4)	62 (57.9)	84 (66.1)	

Table 3. Maternal demographics, maternal clinical characteristics, and infant clinical characteristics overall and by level of participation in the Ten Steps

Variable		Mothers participating in Ten Steps		*p*-value
	Study population n=234	≤5 steps (n=107)	> 5 steps (n=127)	
Cesarean Section	88 (37.6)	45 (42.1)	43 (33.9)	
Planned Feeding Method, n (%)				<0.001[xi]
Plans to Breastfeed	152 (65)	40 (37.4)	112 (88.2)	
Plans to Bottle Feed	57 (24.4)	53 (49.5)	4 (3.1)	
Undecided Feeding Method	4 (1.7)	3 (2.8)	1 (0.8)	
Unable to Determine	21 (9.0)	11 (10.3)	10 (7.9)	
Prior Breastfeeding Experience, n (%)				<0.001
Yes	42 (17.9)	2 (1.9)	40 (31.5)	
No	88 (37.6)	35 (32.7)	53 (41.7)	
Unable to Determine	104 (44.4)	70 (65.4)	34 (26.8)	
Skin-to-Skin Initiation, n (%)				<0.001
Yes	148 (63.2)	42 (40.8)	106 (84.8)	
No	80 (34.2)	61 (59.2)	19 (15.2)	
Unable to Determine	6 (2.6)	4 (3.7)	2 (1.6)	
Type of Skin-to-Skin Contact, n (%)	***n = 154***[xii]			<0.001[xiii]
Minimal (< 15 minutes)	33 (21.4)	27 (58.7)	6 (5.6)	
Moderate, no breastfeeding (15-44 min.)	4 (2.6)	3 (6.5)	1 (0.9)	
Moderate, breastfeeding (15-44 min.)	39 (25.3)	6 (13.0)	33 (30.6)	
Completed, no breastfeeding (=> 60 min.)	2 (1.3)	1 (2.2)	1 (0.9)	
Completed, breastfeeding (=> 45 min.)	70 (45.5)	5 (10.9)	65 (60.2)	
Unable to determine from chart	6 (3.9)	4 (8.7)	2 (1.9)	
Skin-to-skin Interrupted, n (%)	***n = 154***			0.032
Yes	97 (63.0)	32 (69.6)	65 (60.2)	
No	51 (33.1)	10 (21.7)	41 (38.0)	
Unable to Determine	6 (3.9)	4 (8.7)	2 (1.9)	
Delayed skin to skin, n (%)	***n = 154***			0.029
No (Immediate)	112 (72.7)	34 (73.9)	78 (72.2)	
Yes (Delayed < 1 hour)	17 (11.0)	1 (2.2)	16 (14.8)	
Yes (Delayed > 1 hour)	19 (12.3)	7 (15.2)	12 (11.1)	
Unable to Determine	6 (3.9)	4 (8.7)	2 (1.9)	
Lactation Consult, n (%)				<0.001
Yes	143 (61.1)	23 (21.5)	120 (94.5)	
No	91 (38.9)	84 (78.5)	7 (5.5)	
Day of the week of Delivery, n (%)				0.218
Sunday	10 (4.3)	3 (2.8)	7 (5.5)	
Monday	39 (16.7)	15 (14.0)	24 (18.9)	
Tuesday	47 (20.1)	26 (24.3)	21 (16.5)	
Wednesday	53 (22.6)	21 (19.6)	32 (25.2)	
Thursday	34 (14.5)	13 (12.1)	21(16.5)	
Friday	39 (16.7)	21 (19.6)	18 (14.2)	
Saturday	12 (5.1)	8 (7.5)	4 (3.1)	
Unit Census Labor and Delivery, n (%)				0.391
1-5	84 (35.9)	37 (34.6)	47 (37.0)	
6-10	108 (46.2)	54 (50.5)	54 (42.5)	

Table 3. Maternal demographics, maternal clinical characteristics, and infant clinical characteristics overall and by level of participation in the Ten Steps

Variable		Mothers participating in Ten Steps		*p*-value
	Study population n=234	≤5 steps (n=107)	> 5 steps (n=127)	
11-15	42 (17.9)	16 (15.0)	26 (20.5)	
Unit Census Post Partum, n (%)				0.726
1-5	12 (5.1)	6 (5.6)	6 (4.7)	
6-10	124 (53.0)	56 (52.3)	68 (53.5)	
11-15	78 (33.3)	38 (35.5)	40 (31.5)	
16-20	20 (8.5)	7 (6.5)	13 (10.2)	
Shift of Delivery, n (%)				0.088
First Shift (07:00-14:59)	127 (54.3)	60 (56.1)	67 (52.8)	
Second Shift (15:00-22:59)	70 (29.9)	36 (33.6)	34 (26.8)	
Third Shift (23:00-06:59)	37 (15.8)	11 (10.3)	26 (20.5)	
Length of Hospital Stay, mean (SD)	47.8 (14.9)	46.8 (14.0)	48.7 (15.6)	0.326
Infant Clinical Characteristics				
Birth Weight, mean (SD)	3344 (470)	3307 (447)	3374 (488)	0.276
Gestational Age, mean (min - max)	39 (37-42)	39 (37-42)	39 (37-41)	0.884
Initial Temperature, mean (SD)	97.9 (0.9)	98.0 (0.9)	98.0 (0.9)	0.942
Initial Blood Glucose, mean (min - max)	56 (17-98)	59 (17-95)	54 (17-98)	0.206
Initial Bilirubin, mean (min - max)	5.9 (0.5-11.5)	5.6 (0.5-11.5)	6.1 (0.9-10.9)	0.069
1 Minute APGAR Score, n (%)				0.335
Below 9	27 (11.5)	10 (9.3)	17 (13.4)	
9 or Above	207 (88.4)	97 (90.7)	110 (86.6)	

[i] P-value obtained for 3 categories: White, Black or African American, & Other (Hispanic/Latino, Asian)

[ii] P-value obtained for 3 categories: Private Insurance, Medicaid, & Other (Multi-Type, Self-Pay)

[iii] P-value obtained for 4 categories: High School or Less, Some College, College Degree or Postgraduate Education, & Unknown

[iv] P-value obtained for 3 categories: Plans to Breastfeed, Plans to Bottle Feed, & Unknown (Undecided feeding method, Unknown)

[v] Analysis based upon mothers who initiated skin to skin contact (n = 148) and those where skin to skin contact could not be determined (n = 6) = Total (n = 154).

[vi] P-value obtained for 4 categories: Minimal (<15 Minutes), Moderate (15-44 min.) [Moderate, Breastfeeding (15-44 min., Moderate, no Breastfeeding (15-44 min.)], Completed (=>45 min.) [Completed, Breastfeeding (=> 45 min.), Completed, no Breastfeeding(>60 min.)] & Unable to Determine

Table 4. Participation in the Ten Steps

Step	Variable		Mothers participating in Ten Steps		*p*-value
		Study population n=234	≤5 steps (n=107)	> 5 steps (n=127)	
Step 1: Have a written breastfeeding policy that is routinely communicated to all health care staff.	Institution has an established breastfeeding policy. 100% of moms participated in this step.	234 (100)	107 (100)	127 (100)	N/A
Step 2: Train all health care staff in the skills necessary to implement this policy.	All institutional staff have participated in Baby-Friendly training. 100% of moms participated in this step.	234 (100)	107 (100)	127 (100)	N/A
Step 3: Inform all pregnant women about the benefits and management of breastfeeding.	Prenatal Breastfeeding Education, n (%)				<0.001
	Yes	51 (21.8)	7 (6.5)	44 (34.6)	
	No	182 (77.8)	100 (93.5)	82 (65.1)	
Step 4: Help mothers initiate breastfeeding within one hour of birth.	Completed skin-to-skin contact with breastfeeding initiation, n (%)				<0.001
	Yes	96 (41.0)	8 (7.5)	88 (69.3)	
	No	138 (59.0)	99 (92.5)	39 (30.7)	
Step 5: Show mothers how to breastfeed and how to maintain lactation, even if they are separated from their infants.	Maternal Breastfeeding Assistance, n (%)				<0.001
	Yes	143 (61.1)	21 (19.6)	122 (96.8)	
	No	90 (38.5)	86 (80.4)	4 (3.2)	
Step 6: Give infants no food or drink other than breast-milk, unless medically indicated	Exclusive Breastfeeding (includes infants given medically indicated supplements), n (%)				<0.001
	Yes	105 (44.9)	10 (9.3)	95 (74.8)	
	No	129 (55.1)	97 (90.7)	32 (25.2)	
Step 7: Practice rooming in – allow mothers and infants to remain together 24 hours a day.	Mothers from the qualitative portion of the study reported rooming in with their infants, but the medical records lacked documentation of rooming in. Thus, all moms were coded as non-participating in rooming in.	0 (0)	0 (0)	0 (0)	N/A
Step 8: Encourage breastfeeding on demand.	Encourage Breastfeeding on Demand, n (%)				<0.001
	Yes	173 (73.9)	46 (43.0)	127 (100.0)	
	No	61 (26.1)	61 (57.0)	0 (0)	
Step 9: Give no pacifiers or artificial nipples to breastfeeding infants.	There was inadequate documentation of pacifier use in the medical record; thus, all infants were	0 (0)	0 (0)	0 (0)	N/A

Table 4. Participation in the Ten Steps					
Step	Variable		Mothers participating in Ten Steps		*p*-value
		Study population n=234	≤5 steps (n=107)	> 5 steps (n=127)	
	coded as non-participating in this step.				
Step 10: Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or birth center.	Feeding Support Upon Discharge, n (%)				<0.001
	Yes	170 (72.6)	45 (42.1)	125 (98.4)	
	No	64 (27.4)	62 (57.9)	2 (1.6)	

Table 6 Associations between Demographic Characteristics and Adoption of Baby-Friendly Practices [i]						
	n(%)	OR	95% CI	*Wald* Statistic	df	p-value
Age		1.03	0.96 - 1.10	0.61	1	0.44
Race				9.19	2	0.01
White	127 (54.7)	0.54	0.12 - 2.50	0.63	1	0.43
Black or African American	91 (39.2)	0.21	0.05- 0.94	4.14	1	0.04
Other *(Reference Category)*	14 (6.0)					
Marital Status						
Married	110 (47.4)	1.16	0.49 - 2.72	0.11	1	0.74
Not Married *(Reference Category)*	122 (52.6)					
Paternal Involvement				5.75	2	0.06
Yes	184 (79.3)	3.51	1.05 - 11.71	4.19	1	0.04
No	25 (10.8)	1.24	0.28 -5.54	0.78	1	0.78
Unknown *(Reference Category)*	23 (9.9)					
				1.77	2	0.41
Private Insurance	106 (45.7)	3.02	0.51 - 17.95	1.48	1	0.22
Medicaid	115 (49.6)	1.95	0.36 - 10.68	0.60	1	0.44
Other *(Reference Category)*	11 (4.7)					
Rurality						
Rural	130 (56.0)	0.34	0.18 - 0.64	11.17	1	0.001
Urban *(Reference Category)*	102 (44.0)					
Employment				1.77	2	0.41
Employed	83 (35.8)	1.91	0.72 - 5.02	1.70	1	0.19
Unemployed	115 (49.6)	1.32	0.52 - 3.33	0.35	1	0.55
Unable to Determine *(Reference Category)*	34 (14.7)					
Education				5.7	3	0.05
High School or Less *(Reference Category)*	108 (46.6)					
Greater than High School	102 (43.9)	2.2	1.1 – 4.4	5.1	1	0.02
Unknown	22 (9.5)	2.2	0.7 – 6.8	1.8	1	0.18

i = Model fit of -2 Log Likelihood = 254.52, $\chi 2$ (14) = 65.37, $p < 0.001$; correctly classifying 74.6 % of the cases.

Table 7 Associations between Maternal/Infant Clinical Characteristics and Adoption of Baby-Friendly Practices [i]						
	n(%)	**OR**	**95% CI**	***Wald* Statistic**	**df**	**p-value**
Mode of Delivery						
Vaginal *(Reference Category)*	144 (62.3)					
Cesarean Section	87 (37.7)	1.36	0.38 - 4.80	0.23	1	0.64
Planned Feeding Method				3.66	2	0.21
Plans to Breastfeed	150 (64.9)	3.75	0.76 - 18.60	2.62	1	0.11
Plans to Bottle Feed	56 (24.2)	1.79	0.21 - 15.16	0.28	1	0.59
Undecided Feeding Method *(Reference Category)*	25 (10.8)					
Prior Breastfeeding Experience				5.75	2	0.06
Yes	42 (18.2)	4.25	1.11 - 61.15	4.25	1	0.04
No	86 (37.2)	0.02	0.35 - 3.31	0.02	1	0.90
Unknown *(Reference Category)*	103 (44.6)					
Type of Skin-to-Skin Contact				26.11	4	<0.001
No Initiation	79 (34.2)	0.35	0.02 - 8.31	0.42	1	0.52
Minimal (< 15 minutes)	31 (13.4)	0.19	0.01 - 4.97	0.98	1	0.32
Moderate (15-44 min.)	43 (18.6)	3.80	0.17 - 86.78	0.70	1	0.40
Completed (=> 45 min.)	72 (31.2)	10.39	0.41 - 262.59	2.02	1	0.16
Unable to determine *(Reference Category)*	34 (14.7)					
Lactation Consult						
Yes *(Reference Category)*	142 (61.5)					
No	89 (38.5)	0.02	0.01 - 0.09	30.96	1	<0.001
Shift of Delivery				3.39	2	0.18
First Shift (07:00-14:59)	126 (54.5)	0.23	0.04 - 1.20	3.05	1	0.08
Second Shift (15:00-22:59)	68 (29.4)	0.47	0.09 - 2.42	0.83	1	0.36
Third Shift (23:00-06:59) *(Reference Category)*	37 (16.0)					
Initial Bilirubin		1.25	0.94 - 1.66	2.34	1	0.13

i = Model fit of -2 Log Likelihood = 107.72, $\chi 2$ (13) = 210.23, $p < 0.001$; correctly classified 88.7 % of the cases.

Table 9. Converged quantitative and qualitative findings.

Significant Variables from Regression Modeling	Quantitative Measures					Breastfeeding Outcomes			Qualitative Narratives
Race	Descriptives					Quantitative (n=234)			• Some that have the babies, want the babies but have their family members, grandmother and mother watching the kid because they want to run the streets. • It could be…the frustration of it. I think a lot of women think that right after I have the baby my milk is going to be there. It's not. It actually takes a few days for the actual milk supply to come in. If you don't have that support when you're frustrated and trying to figure out what to do, then you're going to give up…. I think for some people the formula is the easy way out. • I really think that it's lack of information and lack of support. The lack of support being huge… and formula is easier. It's so much easier than breastfeeding. Especially if you attempt and it doesn't go well. Then you think, "Okay, well, I tried it, done."
		Total n (%)	≤ 5 Steps n (%)	>5 Steps n (%)	P-Value		Bf Initiation n (%)	Exclusive BM n (%)	
	AA	91 (38.9)	59 (55.1)	32 (25.2)	<0.001	AA	55 (23.5)	20 (8.5)	
	White	128 (54.7)	44 (41.1)	84 (66.1)		White	102 (43.6)	76 (32.5)	
	Other	14 (6)	4 (3.7)	11 (8.7)		Other	14 (6.0)	9 (3.8)	
	Regression Results					Qualitative (n= 16)			
	• AA mothers = 5 times greater odds for non-adoption of BF practices (OR=5 [1/0.2]; p=0.0004, 95% CI [1.7, 10.0]) relative to mothers in the "other" race group						Bf Initiation n (%)	Exclusive BM n (%)	
						AA	16 (100)	6 (37.5)	

Table 9. Converged quantitative and qualitative findings.

Significant Variables from Regression Modeling	Quantitative Measures					Breastfeeding Outcomes			Qualitative Narratives
Rurality	Descriptives					Quantitative (n=234)			**Rural Mothers** • I mean, it's not that far me to drive, if I had a question or anything. • I don't think the hospital here offers any classes, and so you don't know, maybe, the benefits (of breastfeeding). **Urban Mothers** • It does. It makes me more confident that I have that support available if I need it. • Lactation came and I went to the resource center. Everybody helped me very well. They taught me some new things.
		Total n (%)	≤ 5 Steps n (%)	>5 Steps n (%)	P-Value		Bf Initiation n (%)	Exclusive BM n (%)	
	Rural	131 (56)	72 (67.3)	59 (46.5)	0.001	Rural	89 (38.0)	56 (23.9)	
	Urban	103 (44)	35 (32.7)	68 (53.5)		Urban	82 (35.0)	49 (19.7)	
	Regression Results					Qualitative (n=16)			
	• Rural mothers = 10 times greater odds for non-adoption of BF practices (OR=10 [1/0.10]; p=0.001, 95% CI [2.0 10.0]), relative to urban mothers.					Rural	9 (56.3)	3 (50.0)	
						Urban	7 (43.8)	3 (50.0)	
Education Level	Descriptives					Quantitative (n=234)			**High School or Less** • It made me get back in school and even got an education. Now I'm working, I got my own place. I have two kids now. Looking back I'm glad I made that change. Like I said you just need that positive or something like a child to bring you out and make you change your whole life. **Postgraduate Education** • I have my roommate from
		Total n (%)	≤ 5 Steps n (%)	>5 Steps n (%)	P-Value		Bf Initiation n (%)	Exclusive BM n (%)	
	High School or Less	109 (46.6)	65 (27.8)	44 (18.8)	<0.001	High School or Less	67 (28.6)	33 (14.1)	
	College Degree or Postgraduate	96 (41.0)	30 (12.8)	66 (28.2)		College Degree or Postgraduate	82 (35.0)	61 (26.1)	
	Some College	6 (2.6)	1 (0.9)	5 (3.9)		Some College	6 (2.6)	3 (1.3)	
	Unknown	23 (9.8)	11 (10.3)	12 (9.4)		Unknown	16 (6.8)	8 (3.4)	

Table 9. Converged quantitative and qualitative findings.

<table>
<tr><th>Significant Variables from Regression Modeling</th><th colspan="5">Quantitative Measures</th><th colspan="3">Breastfeeding Outcomes</th><th>Qualitative Narratives</th></tr>
<tr><td></td><td colspan="5">Regression Results</td><td colspan="3">Qualitative (n=16)</td><td rowspan="6">college is an OB/GYN, and just hearing her say…"I had latching issue too, but I'm pumping," made me feel better. It wasn't like, "Okay, you failed at this." She went to school for this and kind of knows and she's doing what you're thinking about doing, and so that just brought a huge sense of relief.</td></tr>
<tr><td></td><td colspan="5" rowspan="5">• Mothers with greater than high school education levels had 2.5 times greater odds for non-adoption of Baby-Friendly practices (OR=2.5 (1/0.4); p=0.34, 95% CI [0.7, 10.0]) relative to mothers with a high school education or less.</td><td></td><td>Bf Initiation n (%)</td><td>Exclusive BM n (%)</td></tr>
<tr><td></td><td>High School or Less</td><td>8 (50.0)</td><td>4 (25.0)</td></tr>
<tr><td></td><td>College Degree or Postgraduate</td><td>5 (31.3)</td><td>2 (16.7)</td></tr>
<tr><td></td><td>Some College</td><td>2 (12.5)</td><td>0 (0.0)</td></tr>
<tr><td></td><td>Unknown</td><td>1 (6.3)</td><td>0 (0.0)</td></tr>
<tr><td rowspan="11">Prior breastfeeding experience</td><td colspan="5">Descriptives</td><td colspan="3">Quantitative (n=234)</td><td rowspan="11">• I thought I was doing good, but now thinking back, I was overdoing it because I was hooked to that pump. I could barely go anywhere because I was pumping. With this time, more experience, I kind of know what do now and how to space it out.

• I did have trouble breastfeeding her. It was a learning experience. For example, when I got engorged I felt that she had trouble latching on to the one that had got engorged. I</td></tr>
<tr><td></td><td>Total n (%)</td><td>≤ 5 Steps n (%)</td><td>>5 Steps n (%)</td><td>P-Value</td><td></td><td>Bf Initiation n (%)</td><td>Exclusive BM n (%)</td></tr>
<tr><td>Yes</td><td>42 (17.9)</td><td>2 (1.9)</td><td>40 (31.5)</td><td><0.001</td><td>Yes</td><td>42 (17.9)</td><td>31 (13.2)</td></tr>
<tr><td>No</td><td>88 (37.6)</td><td>35 (32.7)</td><td>53 (41.7)</td><td></td><td>No</td><td>72 (30.8)</td><td>43 (18.4)</td></tr>
<tr><td>Unknown</td><td>104 (44.4)</td><td>70 (65.4)</td><td>34 (26.8)</td><td></td><td>Unknown</td><td>57 (24.4)</td><td>31 (13.2)</td></tr>
<tr><td colspan="5">Regression Results</td><td colspan="3">Qualitative (n=16)</td></tr>
<tr><td colspan="5" rowspan="2">• Mothers with prior breastfeeding experience had 6.5 times greater odds for adoption of Baby-Friendly practices (OR=6.5; p=0.06, 95% CI [0.7, 56.6]) relative to mothers with no prior breastfeeding experience.</td><td></td><td>Bf Initiation n (%)</td><td>Exclusive BM n (%)</td></tr>
<tr><td>Yes</td><td>8 (50.0)</td><td>4 (25)</td></tr>
</table>

Table 9. Converged quantitative and qualitative findings.

<table>
<tr><th>Significant Variables from Regression Modeling</th><th colspan="5">Quantitative Measures</th><th colspan="3">Breastfeeding Outcomes</th><th>Qualitative Narratives</th></tr>
<tr><td></td><td colspan="5"></td><td>No</td><td>8 (50.0)</td><td>2 (12.5)</td><td rowspan="2">kind of had to work through that. An experience. A good learning experience so that I know what to do now.</td></tr>
<tr><td></td><td colspan="5"></td><td>Unknown</td><td>0 (0.0)</td><td>0 (0.0)</td></tr>
<tr><td rowspan="11">Type of skin-to-skin contact</td><td colspan="5">Descriptives</td><td colspan="3">Quantitative (n=234)</td><td rowspan="11"><u>No initiation</u>
• It was a while before I saw him, and normally mothers that deliver vaginally, they get to see their baby and hold their baby automatically. That's not the case with C-sections, so that was probably the worst part. You don't really get to hold your baby immediately like you want to… I was expecting to be breastfeeding too, so that was kind of heartbreaking.

<u>Minimal</u>
• It was wonderful. A bonding experience

<u>Moderate</u>
• It was our one-on-one time. I guess him remembering where he came from.

<u>Completed</u>
• Having that first skin-to-skin bonding experience, it was ... Not trying to be all mushy, but it was emotional…him on my</td></tr>
<tr><td></td><td>Total n (%)</td><td>≤ 5 Steps n (%)</td><td>>5 Steps n (%)</td><td>P-Value</td><td></td><td>Bf Initiation n (%)</td><td>Exclusive BM n (%)</td></tr>
<tr><td>No initiation</td><td>80 (34.2)</td><td>61 (57.5)</td><td>19 (15.0)</td><td><0.001</td><td>No initiation</td><td>41 (17.5)</td><td>18 (7.7)</td></tr>
<tr><td>Minimal < 15 min.</td><td>32 (13.7)</td><td>26 (24.5)</td><td>6 (4.7)</td><td></td><td>Minimal < 15 min.</td><td>14 (6.0)</td><td>6 (2.6)</td></tr>
<tr><td>Moderate 15-44 min.</td><td>43 (18.4)</td><td>9 (8.5)</td><td>34 (26.8)</td><td></td><td>Moderate 15-44 min.</td><td>41 (17.5)</td><td>22 (9.4)</td></tr>
<tr><td>Completed ≥ 45 min.</td><td>72 (30.8)</td><td>6 (5.7)</td><td>66 (52.0)</td><td></td><td>Completed ≥ 45 min.</td><td>71 (30.3)</td><td>57 (24.4)</td></tr>
<tr><td>Unable to Determine</td><td>6 (2.6)</td><td>4 (3.8)</td><td>2 (1.6)</td><td></td><td>Unable to Determine</td><td>4 (1.7)</td><td>2 (0.9)</td></tr>
<tr><td colspan="5">Regression Results</td><td colspan="3">Qualitative (n=16)</td></tr>
<tr><td colspan="5" rowspan="3">• Mothers who had moderate skin-to-skin contact had 17.5 times greater odds (OR=17.5; p=<0.001, 95% CI [4.0, 76.5]) and mothers who had completed skin-to-skin contact had 66.5 times greater odds (OR=66.5; p=<0.001, 95% CI [10.4, 425.6]) of participation in Baby-Friendly practices compared to mothers who had no skin-to-skin contact.</td><td></td><td>Bf Initiation n (%)</td><td>Exclusive BM n (%)</td></tr>
<tr><td>No initiation</td><td>2 (12.5)</td><td>0 (0.0)</td></tr>
<tr><td>Minimal < 15 min.</td><td>2 (12.5)</td><td>1 (6.3)</td></tr>
</table>

Table 9. Converged quantitative and qualitative findings.

<table>
<tr><th>Significant Variables from Regression Modeling</th><th colspan="5">Quantitative Measures</th><th colspan="3">Breastfeeding Outcomes</th><th>Qualitative Narratives</th></tr>
<tr><td rowspan="3"></td><td colspan="5" rowspan="3"></td><td>Moderate 15-44 min.</td><td>6 (37.5)</td><td>2 (12.5)</td><td rowspan="3">chest. Mom's there, my husband's there ... It was a good experience.

• I did not want her and when the first moment I laid eyes on her you get that feeling of like, “Oh my gosh I’m a mother again.”…When I got that skin to skin contact with her it made me feel more like, “Okay I’m ready for this…and it’s a new beginning.” I feel like it might help some women out because it’s not uncommon…for women to feel the way I felt during my pregnancy. I feel that if they did (have skin-to-skin with their infants) that maybe it might change their perspective like it changed mine about having another child.</td></tr>
<tr><td>Completed ≥ 45 min.</td><td>6 (37.5)</td><td>3 (18.8)</td></tr>
<tr><td>Unable to Determine</td><td>(0.0)</td><td>0 (0.0)</td></tr>
<tr><td rowspan="6">Lactation Consult</td><td colspan="5">Descriptives</td><td colspan="3">Quantitative (n=234)</td><td rowspan="6"><u>Lactation Consult</u>
• I told her the issues that I was having, that after that first time that…he wasn't latching correctly…I actually went through and tried to get him to latch, and she talked to me about how to hold him and how to tell if he was latching</td></tr>
<tr><td></td><td>Total n (%)</td><td>≤ 5 Steps n (%)</td><td>>5 Steps n (%)</td><td>P-Value</td><td></td><td>Bf Initiation n (%)</td><td>Exclusive BM n (%)</td></tr>
<tr><td>Yes</td><td>143 (61.1)</td><td>23 (21.5)</td><td>120 (94.5)</td><td><0.001</td><td>Yes</td><td>139 (59.4)</td><td>91 (86.7)</td></tr>
<tr><td>No</td><td>91 (38.9)</td><td>84 (78.5)</td><td>7 (5.5)</td><td></td><td>No</td><td>32 (13.7)</td><td>14 (13.3)</td></tr>
<tr><td colspan="5">Regression Results</td><td colspan="3">Qualitative (n=16)</td></tr>
</table>

Table 9. Converged quantitative and qualitative findings.					
Significant Variables from Regression Modeling	**Quantitative Measures**	**Breastfeeding Outcomes**			**Qualitative Narratives**
	• Mothers who received a lactation consult had 68.5 times greater odds relative to those who did not receive a consult for adoption of Baby-Friendly practices (OR= 68.5; p<0.001, 95% CI [16.5, 284.9]).		Bf Initiation n (%)	Exclusive BM n (%)	properly or not. **No Lactation Consult** • I would have liked to get some help…I needed at that point because that whole afternoon and the whole day that he wasn't eating anything and I was worried.
		Yes	13 (81.3)	5 (31.3)	
		No	3 (18.8)	1 (6.3)	
AA=African American; BF=Baby-Friendly; BM=Breast Milk; Bf= Breastfeeding					

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1.3. Factors Influencing African American Mothers' Adoption of Baby-Friendly Practices: Qualitative Findings of a Mixed-Methods Study

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Abstract

Background: African American mothers have lower rates of breastfeeding when compared to other racial/ethnic groups, but little is known about factors affecting this trend. The Baby-Friendly Hospital Initiative (BFHI), a maternal support program, has demonstrated a positive impact on maternal breastfeeding decisions in urban settings; however, African American mothers' breastfeeding rates remained below those of White mothers. No studies have evaluated Baby-Friendly experiences and perceptions for rural African American mothers in the southeastern U.S.

Methods: Purposive sampling was used to recruit African American mothers who had recent experiences with Baby-Friendly practices and delivered infants in a regional hospital that serves a large rural population. In-depth interviews to explore perceptions and experiences with Baby-Friendly practices and resultant breastfeeding decisions were performed. A descriptive qualitative approach guided the study. Transcripts were uploaded into qualitative analysis software and directed content analysis was conducted for identification of themes and subsequent validation of the ecological conceptual model of the BFHI.

Findings: Sixteen mothers participated. Six themes were identified, *including maternal desire to breastfeed, infant state, maternal state, milk supply concerns, provider support, and access to breastfeeding equipment and support services.* Maternal depictions of barriers and facilitators to Baby-Friendly practice involvement added a more comprehensive understanding of the interaction of factors leading to Baby-Friendly practice adoption.

Conclusions: Maternal/infant bonding practices of skin-to-skin contact, rooming in, and early breastfeeding enhanced maternal desire to breastfeed, while lack of breastfeeding education and access to equipment and services hindered breastfeeding success.

Introduction and Background

Low rates of breastfeeding in the United States (U.S.) have been problematic for centuries, leading to public health concerns and the initiation of breastfeeding promotion campaigns dating back to the early 1900s [1]. In recent years, the number of infants who begin breastfeeding at birth has improved and is approaching Healthy People 2020 goals (goal 81.9%; actual 81.1%), however, racial/ethnic differences in breastfeeding initiation and duration persist [2-4]. Additionally, breastfeeding rates for all racial/ethnic groups continue to decrease substantially by 6 months (goal 60.6%; actual 49%) and 12 months (goal 34.1%; actual 27%) [2, 4]. Thus, mothers are in need of increased levels of home and community support to successfully maintaining breastfeeding.

African American mothers have the greatest risk of low rates of breastfeeding initiation, duration, and exclusivity compared to other racial/ethnic groups, and thus, infants lack the health protection that an exclusive breast milk diet provides [2, 3, 5, 6]. Additionally, African American mothers' breastfeeding rates remain lower than White mothers of similar income and education level [2, 3, 7]. Similarly, women living in rural areas of the U.S. and in southeastern regions have lower rates of breastfeeding than those living in urban areas [8]. Evidence suggests that a combination of factors including maternal cultural beliefs, breastfeeding perceptions, and a lack of breastfeeding education and support may contribute to lower rates of breastfeeding for these

mothers; however, there is a lack of studies examining maternal breastfeeding experiences and perceptions to explain these trends [8, 9].

The Baby-Friendly Hospital Initiative (BFHI) is a movement sponsored by the World Health Organization (WHO) and United Children's Fund (UNICEF) to establish supportive and educational environments that enhance mothers' delivery experiences, initial infant bonding experiences, and influence maternal breastfeeding decisions [10-15]. Hospitals and birthing centers achieve Baby-Friendly designation status by demonstrating implementation of the *Ten Steps to Successful Breastfeeding* and compliance with the WHO's *International Code of Marketing for Breast Milk Substitutes* [10, 16]. The "Ten Steps" is a set of maternal support and breastfeeding promotion practices, and "The Code" mandates paying fair market price for formula within clinics and limiting the promotion of formula to new mothers [17]. Baby-Friendly practices are based on the premise that individual attitudes towards breastfeeding are largely influenced by breastfeeding education during the early prenatal period, positive birth and initial breastfeeding experiences, and continued provider support [15, 18]. Thus, Baby-Friendly practices aim to influence maternal birth experiences and to positively impact maternal choice to breastfeed.

While the BFHI is an international campaign, Baby-Friendly USA is the accreditation body in the U.S. The Baby-Friendly 4-phase designation process (4D pathway) requires that facilities follow institution policy changes that adhere to the Baby-Friendly philosophy, as operationalized through the *Ten Steps to Successful Breastfeeding* (Appendix A) [19-21]. Additionally, the *Baby-Friendly Guidelines and Evaluation Criteria for Facilities Seeking Baby-Friendly Designation* outlines the systematic changes necessary to support mothers and to influence breastfeeding attitudes through practices designed to educate and support mothers,

offer unrestricted mother/infant contact, and to encourage exclusive breast milk feedings and infant feeding on demand [14, 15, 22].

Studies of breastfeeding among racial/ethnic minorities, mothers with lower education, and low-income mothers have demonstrated that the BFHI positively affected breastfeeding decisions for disadvantaged mothers living in urban settings [23, 24]. However, no studies have reported rural-dwelling, southeastern U.S., African American mothers' Baby-Friendly experiences and perceptions, thus limiting knowledge of potential barriers and facilitators to breastfeeding for this population [6]. This knowledge gap hinders understanding of the factors that contribute to maternal adoption of Baby-Friendly practices and breastfeeding initiation, exclusivity, and duration [5, 25-27].

The goal of this study was to investigate African American mothers' experiences and perceptions of the maternal support processes associated with the BFHI in a southeastern U.S. regional hospital that serves a substantial rural population, along with associated maternal breastfeeding decisions. As part of a larger mixed-methods study, qualitative explorations of mothers' Baby-Friendly practice perceptions and experiences helped to determine barriers and facilitators to maternal adoption of Baby-Friendly practices, along with the influences of Baby-Friendly practices on breastfeeding decisions. Findings from this exploration may inform the health care provider's role in addressing African American mothers' maternal breastfeeding support needs and tailoring of Baby-Friendly interventions to increase successful breastfeeding in this population.

Methods

Guided by a descriptive qualitative approach (Sandelowski, 2000), directed content analysis of in-depth interviews was conducted with both urban- and rural-dwelling southeastern U.S. African American mothers who had recent exposure to Baby-Friendly practices [28, 29]. The descriptive qualitative approach was valuable to this exploration to provide a "comprehensive summary" [28, p. 336] of maternal Baby-Friendly practice experiences using minimal interpretation to describe participant observations [28, 29]. This approach allowed the investigator to " stay closer to the data" [29, para. 7] and formulate a thorough account of maternal experiences with Baby-Friendly events. The Institutional Review Boards at McLeod Regional Medical Center and the Medical University of South Carolina provided ethical approval for this study.

Data Collection

Purposeful criterion sampling was used to recruit African American mothers, aged 18 years and older, who delivered their infants in a facility implementing Baby-Friendly practices during April and May 2016. The facility is a regional hospital serving a large rural population [30, 31]. Participation from rural mothers was essential to gain perspectives of barriers and facilitators to Baby-Friendly practice participation and breastfeeding for a rural-dwelling population. Mothers were classified as rural or urban dwelling using the Office of Management and Budget (OMB) definition of Metropolitan, Micropolitan, and Nonmetro areas, along with the U.S. Department of Agriculture (USDA), Economic Research Division's rural-urban commuting area (RUCA) census tract codes [32, 33]. The PI obtained written informed consent and enrolled (n=20) mothers who met inclusion criteria and expressed an interest in providing data through medical record review and an in-depth interview [34, 35].

Mothers were interviewed in their homes for an average of 30-45 minutes using a semi-structured interview guide (Appendix B) to elicit open dialog about maternal Baby-Friendly experiences. The interviews were audio recorded and transcribed verbatim using a professional transcription service. The PI collected additional maternal/infant data retrospectively through review of the facility's electronic medical record (EMR), including measures of maternal participation in the *Ten Steps*, maternal demographic information, infant variables, delivery variables, and breastfeeding outcomes. Medical record documentation of maternal participation in the *Ten Steps* was linked with mothers' in-depth interview reports of *Ten Steps* participation to determine consistency between the maternal medical record and maternal perceptions of participation. Mothers were assigned a pseudonym to protect their identity when reporting maternal perceptions and experiences and when linking reports of Baby-Friendly practices to documentation of those practices obtained from the medical record.

Participants

Mothers were recruited while on the postpartum unit of the facility. Staff members provided print flyers to mothers who appeared to meet inclusion criteria and asked each mother if she was interested in speaking to the PI. The PI asked questions to determine appropriateness for enrollment and addressed mothers' questions and concerns. The PI obtained written informed consent, enrolled the mothers, and examined their medical records. African American mothers 18 years or older who delivered an infant 38 weeks gestational age or older were included. Upon medical record examination, two enrolled mothers were found to have infants born prior to 38 weeks gestation (37.4 and 37.5 weeks gestation). These mothers expressed interest in participation, and the infants were feeding well with no poor clinical indicators. Thus, the

mothers were retained in the study with appropriate protocol deviations filed. The PI scheduled interviews with all mothers between one to two weeks post-discharge.

Table 1: Inclusion and Exclusion Criteria for the study

Inclusion Criteria	Exclusion Criteria
Mothers aged 18 years and older (main study EMR review) African American mothers aged 18 years and older (interviews)	Infants with congenital abnormalities that prevent breastfeeding or require admission to the NICU
Infants 38 weeks gestation and older	Infants admitted to the NICU
	Mothers with HIV
	Mothers unable to breastfeed due to illness or complication with delivery
	Infant death
	Mothers prescribed medications or taking recreational substances contraindicated with breastfeeding
	Mothers with Department of Social Services involvement
	Non-English speaking mothers

The PI received training in qualitative methods and worked with a team of research experts to develop the semi-structured interview guide with a goal of obtaining detailed descriptions of mothers' Baby-Friendly and breastfeeding experiences. Participation in Baby-Friendly practices was determined using maternal depictions of Baby-Friendly experiences, along with medical record documentation of participation in the *Ten Steps*. The PI disclosed her own interest in the topic as a former neonatal nurse, a mother who previously breastfed three children, and as a student researcher. This disclosure and initial conversation appeared to relax the mothers and facilitated their open dialog, as well as initiated a few questions pertaining to normal newborn care and infant feeding. Mothers were provided a $30 gift card at the completion of the interview.

Data Analysis

Analysis of interview data was conducted using NVivo 11.0 qualitative software and directed content analysis [35, 36]. The PI and an expert team member reviewed transcripts for

identification and confirmation of themes. The directed approach was structured in nature with a goal to "validate or extend conceptually a theoretical framework or theory" [34, p. 1281]." The conceptual model of the BFHI using the Social Ecological Model (SEM) (Appendix C) was developed through findings in the Munn et al. (2016) integrative review of the impact in the United States of the BFHI on early infant health and breastfeeding outcomes [37]. The directed approach was used to validate the conceptual model by examining maternal depictions of Baby-Friendly practices, along with barriers and facilitators to maternal participation in each step, followed by analysis of alignment of those findings with key concepts from the ecological BFHI model [34, 35]. After this initial analysis, the ecological BFHI model was determined to be both useful and valid to organize maternal Baby-Friendly experiences and perceptions. Initial coding was based upon key concepts from the model and themes were developed based upon the following levels: policy/systems factors, organizational/hospital factors, intrapersonal provider factors, and intrapersonal mother/infant dyad factors. Focused coding further solidified themes and identified major topic areas [34]. Additionally, after the in-depth interview, maternal/infant demographic and delivery stay data were linked with qualitative interview data using pseudonyms to protect the mothers' identities. Data were examined for congruence or discrepancies between maternal reports of Baby-Friendly practices versus what was charted in the medical record.

Results

Of the 20 enrolled participants, 16 mothers participated in an in-depth interview in their homes. The interviewed mothers had a mean age of 28 years (SD=5) and ranged in age from 20-36 years. Half [8, (50%)] of the mothers were married, insured through Medicaid, were

employed, and had a high school education or less. Over half of mothers 9 (56.3%) were rural-dwelling versus 7 (43.8%) urban-dwelling, and 5 (31.3%) had a college degree or post-graduate education.

Data analysis resulted in six main themes related to maternal adoption of Baby-Friendly practices: maternal desire to breastfeed, infant state, maternal state, milk supply concerns, provider support, and access to breastfeeding equipment and services. All themes correlated to levels within the ecological conceptual model of the BFHI (Appendix C), and added strength to the validity of model structure, with themes providing relevance at the mother/infant dyad intrapersonal, interpersonal provider, organizational/hospital, and policy/systems factor levels. Furthermore, themes (in bold and italics) provided explanation of existing model elements, and were added to the model to clarify the relationship between factors. Additional maternal perceptions emerged (demographic factor perceptions) that did not fall into major theme categories but added understanding to barriers and facilitators of adoption of Baby-Friendly practices unique to African American mothers.

Mother/infant dyad intrapersonal level themes

Maternal desire to breastfeed

Maternal desire to breastfeed emerged as a theme that was comprised of several components. Mothers reported their motivations to breastfeed emerged from wanting their infants to be healthy, feelings of bonding from early-skin-to-skin contact, rooming in, and early breastfeeding, and from family support. Mothers attributed these elements to their desire to continue breastfeeding.

Health benefits of breast milk

All interviewed mothers vocalized concern over infant health and stated belief that breast milk would help to ensure their infant's good health.

> *Before I was even pregnant I was like I'm going to breastfeed my child because I hear all this good stuff about it. It helps you lose weight. It contracts your uterus back. It helps the baby. If the baby gets sick it will change to accommodate the baby, help his brain development. All these pluses, might as well.*

"Healthy reasons, because I read that ninety-nine percent of babies that's breastfeed, they don't really get sick."

Bonding from rooming in, early breastfeeding, and skin-to-skin contact

Mothers who participated in rooming in, early breastfeeding, and skin-to-skin contact reported feelings of bonding with their infants. These mothers reported forming a deep connection with their infants that enhanced their desire to breastfeed.

> *I wanted my baby in the room. I didn't want my baby in the nursery. I don't know what they do in the nursery. You let my baby cry cause you have more babies in there. My baby need one-on-one attention. I'm his mother so I'm going to take care of my baby.*

"I just felt comfortable with having her with me. Being that it's been 7 years, I figure having her in there would help me get back into the swing of being a mom all over again."

> *I did not want her and when the first moment I laid eyes on her you get that feeling of like, "Oh my gosh I'm a mother again." I fell for her. When I got that skin to skin contact with her it made me feel more like, "Okay I'm ready for this and it's a new journey, it's a new beginning." I feel like it might help some women out because it's not uncommon…for women to feel the way I felt during my pregnancy. I feel that if they did* (have skin to skin contact) *that maybe it might change their perspective like it changed mine about having another child.*

Family support

Mothers who had family involvement reported feeling more confident with infant care and feeding because of the support and availability those family members provided. Mothers who had someone in the house to assist with daily chores, infant care, and care of other children reported feeling less anxious about breastfeeding and attributed those feelings to family member support.

> *I can't imagine if it was just me and I was trying to do everything... I would have given up. I wouldn't have even thought about it anymore because you've got so many other things that seem more pressing to you at the time that it would be hard to even try.*

"Yeah wonderful help. My sister, she gets off from work and comes, makes her way here too. She supposed to be here, I tell her to go home but she doesn't listen."

One mother had no skin-to-skin contact, no lactation consult, and went home with no paternal or family involvement. This mother planned to breastfeed, but was unable to successfully breastfeed for multiple reasons. Lack of family support was a contributing factor to her ceasing breastfeeding while in the hospital.

> *I think that just with it not working at the hospital, where I had access to people to really teach me, just made me just not want to keep trying, because I knew when I was coming home and I was on my own, and I wasn't going to want to go out…or really have anybody coming here….so I just decided just to let my dream go pretty much and just deal with what it is. I have to bottle feed, he has to eat, so...*

Infant state

Interviewed participants who participated in skin-to-skin contact [85.7% (12/14)] described feelings of infant bonding and of their infants having a calm state or "being calm" after participation in Baby-Friendly practices.

"She's not as fussy. We had the skin-to-skin contact. Even whenever I do have times if she's fussy and I pick her up and put her on my chest, she quiets right down."

I guess it felt kind of natural, because like I said they're just born and you want to, like I said, you want to get that bond. I think we really have a strong bond, even with him, because as you can see now, he's just kind of calm there, laying around, looking around, and I think that might have helped, just that first instant contact.

"She is just quiet, hardly ever cries… It's crazy because even when she's hungry she'll move her arms a certain way. I can tell what is what, her motions."

It's kind of indescribable. I do think it's kind of comforting for the baby as well, being in a new environment, unfamiliar surroundings, and just being able to be close to mom and smell that smell that they're familiar with.

Maternal state

Of mothers who had a Cesarean delivery, 54.5% (6/11) voiced concerns over pain and being sleepy or "fuzzy" after delivery. These mothers reported difficulty learning about breastfeeding, appreciating the bonding attributes of skin-to-skin contact, and even remembering skin-to-skin contact or first breastfeeding attempts. Additionally, three mothers could not remember their first breastfeeding attempt and reported information that was inconsistent with the medical record, suggesting that their memory of the events was altered or unclear.

They give you the medicine and it has you a little loopy. I was like, "No. I'm going to sleep because I want to see my baby so I'm going to fight this. I'm going to fight it." I fought it.

"I was a little fuzzy…. I want to say that it was the next day because I'd had an epidural and I was out of it a little bit. I want to say it was like the next morning."

I felt like it really wasn't what I was expecting just because I was in so much pain I couldn't really, I don't know. I couldn't really learn like I wanted to because I was in pain, and ... I was on pain medicine, I really was kind of out of it.

"I was still kind of high a little bit…I remember, when he was born, they let me look at him. I just went back to sleep."

Milk supply concerns

Concern over milk supply was the most common barrier to breastfeeding discussed by the mothers. Of the 16 interviewed mothers, 12 (75%) discussed concerns with milk supply insufficiency as cause for either breastfeeding cessation, or for formula supplementation. Five mothers (31.3%) exclusively breastfed or gave only medically indicated supplementation in the hospital. Of those five mothers, four still exclusively breastfed between 1-2 weeks post discharge. One mother continued to administer provider ordered formula supplementations for infant weight loss. Mothers who discussed concerns with milk supply addressed frustration with milk supply taking several days to establish, and then being very excited and validated in their breastfeeding efforts once they reached lactogenesis stage II and their breast milk "came in" [38].

> *The supply. That's the only thing. Once my chest did get hard, I'm like, "Okay."... Then I got the pump and I was like, "Yay! I've got breast milk. Oh my gosh. I'm like a cow. Look at me. …The fact that I can actually feed my child.*

"I was so happy when it dropped. I was so proud. I about wanted to cry when it dropped."

For the 11 mothers who chose to supplement in the hospital, breastfeeding decisions at 1-2 weeks post discharge included: 1 (9%) exclusively breastfeeding, 3 (27.3%) some supplementation (approximately ≤2 formula feeds per day), 4 (36.4%) approximately equal breast milk and formula feedings, and 3 (27.3%) ceased breastfeeding,

> *I was very engorged and the milk wouldn't come out. It was a little bit of frustration and hating for him to be hungry and everything. We were doing the supplement. Then that just turned into, okay, let's just go ahead and put him on formula. I didn't want him to lose too much weight and everything.*

It was a little hard. I was like, "Can't I just bottle feed her for a little while and then try it again?" She didn't really take well to breastfeeding until I got home. Throughout my visit at the hospital, I'd say I was trying. It seemed like when we got home, she was fine.

Mothers expressed concern that the infants were hungry, so they chose to supplement until they reached stage lactogenesis II and perceived their milk had "come in" [39].

"Oh my gosh, my baby has to eat. He has to eat. If he doesn't do anything else, he has to eat."

"He latched on just fine, it was just that the milk wasn't there…Before it ended, somebody gave him a bottle because he had to eat…When I got home, that's when I started getting milk."

Of the 11 mothers who continued to breastfeed in the hospital but chose to supplement with formula, 5 (45.5%) provided more in-hospital formula feeds than breast milk feeds. At 1-2 weeks post-discharge, 1 (20%) mother ceased breastfeeding, 2 (40%) gave ≤ 2 formula feeds per day, and 2 (40%) gave approximately equal formula/breast milk feeds. Additionally, one mother who provided half formula/half breast milk feeds in the hospital exclusively breastfed at home.

Interpersonal provider level themes

Provider support

Provider support was either a barrier or facilitator to maternal breastfeeding success and to maternal knowledge of Baby-Friendly practices. Provider support was separated into categories of prenatal education and in hospital lactation consult/support. Only 12.5% (2/16) of mothers reported getting any breastfeeding or Baby-Friendly practice education from a physician prior to entering the hospital for delivery. This presents a major barrier for mothers attempting to breastfeed. Mothers who had knowledge of breastfeeding prior to delivery either performed their

own research, went to prenatal or breastfeeding classes, or found out information from family or friends who had breastfed. This was true of all mothers with no discrimination between education levels or socioeconomic status.

Prenatal education

"He asked me if wanted to breastfeed or bottle feed, and I said I'm going to try to breast, but that's it."

"She asked me what my preference was. She was supportive of breastfeeding."

"They asked me if I was planning on breastfeeding. That was it."

I had kind of already knew from my first one…He's one of the ones that don't get sick as much, and he's more advanced than all my other children. He stays on the A honor roll, A/B honor roll, every now and then he'll slip and get a grade that's a C, but he's really, really, really smart.

Lactation consult

While lactation consultation is not a specific requirement for Baby-Friendly designation, the education and support provided by lactation consultants were paramount to maternal breastfeeding success [37]. 68.75% (11/16) of interviewed mothers contributed lactation consultation support to their knowledge of breastfeeding and to their breastfeeding success.

"She was nice. We tried everything and she stayed for like five hours trying to help me pump, and putting the machine, and we sat there, we did the skin-to-skin, and I couldn't still get anything."

"I spoke with the lactation consultant. She was like, "Just make sure you pump every 2 hours and eat certain foods and this, that and the other. So far everything has been wonderful with that. It's been great."

I told her the issues that I was having. ...that he wasn't really latching, or he wasn't latching correctly. ...I actually went through and tried to get him to latch, and she talked to me about how to hold him and how to tell if he was latching properly.

In contrast, of the three mothers who did not receive a lactation consult in the hospital, two ceased breastfeeding prior to hospital discharge. One of these mothers did not have a lactation consult on the day of delivery, struggled to breastfeed, and ceased breastfeeding the day after delivery. This mother attempted to breastfeed at home when her milk supply "came in", but was unsure how to do so successfully. She was exclusively formula feeding at 1-2 weeks of age.

"I would have liked to get some help. It was something I needed at that point because that whole afternoon and the whole day that he wasn't eating anything and I was worried."

Organizational/hospital and Policy/systems level themes

Access to breastfeeding equipment and support services

Mothers who had access to a breast pump or to post-discharge lactation services were able to breastfeed more successfully than those who did not receive a consultation. 68.75% (11/16) of mothers had access to a breast pump or to lactation services upon discharge. All of these mothers were still breastfeeding, and 45.5% (5/11) were exclusively breastfeeding.

"My friend had a pump that she was using when she had her baby. She probably stopped when her baby was three to four months and then she gave it to me."

*I had lactation coming the next day. She told me what to do. A real nice older lady… She showed me what to do and that was it. I knew what I was doing from then on...(*at the WIC office)*…They were ecstatic. They were happy passing that pump over. They do rental pumps. They give you supplies. I said, "I'm going to try to breastfeed. I'll be back tomorrow."...They mentor, try to get you at least breastfeed for two weeks before you decide to get a pump.*

In contrast, mothers with no access to an electric pump struggled to breastfeed successfully. Three mothers spoke to a hospital or WIC representatives about getting a pump, but were confused about being able to get the pump or to keep the pump, indicating a need for clarification when explaining pump accessibility to mothers.

"That was aggravating trying to pump with that hand pump."

I actually want to still try the pump, I just didn't know how to get the pump, because the hospital said I would have to bring it back…actually the breastfeeding lady from WIC. She's the one that actually told me that I would have to give it to a parent that's in need ... If a child is in NICU or something like that.

"WIC was like, "We have loaner pumps." They're not pumps that they're going to actually give to you or I would have to go out and buy my own pump. Pumps are expensive."

Demographic Factor Perceptions

Race

While maternal narratives did not indicate how race personally affected their Baby-Friendly participation or breastfeeding decisions, 56.3% (9/16) of mothers offered potential reasons other African American mothers may decide not to breastfeed. Reasons included a lack of breastfeeding information and support, frustration with breastfeeding coupled with a lack of information on the health benefits, mothers viewing formula as an "easy fix", and young mothers unwilling to give up their current lifestyle.

"Some that have the babies…have their family members, grandmother and mother watching the kid because they want to run the streets."

It could be…the frustration of it. I think a lot of women think that right after I have the baby my milk is going to be there. It's not. It actually takes a few days for the actual milk supply to come in. If you don't have that support when you're frustrated and trying to

figure out what to do, then you're going to give up…. I think for some people the formula is the easy way out.

I really think that it's lack of information and lack of support. The lack of support being huge…and formula is easier. It's so much easier than breastfeeding. Especially if you attempt and it doesn't go well. Then you think, "Okay, well, I tried it, done."

Rurality

Narratives from mothers [rural = 56.3% (9/16); urban = 43.8% (7/16)] provided conflicting perspectives. 77.8% (7/9) of rural dwelling mothers felt their residential location and distance from the lactation resource center did not hinder their breastfeeding efforts. However, one of the mothers who denied distance being a factor influencing her personal breastfeeding decisions reported that a lack of breastfeeding classes at the local rural hospital may preclude other mothers from gaining pertinent prenatal breastfeeding information.

Rural Mothers

"I mean, it's not that far me to drive, if I had a question or anything."

"I don't think the hospital here offers any classes, and so you don't know, maybe, the benefits (of breastfeeding)."

Urban Mothers

"It makes me more confident that I have that support available if I need it."

"Lactation came and I went to the resource center. Everybody helped me very well. They taught me some new things."

Education

No maternal narratives specifically addressed education level as a factor in their participation in Baby-Friendly practices; however, three mothers with postgraduate education (some Master's level classes) reported having additional sources of breastfeeding support not mentioned by mothers with a high school education or less. One mother had a former college roommate who is now an obstetrician to turn to for breastfeeding advice. Other mothers had workplace environments supportive of pumping, and thus, had no concerns with continued breastfeeding upon return to work.

High School or Less

It made me get back in school and even got an education. Now I'm working, I got my own place. I have two kids now. Looking back I'm glad I made that change. Like I said you just need that positive or something like a child to bring you out and make you change your whole life.

Postgraduate Education

I have my roommate from college is an OB/GYN, and just hearing her say…"I had latching issue too, but I'm pumping," made me feel better. It wasn't like, "Okay, you failed at this." She went to school for this and kind of knows and she's doing what you're thinking about doing, and so that just brought a huge sense of relief.

Discussion

Baby-Friendly categorized themes and maternal demographic perceptions provided a unique and rich assessment of barriers and facilitators to African American mothers' adoption of Baby-Friendly practices. Maternal demographic perceptions of race, education level, and rurality align with prior quantitative evidence that breastfeeding rates are lower in disadvantaged groups [6, 24, 39]. Similarly, mothers who participated in a greater number of Baby-Friendly practices were more likely to have increased breastfeeding initiation and exclusivity.

Our findings parallel barriers to breastfeeding for African American mothers as reported by Jones et al. (2015) in their systematic review of racial and ethnic disparities in breastfeeding [40]. In the review, African American mothers reported multiple barriers to breastfeeding, including lack of access to breastfeeding information and support, free formula from WIC as an easy solution to infant feeding problems, return to work concerns, lack of family and health care provider support, and unwillingness of young mothers to alter current lifestyle [40]. Mothers in our studies voiced their perceptions of these same issues as either barriers to their own personal breastfeeding success or to barriers to breastfeeding for other African American mothers.

Maternal in-depth interviews provided powerful narratives demonstrating rich depictions of how breastfeeding information and support, as well as participation in early mother/infant bonding practices affected maternal adoption of Baby-Friendly practices and breastfeeding decisions. In contrast, a lack of access to breastfeeding information, support, and breastfeeding supplies and equipment hindered maternal breastfeeding success. Additionally, themes were produced from maternal narratives that added validity to the structure of the ecological conceptual model of the BFHI.

Maternal narratives supported evidence that maternal infant bonding practices such as skin-to-skin contact, rooming in, and early breastfeeding promote maternal/infant bonding and enhance maternal desire to breastfeed. One mother stated that she did not want her baby until after delivery and participation in skin-to-skin contact, stating that skin-to-skin participation "changed her perspective" on "becoming a mother again". This report demonstrated the powerful bonding effects of skin-to-skin contact and the potential to enhance maternal desire to adopt Baby-Friendly practices and to successfully breastfeed despite the presence of other life circumstances and

barriers. DeChateau's and Phillips' observations of skin-to-skin contact and breastfeeding revealed that as little as 15 minutes of skin-to-skin contact positively affected maternal infant bonding through increased maternal confidence in caring for the infant [41, 42]. Maternal narratives supported these findings and demonstrated the importance of maternal adoption of Baby-Friendly maternal/infant bonding practices for breastfeeding success.

A theme of calm infant state emerged through maternal reports of Baby-Friendly experiences. In a systematic review of the effects of early mother/infant contact, Moore et al. highlighted associations of early skin-to-skin contact with improved infant physiological responses such as early stabilization of temperature and blood glucose levels, as well as decreased infant crying [43]. In 2009, Bystrova et al. examined infants who had participated in 1-2 hours of early skin-to-skin contact and found that at one-year of age, those infants displayed better self-regulation, exhibiting less frustration and being able to calm themselves easily [44]. Similarly, in this study, mothers who participated in early skin-to-skin contact and breastfeeding reported that their infants were very calm and cried very little. Mothers attributed the infant's calm state to early skin-to-skin contact and early bonding.

Maternal state was an important barrier to early skin-to-skin contact, bonding, and breastfeeding for mothers. Mothers who were recovering from Cesarean sections reported difficulty learning about breastfeeding and had difficulty bonding during skin-to-skin contact, which could be due to the effects of anesthesia recovery and pain medication. A look at the adoption of Baby-Friendly practices for these mothers may demonstrate that greater staff support and education are needed.

Maternal awareness of stage II lactogenesis or of milk "coming in" generally occurs prior to 72 hours after infant delivery and can be described as sensations of breast fullness or milk leakage [38]. Due to changing trends in maternity care established in the 1970s, most mothers who deliver vaginally are discharged to home by 24 hours after delivery and have not yet reached stage II lactogenesis [45]. Study narratives revealed that mothers were very concerned about milk supply, and they often chose to supplement in the hospital due to concerns that their infants were hungry and that their milk had not yet "come in". Many of the mothers decreased formula supplementation and continued to breastfeed at home once they felt their milk had "come in". These findings suggest that mothers who appear to be making the choice to formula feed in the hospital are able to successfully provide breast milk at home once they reach stage II lactogenesis [38]. This finding also emphasizes the importance of a lactation consultation for every mother and is significant for Baby-Friendly practice implementation. While maternal breastfeeding support is the responsibility of all maternal/infant hospital care providers, routine lactation consultation is not mandated under Baby-Friendly designation standards [37]. One mother who did not have a lactation consult in the hospital attempted to breastfeed at home once her milk "came in", but was unsuccessful. This mother did not receive breastfeeding education, support, and assistance through lactation consultation while in the hospital and attributed her breastfeeding cessation to the lack of support.

Provider support was fundamental to maternal adoption of Baby-Friendly practices and breastfeeding success. A lack of provider prenatal breastfeeding education was evident for nearly all interviewed mothers, and mothers received the majority of their breastfeeding information and support from lactation consultation. Lactation consultants, in turn, provided mothers with

breastfeeding information and resources upon discharge. Mothers who had access to breastfeeding resources and pumps more often sustained breastfeeding, whereas mothers with no breast pump or support more often ceased breastfeeding. Several mothers were confused about how to obtain a breast pump from their local resource centers, thus denoting a communication gap in breast pump attainment processes. This finding suggests that a simple intervention to clarify access to breast pumps for eligible disadvantaged mothers could increase maternal breastfeeding success.

Limitations

Study limitations included potential selection bias, participant loss to follow up, and potential maternal report bias. We recruited and enrolled mothers purposefully after they voiced interest in study participation. Twenty mothers were enrolled in the study; however, four did not participate in an in-depth interview. This loss limited the amount of potentially useful information gained from those four maternal interviews. Additionally, mothers may have provided socially desirable responses to the PI due to the breastfeeding promotion nature of the investigation.

Conclusions

Study findings indicated that southeastern U.S. African American mothers faced numerous barriers to the adoption of Baby-Friendly practices, often resulting in a lack of breastfeeding success. Mothers had little provider-directed prenatal breastfeeding education, and thus, lacked information on the amount of breast milk their infants needed in the hospital. These mothers often supplemented with formula until after hospital discharge when their milk "came in". Those who received lactation consultation in the hospital and had access to breastfeeding equipment and services upon discharge were able to successfully breastfeed, whereas, those who did not receive a lactation consult and did not have access to breastfeeding services upon

discharge ceased breastfeeding. Despite these barriers, implementation of breastfeeding education and support, as well as early mother/infant bonding practices of skin-to-skin contact, rooming in, and early breastfeeding facilitated maternal adoption of Baby-Friendly practices, enhanced maternal desire to breastfeed, and increased breastfeeding success. These findings provide information for health care providers to effectively tailor Baby-Friendly practice implementation for African American mothers and to increase their infant bonding and breastfeeding success.

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Appendix A

The *Ten Steps to Successful Breastfeeding* are*:*

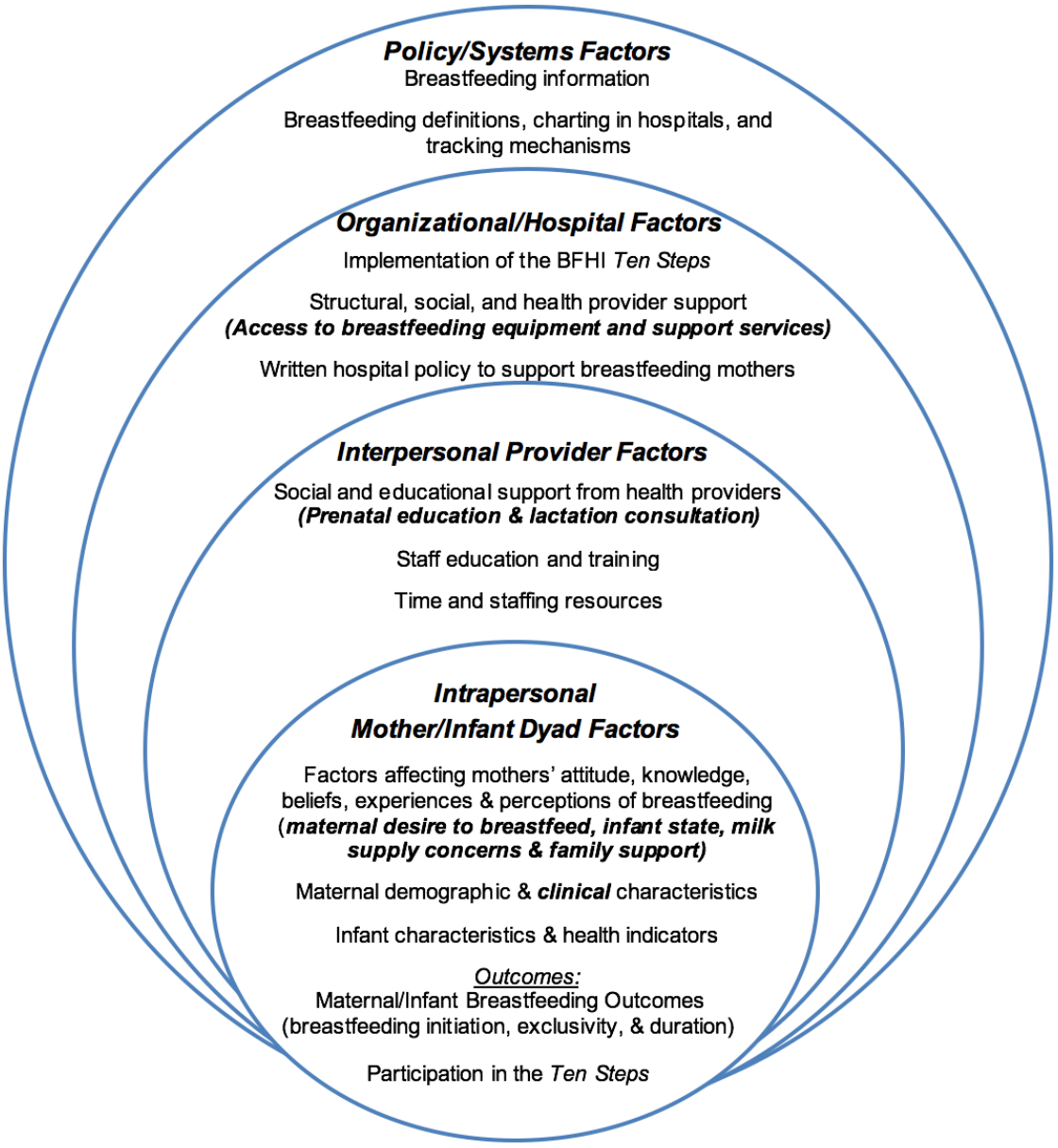
1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in the skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within 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.

Appendix B

Semi-Structured Interview Questions:

1. Tell me about your recent labor and delivery experience.
2. What types of baby-friendly practices did you participate in during your hospital stay?
3. What were your feelings about breastfeeding and baby-friendly practices prior to your hospital stay?
4. What were your experiences with initiating breastfeeding?
5. What were your experiences with breastfeeding after discharge?
6. What factors helped you with breastfeeding?
7. What factors hindered you with breastfeeding?
8. Describe your feelings about breastfeeding or baby-friendly practices after participating in baby-friendly practices.
9. What concerns do you have as you continue to breastfeed at home? Or what feeding concerns do you have now that you have ceased breastfeeding?

Appendix C. Conceptual Model of the BFHI using the SEM



BFHI = Baby Friendly Hospital Initiative,
SEM = Social Ecological Model,
"Ten Steps" = "Ten Steps to Successful Breastfeeding"

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SUMMARY OF MANUSCRIPTS

Overview of Manuscripts' Contributions to the Question of Factors Influencing African American Mothers' Adoption of Baby-Friendly Practices

Results of the first manuscript, an integrative review of the impact in the U.S. of the Baby-Friendly Hospital Initiative (BFHI) on early infant health and breastfeeding outcomes served as both the foundational knowledge and framework for the mixed-methods dissertation study. Findings from the review supported the BFHI's success in facilitating successful breastfeeding initiation and exclusivity, but offered limited information on breastfeeding duration due to deficiencies in breastfeeding tracking mechanisms (Merewood, Mehta, Chamberlain, Philipp, & Bauchner, 2005; Merewood et al., 2007; Merewood, Philipp, Chawla, & Cimo, 2003; Munn, Newman, Mueller, Phillips, & Taylor, 2016; Philipp et al., 2001). Examination of the "Ten Steps" of the BFHI revealed that, step three, prenatal education and step ten, postnatal breastfeeding support were the most difficult steps to implement; yet, maternal exposure to those steps may significantly influence breastfeeding decisions (Crivelli-Kovack & Chung, 2011; DiGirolamo, Grummer-Strawn, & Fein, 2008; Li et al., 2014). The review also revealed that underlying mechanisms by which Baby-Friendly practices contribute to maternal breastfeeding decisions remain unclear; thus, studies are needed to examine mothers' experiences and perceptions of Baby-Friendly practices (VanDevanter, Gennaro, Budin, Calalang-Javiera, & Nguyen, 2014; Vasquez & Berg, 2012). Additionally, studies are needed to investigate the impact of the BFHI on women living in rural areas and in southeastern regions of the U.S. (Labbok, Taylor, & Nickel, 2013). Finally, studies are needed to examine early infant health outcomes related to the BFHI, especially for late premature infants (34-36 weeks) who are

most vulnerable to poor outcomes and are in need of specialized breastfeeding support (Goyal, Attanasio, & Kozhimannil, 2014; Radtke, 2011). Salient points from this review were analyzed and categorized according to the levels of the Social Ecological Model (SEM) and were used to develop an ecological conceptual model of the BFHI (McLeroy, Bibeau, Steckler, & Glanz, 1988).

From these findings, a mixed-methods study *(manuscript #2)* was designed to investigate factors influencing southeastern U.S. rural-dwelling African American mothers' barriers and facilitators to adoption of Baby-Friendly practices. During the quantitative phase, the association of maternal demographic and clinical factors was examined, along with infant clinical characteristics with level of maternal participation in Baby-Friendly practices (*Ten Steps)*. Bivariate analysis determined statistically significant differences between groups (≤5 steps vs. > 5 steps) for demographic and clinical characteristics and identified potential predictors for the subsequent logistic regression analysis.

Quantitative demographic predictors of race and rurality align with prior evidence that breastfeeding rates are lower in disadvantaged groups (CDC, 2016a; CDC, 2016b; Labbok et al., 2013; Perez-Escamilla & Chapman, 2012; DHHS, 2011; Vasquez & Berg, 2012). Further, mothers who adopted Baby-Friendly practices were more likely to have increased breastfeeding initiation and exclusivity. Rural-dwelling and African American mothers were less likely to participate in Baby-Friendly practices and less likely to have resultant breastfeeding success. Clinical indicators of prior breastfeeding experience, skin-to-skin contact, and lactation consultation had the greatest influence on maternal adoption of Baby-Friendly practices and breastfeeding success. Maternal in-depth interviews provided powerful narratives demonstrating

rich depictions of how these clinical experiences affected maternal adoption of Baby-Friendly practices and breastfeeding decisions.

The qualitative phase of the study was conducted using a descriptive qualitative approach and directed content analysis, and resulted in six themes: *maternal desire to breastfeed, infant state, maternal state, milk supply concerns, provider support, and access to breastfeeding equipment and support services*. The directed approach was based on key concepts from the ecological model of the BFHI (Hsieh & Shannon, 2005; McLeroy et al., 1988). This model was described in our first manuscript entitled, *The Impact in the United States of the Baby-Friendly Hospital Initiative on Early Infant Health and Breastfeeding Outcomes* (Munn et al., 2016). Themes were developed based upon the following levels: policy/systems factors, organizational/hospital factors, intrapersonal provider factors, and intrapersonal mother/infant dyad factors. Themes further explained existing BFHI conceptual model elements and were added to the model to clarify the relationship between factors. Additionally, after the in-depth interviews, we linked maternal/infant demographic and delivery stay data with qualitative interview data and examined for congruence or discrepancies between maternal reports of Baby-Friendly practices versus medical record documentation.

Data were merged using a comparison matrix with quantitative predictors of maternal adoption of Baby-Friendly practices and qualitative narratives that helped provide explanation for the quantitative predictor's significance. Some narratives offered more direct explanation of quantitative predictors than others; however, examination of the narratives aided in the analysis and formulation of an overall interpretation to address factors affecting African American

mothers' adoption Baby-Friendly practices (Cresswell, Klassen, Plano Clark, & Clegg Smith, 2011; Cresswell & Plano Clark, 2011).

Our qualitative data added to the breadth of understanding of maternal Baby-Friendly experiences and breastfeeding decisions of mothers in our study. As such, a qualitative manuscript *(manuscript #3)* provides in-depth explanation of African American mothers' perceptions and experiences with Baby-Friendly practices and breastfeeding, along with their barriers and facilitators to successful Baby-Friendly participation and successful breastfeeding.

Maternal narratives supported evidence that maternal infant bonding practices such as skin-to-skin contact, rooming in, and early breastfeeding promote maternal/infant bonding and enhance maternal desire to breastfeed. Quantitative and qualitative results converged on these findings and demonstrated the importance of maternal adoption of Baby-Friendly maternal/infant bonding practices for breastfeeding success.

A theme of calm infant state emerged through maternal reports of Baby-Friendly experiences. Previously published studies on the effects of early skin-to-skin contact highlighted associations between improved infant physiological responses and decreased infant crying at birth, as well as increased self-regulation and self-calming among infants at one year of age (Bystrova, 2009; Moore, Anderson, Bergman, & Dowswell, 2012). Similarly, in our study, mothers who participated in early skin-to-skin contact and breastfeeding reported that their infants were very calm and cried very little. Mothers attributed the infant's calm state to early skin-to-skin contact and early bonding.

Maternal state was an important barrier to early skin-to-skin contact, bonding, and breastfeeding for mothers. Mothers who were recovering from Cesarean sections reported

difficulty learning about breastfeeding and had difficulty bonding during skin-to-skin contact due to the effects of anesthesia recovery and pain medication. Additionally, some mothers could not remember their first breastfeeding attempt and reported information that was inconsistent with the medical record, suggesting that their memory of the events was altered or unclear due. This finding suggests a need for increased education and support for health care providers to enhance adoption of Baby-Friendly practices for mothers delivering by Cesarean section.

Interviews revealed maternal concern over a lack of milk supply, and that mothers often chose to supplement in the hospital because they were worried that their infants were hungry. Many of the mothers decreased formula supplementation and continued to breastfeed at home once their milk "came in". These findings suggest that mothers who appear to formula feed in the hospital, are able to successfully provide breast milk at home once they reach stage II lactogenesis (Chapman, 2000).

A lack of provider prenatal breastfeeding education was evident for nearly all interviewed mothers, and mothers received the majority of their breastfeeding information and support from lactation consultation. Lactation consultants, in turn, provided mothers with breastfeeding information and resources upon discharge. Mothers who had access to breastfeeding resources and pumps more often sustained breastfeeding, whereas mothers with no breast pump or support more often ceased breastfeeding.

The overall product of the dissertation study were qualitative and quantitative findings that led to a comprehensive overall depiction of factors contributing to African American mothers' adoption of Baby-Friendly practices. Study findings indicated that in the southeastern U.S., rural-dwelling and African American mothers have greater odds of non-adoption of Baby-

Friendly practices and have less resultant breastfeeding success than mothers of other races. However, clinical variables of prior breastfeeding experience, early skin-to-skin contact, and lactation consultation increase maternal odds for adoption of Baby-Friendly practice and resultant successful breastfeeding. Thus, clinical practice delivery, Baby-Friendly practice delivery, and breastfeeding education and support may influence mothers who are at a higher risk for non-adoption of Baby-Friendly practices and may contribute to improved Baby-Friendly participation, mother/infant bonding practices, and resultant breastfeeding success.

Themes developed from qualitative interviews provided insights and enriched the understanding of why particular factors hindered or facilitated maternal Baby-Friendly practice adoption for the study population. While a lack of breastfeeding information, support, and equipment access hindered breastfeeding success, the presence of breastfeeding information, support, participation in maternal/infant bonding practices, and early breastfeeding increased maternal desire to breastfeed and resulted in greater breastfeeding success. These findings provide information for health care providers to effectively tailor Baby-Friendly practice implementation for rural dwelling and African American mothers and to increase their infant bonding and breastfeeding success.

Limitations of dissertation research

Limitations of the research are provided within each manuscript. The integrative review was limited to studies conducted in the U.S., and articles were only included if outcomes were reported or measured. Therefore, exclusion criteria could have limited the availability of evidence to address BFHI implementation factors. There were a number of limitations in the mixed-methods study. Medical record documentation of Baby-Friendly practices was sometimes

difficult to determine. The medical record often had only approximations of breastfeeding times and skin-to-skin times rather than exact times. For this reason, skin-to-skin contact was delineated into categories when time could be reasonably approximated. Additionally, pacifier use and rooming in was not documented with enough distinction in the medical record to determine participation. Prior breastfeeding experience, maternal education level, and maternal employment were also missing from some charts, leading to a large number of mothers in an "unknown" category. Missing data potentially decreased the significance of these predictors of maternal adoption of Baby-Friendly practices in the logistic regression model.

Qualitative limitations include potential selection bias, participant loss to follow up, and potential maternal report bias. Mothers were purposefully recruited and enrolled after voicing interest in study participation. While 20 mothers were enrolled in the study, only 16 provided an in-depth interview. Potentially useful data was lost to follow up for four participants who did not have an in-depth interview. Additionally, mothers may have reported socially desirable breastfeeding rates to the PI due to the breastfeeding promotion nature of the investigation.

Lessons Learned

Data collection for the study proved to be a very arduous process. Nearly 900 medical records were screened due to the nature of the data access provided by the facility. Additionally, four separate databases housed the maternal/infant medical records. It took many hours to create an efficient process of compiling the pieces of information into one REDCap record to produce an accurate recount of the mother/infant dyad delivery and postpartum hospital course. The PI now has a greater understanding of and appreciation for data extraction from an electronic

medical records (EMR) system, as well as greater knowledge of what type of data is feasible to collect in future investigations.

Recruitment for the qualitative phase of the study was not a significant barrier to success. The Postpartum unit of the facility had many potentially eligible mothers who were open to speaking about the study. Many were interested in participating and were comfortable with sharing their experiences. Despite maternal interest and a short time-period between enrollment and interviews, four mothers were lost to follow-up. Perhaps, the most significant barrier to recruitment was participation from nurses who were often busy and did not have time to ask mothers if they were interested in the study.

Research trajectory

Further investigation of best implementation practices associated with the BFHI are needed. As more U.S. hospitals are adopting Baby-Friendly practices, more concerns are being raised as to both the benefits of Baby-Friendly practices and barriers to proper practice implementation. In September 2016, the American Academy of Pediatrics released a statement on safe sleep concerns associated with skin-to-skin contact (Feldman-Winter, Goldsmith, AAP Committe on Fetus and Newborn, & AAP Task Force on Sudden Infant Death Syndrome, 2016). This statement addressed new case reports of instances of sudden postnatal collapse in newborns participating in early skin-to-skin contact. The statement reported that dangers of postnatal collapse and infant falls are likely increased when mothers fall asleep during skin-to-skin contact and when early skin-to-skin contact is not monitored closely by health care providers (Feldman-Winter et al., 2016). These concerns indicate the need for more detailed Baby-Friendly practice guidelines to address potential safety problems. Additionally, the impact of Baby-Friendly

practices has not been investigated in late-preterm infants. This was an important finding from our first manuscript that was not addressed in the dissertation study. Future study of the benefits of Baby-Friendly practices in this population is necessary to protect the health and breastfeeding needs of this vulnerable infant population.

Contribution of Research to Science and Nursing

The BFHI is a rapidly growing initiative in the U.S. (Baby-Friendly USA, 2012a, 2014). Although the program is valuable to addressing maternal needs and to influencing breastfeeding outcomes in other countries, the impact of Baby-Friendly practices had not been investigated in southeastern U.S. African American mothers; a population most at risk for poor breastfeeding rates and maternal/infant health outcomes (Atchan, Davis, & Foureur, 2013; CDC, 2016b; Jones, Power, Queenan, & Schulkin, 2015; Labbok et al., 2013; Sparks, 2010). This study provided both quantitative predictors for maternal adoption of Baby-Friendly practices and qualitative explanations of those barriers and facilitators to Baby-Friendly participation for the population. This study informs the health care provider's role in customization of Baby-Friendly practice implementation for the study population. Study results provide information to ultimately improve maternal/infant health outcomes, to facilitate mother/infant bonding and satisfaction, and to decrease healthcare expenditures associated with formula costs, poor maternal health, and infant morbidity and mortality.

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LIST OF APPENDICES

APPENDIX A MUSC IRB Approval Letter and Audit Report Acknowledgement

Institutional Review Board for Human Research (IRB)
Office of Research Integrity (ORI)
Medical University of South Carolina

Harborview Office Tower
19 Hagood Ave., Suite 601, MSC857
Charleston, SC 29425-8570
Federal Wide Assurance # 1888

APPROVAL:
This is to certify that the research proposal **Pro00053060** entitled:
Factors Influencing African American Mothers' Adoption of Baby-Friendly Practices: A Mixed-Methods Study Proposal

Submitted by: **Allison Munn**
Department: **Medical University of South Carolina**

For consideration has been reviewed by **IRB-I - Medical University of South Carolina** and approved with respect to the study of human subjects as adequately protecting the rights and welfare of the individuals involved, employing adequately methods of securing informed consent from these individuals and not involving undue risk in the light of potential benefits to be derived therefrom. Additionally, the Institutional Review Board for Human Research (IRB) recommends approval of the investigator's request for Waiver of Consent pursuant to 45 CFR 46.116(d) because the research involves no more than minimal risk to the subject, the waiver will not adversely affect the rights and welfare of the subjects, and the research could not be practicably carried out without the waiver. The Institutional Review Board for Human Research (IRB) also recommends approval of the investigator's request for a HIPAA Waiver of Authorization, as it appears that the criteria of the Privacy Rule have been satisfied. The HIPAA Waiver of Authorization was reviewed under expedited review procedures. No IRB member who has a conflicting interest was involved in the review or approval of this study, except to provide information as requested by the IRB.

Original Approval Date: **3/23/2016**
Approval Expiration: **3/22/2017**

Type: **Expedited**

Chairman, **IRB-I - Medical University of South Carolina**
Mark Hamner*

Statement of Principal Investigator:

As previously signed and certified, I understand that approval of this research involving human subjects is contingent upon my agreement:

1. To report to the Institutional Review Board for Human Research (IRB) any adverse events or research related injuries which might occur in relation to the human research. I have read and will comply with IRB reporting requirements for adverse events.
2. To submit in writing for prior IRB approval any alterations to the plan of human research.
3. To submit timely continuing review reports of this research as requested by the IRB.
4. To maintain copies of all pertinent information related to the research activities in this project, including copies of informed consent agreements obtained from all participants.
5. To notify the IRB immediately upon the termination of this project, and/or the departure of the principal investigator from this Institution and the project.

* ***Electronic Signature****: This document has been electronically signed by the IRB Chairman through the HSSC eIRB Submission System authorizing IRB approval for this study as described in this letter.*

Initial Review Approval of Full Board or Expedited Research 3/24/2016

APPENDIX A MUSC IRB Approval Letter and Audit Report Acknowledgement

Institutional Review Board for Human Research (IRB)
Office of Research Integrity (ORI)
Medical University of South Carolina

Harborview Office Tower
19 Hagood Ave., Suite 601, MSC857
Charleston, SC 29425-8570
Federal Wide Assurance # 1888

ACKNOWLEDGMENT: **Protocol: Pro00053060**
MUSC Reportable Event #: Adv00030590
Submission Type: Other Reports/Events

This is to certify that the reportable event for the research proposal entitled:
Factors Influencing African American Mothers' Adoption of Baby-Friendly Practices: A Mixed-Methods Study Proposal

Submitted by: **Allison Munn**
Department: **Medical University of South Carolina**

The IRB has reviewed the Audit Report and your response to the findings at the **July 5, 2016** meeting. The Board agreed to accept your response.

No IRB member who has a conflicting interest was involved in the review of this reportable event, except to provide information as requested by the IRB.

Acknowledgment Date: **7/5/2016**

Chair, IRB-I
Mark Hamner, M.D.

***Electronic Signature**: This document has been electronically signed by the IRB Chairman through the HSSC eIRB Submission System authorizing IRB approval for this study as described in this letter.*

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For Expedited or full Board Reportable Event Acknowledgment 7/21/2016

APPENDIX B McLeod Health IRB Approval Letter

McLeod Health
The Choice for Medical Excellence.

February 11, 2016

Allison Munn
1118 Wisteria Drive
Florence, SC 29501

RE: **Factors Influencing African American Mothers' Adoption of Baby-Friendly Practices: A Mixed-Methods Study Proposal. Initial Approval.**

Dear Allison,

Thank you for presenting **Factors Influencing African American Mothers' Adoption of Baby-Friendly Practices: A Mixed-Methods Study Proposal** to the McLeod Health Institutional Review Board on January 28, 2016. Your request for initial approval is granted.

Please note that this approval was given pending the following changes to the ICF: (1) removal of the Medical University Hospital as the primary destination for medical treatment, and (2) removal of the MUSC stamp from all pages.

The IRB acknowledges that the purpose of this study is to explore rural African American mothers' perceptions of barriers and facilitators to adoption of Baby-Friendly practices, along with their associated breastfeeding experiences and decisions after participation in Baby-Friendly practices. The study will take place over 2 months and will involve 150-200 medical record reviews, plus up to 20 mothers recruited for in-depth interviews post-discharge.

With this approval, the following documents were reviewed: study proposal and ICF. I am attaching a HIPAA waiver of authorization and the waiver of informed consent for your files.

Since you are interested in preseting outside of McLeod, please submit your presentation and/or publication piece to the IRB upon completion of your project. A committee will review your presentation and make a decision within 30 days.

The continuing review will expire on January 27, 2017 (12 months from the approval date). It is the responsibility of the principal investigator to request continuing review prior to the expiration date. This will ensure the McLeod IRB has adequate time to process the renewal. If you have any questions, please feel free to contact me at 843-777-2013.

Sincerely,

Natalie S. Bee
IRB Coordinator

555 East Cheves Street P.O. Box 100551 Florence, SC 29501-0551 Phone (843) 777-2000
McLeod Regional Medical Center McLeod Medical Center-Dillon McLeod Medical Center-Darlington
McLeod Physician Associates McLeod Children's Hospital McLeod Ambulatory Surgery Center
McLeod Home Health McLeod Health & Fitness Center McLeod Health Foundation

APPENDIX C: McLeod Health IRB Request for HIPAA Waiver of Authorization

McLeod Health
Institutional Review Board
Request for Waiver of Informed Consent

Use this form if you are requesting a waiver of consent/authorization to access records for research purposes. The criteria listed below satisfy the requirements of the federal research regulations.

If you are granting (a) a waiver of informed consent or (b) waiver of the consent procedure requirement to indicate all or alter some or all of the elements of informed consent you must document the responses to each of the following statements. Regulatory references: 45 CFR 46.117(c) and 45 CFR 46.116(d) (see below).

Name of Principal Investigator: Allison Munn

Title of Study: **Factors Influencing African American Mothers' Adoption of Baby-Friendly Practices: A Mixed-Methods Study Proposal**

	Please check
1. The research in its entirety involves no more than minimal risk.	
2. The waiver of informed consent will not adversely affect the rights and welfare of the subjects.	✓
3. It is not practicable to conduct the research without the waiver/alteration.	
4. Whenever appropriate, subjects will be provided with additional pertinent information after their participation.	

If you have checked the response to each of the four previous statements, in order to receive the waiver, you must (a) describe the reason(s) the waiver is necessary and (b) explain whether entire informed consent is being waived or only certain required elements are being waived. (If so, list which ones.)

_____

_____

If a waiver is granted under the previously mentioned conditions, documentation of informed consent (i.e. signed consent form) is also waived. Even if the waiver is granted, the IRB may require other conditions. The IRB may require the researcher to provide subjects with an information sheet (written summary) about the research.

IRB USE ONLY:

I certify that the attached waiver of consent/authorization request meets the criteria listed above. This request was approved by Full Board Review on January 28, 2016.

Walter E. Connor, MD

Print Name of IRB Chair
(or Member Conducting Expedited Review)

Signature of IRB Chair
(or Member Conducting Expedited Review)

45 CFR 46.116(d)
(d) An IRB may approve a consent procedure which does not include, or which alters, some or all of the elements of informed consent set forth in this section, or waive the requirements to obtain informed consent provided the IRB finds and documents that:
(1) The research involves no more than minimal risk to the subjects;
(2) The waiver or alteration will not adversely affect the rights and welfare of the subjects;
(3) The research could not practicably be carried out without the waiver or alteration; and
(4) Whenever appropriate, the subjects will be provided with additional pertinent information after participation.

45 CFR 46.117(c)
(c) An IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects if it finds either:
(1) That the only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the subject with the research, and the subject's wishes will govern; or
(2) That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context.
In cases in which the documentation requirement is waived, the IRB may require the investigator to provide subjects with a written statement regarding the research.

APPENDIX D MUSC IRB Off Campus Study Site Form

Office of Research Integrity
19 Hagood Ave, Suite 601
(843) 792-4148
Fax (843) 792-7457

Off Campus Study Site Form

PRO/HR # 00053060

STUDY TITLE: Factors Influencing African American Mothers' Adoption of Baby-Friendly Practices: A Mixed-Methods Study Proposal

PRINCIPAL INVESTIGATOR: Allison C. Munn

ADDRESS OF OFF-SITE FACILITY: McLeod Regional Medical Center, 555 East Cheves Street, PO Box 100551, Florence, SC 29501

***complete a new form for each off site facility*

NAME OF NON-MUSC INVESTIGATOR/ INSTITUTIONAL OFFICIAL: Marie Segars Saleeby

SECTION I.

A. Is the off-campus site "engaged" in human subject's research pertaining to this study?

To make this determination you will need to consult the OHRP website to assist in determining if the off campus site's role in this study makes the site "engaged." In general, an institution is considered *engaged* in a particular non-exempt human subjects research project when its employees or agents for the purposes of the research project obtain: (1) data about the subjects of the research through intervention or interaction with them; (2) identifiable private information about the subjects of the research; or (3) the informed consent of human subjects for the research. See the following link for categories and guidance: http://www.hhs.gov/ohrp/policy/engage08.html

1. Check either A or B below: (Completion of A or B is required)

☑ (A) Activities at the off-campus site are consistent with examples under Category A; the site is engaged in human subjects research

If you checked this section, please identify the specific type of activity or activities to be done at this off site campus by providing the number of the example from the OHRP website. For example: A1, A2, A3, etc.
A4

☐ (B) Activities at the off-campus site are consistent with examples under category B; the site is not engaged in human subjects' research

If you checked this section, please identify the specific type of activity or activities to be done at this off site campus by providing the number of the example from the OHRP website. For example: B1, B2, B3, etc.

2. Does the off-campus site have a Federal Wide Assurance (FWA)?

☑ Yes If yes, what is their FWA: 00007828
☐ No

3. Does the off-campus site have an Institutional Review Board for Human Research?

☑ Yes ☐ No

If Yes, the individual or site must contact that IRB and provide MUSC with documentation on whether IRB approval is required.

Please provide the name, address and phone number of the IRB:

Natalie S. Bee, BS - IRB Coordinator
McLeod Health - Research Dept.
P. O. Box 100551
Florence, SC 29501-0551
(843) 777-2013 (phone)

If Yes, has the off-campus site's IRB approved this study?

☑ Yes ☐ No

If the off-campus site's IRB has not approved this study, will review by that IRB be required?

☐ Yes ☐ No

If no, please explain.

SECTION II. *(Complete this section if you selected Section I.A(1)(A)).*
A. List all community individuals that will be engaged in the study.

Individuals are "engaged" if they will: (1) obtain data about research participants through intervention or interaction with them; or (2) obtain identifiable private information or identifiable specimens about the participants of the research – even if they do not directly interact with them or (3) the informed consent of human subjects for the research. More information pertaining to what constitutes engagement can be found in the OHRP guidance on engagement at: http://www.hhs.gov/ohrp/policy/engage08.html

Individual's Name *Use full legal name*	**Individual's Credentials and/or Position** *(e.g., M.D., Executive Director., recruitment specialist)*	**Individual's Role on the study** *(e.g. ,consent, deliver interventions, data analysis)*

To expand table, move to the end of the last row and press the tab key.
***Any community individual "engaged" in research will need to complete the CITI MIAMI training course and be listed on the eIRB personnel list.*

** If any community individual member of a facility is considered "engaged" in research, the site is then considered "engaged in research under section I(A)(1) of this form.

B. For each individual listed above who will be involved in the informed consent process, please complete the information below.

Name: Current Position/Role at the Facility: Human Subjects Education/Training:

You may copy and paste this box as many times as needed. Box expands.

***For those individuals and/or sites that do not have their own IRB, MUSC may consider taking on the role of IRB of Record. Please review the guidance provided by SCTR (pg2) on how to apply for a Federal Wide Assurance (FWA) / Institutional Authorization Agreement (IAA). Contact your MUSC IRB administrator if you have questions.

**MUSC may assume IRB responsibilities for non-affiliated institutions and investigators only under certain conditions (i.e., such as when an approved IRB Authorization Agreement exists designating the MUSC IRB to serve as the IRB of Record and the facility applies for and receives and FWA from OHRP).

**If the MUSC IRB takes on the role of IRB of Record, individuals must complete an IRB approved education program (CITI MIAMI) for the protection of human research participants prior to conducting this, or any other, research involving human participants.

APPENDIX E Participant Informed Consent Document

Medical University of South Carolina
CONSENT TO BE A RESEARCH SUBJECT

TITLE OF RESEARCH: Factors Influencing African American Mothers' Adoption of Baby-Friendly Practices: A Mixed-Methods Study

A. PURPOSE OF THE RESEARCH

You are being asked to volunteer for a research study. Research studies are voluntary and include only people who choose to take part. Please read this consent form carefully and take your time making your decision. As the researcher discusses this consent form with you, please ask her to explain any words or information that you do not clearly understand. The purpose of this study is to better understand what makes African American mothers more or less likely to participate in certain mother/infant bonding or "Baby-Friendly" practices and to breastfeed. You are being asked to participate in this study because you have delivered or will deliver a baby, and you have the opportunity to both participate in Baby-Friendly practices and to breastfeed. The investigator in charge of this study is Allison Munn. The study is being done at one site, McLeod Regional Medical Center in Florence, SC, and it will involve approximately 20 volunteers. You do not have to participate in this study. Your health care will not be affected in any way by your choice to not participate in the study. The information you share might help to plan ways to help other mothers have meaningful Baby-Friendly experiences and to successfully breastfeed.

B. PROCEDURES

A. If you agree to be in this study, the following will happen:
   1. The researcher will check your and your infant's medical records to gather general information about you like your age, number of children, address/county of residence, and education, along with information about your breastfeeding practices in the hospital and your infant's birth and health assessment information.
   2. A one-on-one interview will take place with the investigator in charge of this study (Allison Munn) within one month after your discharge from the hospital. The one-on-one interview will take place in a private location of your choosing. During this interview, you will be asked questions about what it is like to participate in Baby-Friendly practices after delivering your infant and what experiences you have had with feeding your infant. All interviews will be audio recorded so that the researcher may review the information in more depth later. An alternate name will be assigned to your medical record information and when the interviews are typed so your privacy will be protected.
   3. You may be withdrawn from the study without your consent if the researcher believes it is in your best interest or if you are unable to follow study procedures.

C. DURATION

Participation in the study will take place in one visit and will last approximately 30-45 minutes.

D. RISKS AND DISCOMFORTS

There is a risk of a loss of confidentiality of your personal information as a result of participation in this study.

1. The greatest risk of participating in this study is that you may be emotionally distressed by discussing your experiences. You do not have to answer any questions that make you feel uncomfortable. You are also free to quit the study at any time. If you feel extremely upset, a consult with a mental health provider can be arranged.
2. There is a risk of loss of confidentiality from participating in this study. To minimize this risk, an alternate name will be recorded with the study findings.
3. There is a risk that you could become tired or fatigued during interview or that you need to care for or feed your infant during the interview. Breaks will be offered, but if you become exhausted, the interview may be rescheduled.

E. BENEFITS

There may be no direct benefit to you from participating in this study. However, it is hoped that the information gained from the study will help the researcher learn more about how to help other African American mothers to participate in and have meaningful Baby-Friendly experiences and to successfully breastfeed.

F. COSTS

There will be no cost to you as a result of participation in this study.

G. PAYMENT TO PARTICIPANTS

In return for your time and effort, you will be given a $30 gift card at the end of the one-on-one interview session.

Payments that you receive from MUSC for participating in a research study are considered taxable income per IRS regulations. Payment types may include, but are not limited to: checks, cash, gift certificates/cards, personal property, and other items of value. If the total amount of payment you receive from MUSC reaches or exceeds $600.00 in a calendar year, you will be issued a Form 1099.

H. ALTERNATIVES

There is no alternative to participating in this study. You may choose not to participate.

I. SIGNIFICANT NEW FINDINGS

New information will be available as a result of this study. If you would like to hear about the results of this study, please let Allison Munn know. She will discuss the findings with interested participants after all interviews are completed.

J. FUTURE CONTACT

The researcher in charge of this study might like to contact you in the future about other research opportunities. Please initial by your choice below:

____Yes, I agree to be contacted

____No, I do not agree to be contacted

K. ADDITIONAL INFORMATION

Results of this research will be used for the purposes described in this study. This information may be published, but you will not be identified. Information that is obtained concerning this research that can be identified with you will remain confidential to the extent possible within State and Federal law. The investigators associated with this study, the sponsor, and the MUSC Institutional Review Board for Human Research will have access to identifying information. All records in South Carolina are subject to subpoena by a court of law.

In the event that you are injured as a result of participation in this study, you should immediately go to the emergency room of the nearest hospital, and tell the physician on call that you are in a research study. They will call your study doctor who will make arrangements for your treatment. If the study sponsor does not pay for your treatment, the Medical University Hospital and the physicians who render treatment to you will bill your insurance company. If your insurance company denies coverage or insurance is not available, you will be responsible for payment for all services rendered to you.

Your participation in this study is voluntary. You may refuse to take part in or stop taking part in this study at any time. You should call the investigator in charge of this study if you decide to do this. Your decision not to take part in the study will not affect your current or future medical care or any benefits to which you are entitled.

The investigators and/or the sponsor may stop your participation in this study at any time if they decide it is in your best interest. They may also do this if you do not follow the investigator's instructions.

Volunteers Statement

I have been given a chance to ask questions about this research study. These questions have been answered to my satisfaction. If I have any more questions about my participation in this study or study related injury, I may contact Allison Munn, 843-319-1465, Munnac@musc.edu. I may contact the Medical University of SC Hospital Medical Director (843) 792-9537 concerning medical treatment.

If I have any questions, problems, or concerns, desire further information or wish to offer input, I may contact the Medical University of SC Institutional Review Board for Human Research IRB Manager or the Office of Research Integrity Director at (843) 792-4148. I may also contact the McLeod Health Institutional Review Board for Human Research IRB/Research Department at 843-777-2013. This includes any questions about my rights as a research subject in this study.

I agree to participate in this study. I have been given a copy of this form for my own records.

If you wish to participate, you should sign below.

_____	_____	_____	_____
Signature of Person Obtaining Consent	Date	Signature of Participant	Date

APPENDIX F Standard HIPAA Authorization Document

Authorization to Use or Disclose (Release) Health Information that Identifies You for a Research Study

If you sign this document, you give permission to the Medical University of South Carolina (MUSC) to use or disclose (release) your health information that identifies you for the research study described here:

Factors Influencing African American Mothers' Adoption of Baby-Friendly Practices: A Mixed-Methods Study Proposal

The purpose of this study is to explore factors that influence African American mothers' participation in Baby-Friendly practices and their associated breastfeeding decisions.

The health information MUSC may use or disclose (release) for this research study includes information in your medical record, results of physical exams, medical history, lab tests or certain health information indicating or relating to your condition.

The health information listed above may be used by and/or disclosed (released) to the following, as applicable:

- The sponsor of the study including its agents such as data repositories or contract research organizations monitoring the study;
- Other institutions and investigators participating in the study;
- Data Safety Monitoring Boards;
- Accrediting agencies;
- Clinical staff not involved in the study whom may become involved if it is relevant;
- Health insurer or payer in order to secure payment for covered treatment;
- Parents of minor children is less than 16 years old. Parents of children 16 years old or older require authorization from the child; or
- Federal and state agencies and MUSC committees having authority over the study such as:
  - The Institutional Review Board (IRB) overseeing this study;
  - Committees with quality improvement responsibilities;
  - Office of Human Research Protections;
  - Food and Drug Administration;
  - National Institutes of Health; or
  - Other governmental offices, such as a public health agency or as required by law.

MUSC is required by law to protect your health information. By signing this document, you authorize MUSC to use and/or disclose (release) your health information for this research. Those persons who receive your health information may not be required by Federal privacy laws (such as the Privacy Rule) to protect it and may share your information with others without your permission, if permitted by laws governing them.

You do not have to sign this authorization. If you choose not to sign, it will not affect your treatment, payment or enrollment in any health plan or affect your eligibility for benefits. However, you will not be allowed to be a participant in this research study.

MUSC
MEDICAL UNIVERSITY of SOUTH CAROLINA
IRB Number: Pro00053060
Date Approved 3/23/2016

You may change your mind and revoke (take back) this Authorization at any time. Even if you revoke this Authorization, MUSC may still use or disclose (release) health information already obtained about you as necessary to maintain the integrity or reliability of the research study. If you revoke this Authorization, you may no longer be allowed to participate in this research study. To revoke this Authorization, you must write to:

Allison C. Munn RN, BSN, PhD Candidate
1118 Wisteria Drive
Florence, SC 29501

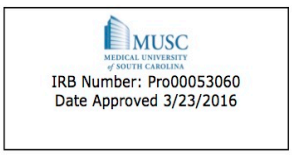
You will not be allowed to see or copy the information described on this Authorization as long as the research study is in progress. When the study is complete, you have a right to see and obtain a copy of the information.

Your health information will be used or disclosed when required by law. Your health information may be shared with a public health authority that is authorized by law to collect or receive such information for the purpose of preventing or controlling disease, injury or disability and for conducting public health surveillance, investigations or interventions. No publication or public presentation about the research study will reveal your identity without another signed authorization from you.

You will be given a copy of this Authorization. This Authorization will expire at the end of the research study. If you have questions or concerns about this Authorization or your privacy rights, please contact MUSC's Privacy Officer at 843-792-8740.

Regulations require that you be given a copy of the MUSC Notice of Privacy Practices (NPP) describing the practices of MUSC regarding your health information. One can be found at the end of this form.

[SIGNATURE PAGE TO FOLLOW]



Signature of Research Participant ages 16 & above* Date

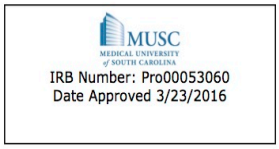
Signature of Research Participant's Legally Authorized Representative (if applicable) Date

Printed Name of Research Participant

Printed Name of Research Participant's Legally Authorized Representative (if applicable)

Representative's Relationship to Research Subject

*If the research participant is 16 to 18 years of age, signatures of both the research participant and the Legally Authorized Representative are required.



MUSC
MEDICAL UNIVERSITY of SOUTH CAROLINA

NOTICE OF PRIVACY PRACTICES

MUSC Organized Health Care Arrangement (OHCA)

THIS NOTICE DESCRIBES HOW MEDICAL INFORMATION ABOUT YOU MAY BE USED AND DISCLOSED AND HOW YOU CAN GET ACCESSS TO THIS INFORMATION. PLEASE REVIEW IT CAREFULLY.

The Medical University of South Carolina and its affiliates (including but not limited to the Medical University Hospital Authority, MUSC Physicians, and MUSC Physicians Primary Care) participate in a clinically integrated health care setting. As a result of this clinical integration, these organizations function as an Organized Health Care Arrangement (OHCA) as defined by the Health Insurance Portability and Accountability Act (HIPAA). For purposes of this notice, the members of the MUSC OHCA are collectively referred to in this document as "MUSC." W**e collect or receive this information about your past, present or future health condition to provide health care to you, to receive payment for this health care, or to operate the hospital and/or clinics.**

HOW WE MAY USE AND RELEASE YOUR PROTECTED HEALTH INFORMATION (PHI)

A. The following uses do NOT require your authorization, except where required by SC law:

1. For treatment. Your PHI may be discussed by caregivers to determine your plan of care. For example, the physicians, nurses, medical students and other health care personnel may share PHI in order to coordinate the services you may need.

2. To obtain payment. We may use and disclose PHI to obtain payment for our services from you, an insurance company or a third party. For example, we may use the information to send a claim to your insurance company.

3. For health care operations. We may use and disclose PHI for hospital and/or clinic operations. For example, we may use the information to review our treatment and services and to evaluate the performance of our staff in caring for you.

4. For public health activities. We report to public health authorities, as required by law, information regarding births, deaths, various diseases, reactions to medications and medical products.

5. Victims of abuse, neglect, domestic violence. Your PHI may be released, as required by law, to the South Carolina Department of Social Services when cases of abuse and neglect are suspected.

6. Health oversight activities. We will release information for federal or state audits, civil, administrative or criminal investigations, inspections, licensure or disciplinary actions, as required by law.

7. Judicial and administrative proceedings. Your PHI may be released in response to a subpoena or court order.

8. Law enforcement or national security purposes. Your PHI may be released as part of an investigation by law enforcement.

9. Uses and disclosures about patients who have died. We provide coroners, medical examiners and funeral directors necessary information related to an individual's death.

10. For purposes of organ donation. As required by law, we will notify organ procurement organizations to assist them in organ, eye or tissue donation and transplants.

11. Research. We may use your PHI if the Institutional Review Board (IRB) for research reviews, approves and establishes safeguards to ensure privacy.

MUSC
MEDICAL UNIVERSITY of SOUTH CAROLINA
IRB Number: Pro00053060
Date Approved 3/23/2016

12. To avoid harm. In order to avoid a serious threat to the health or safety of a person or the public, we may release limited information to law enforcement personnel or persons able to prevent or lessen such harm.

13. For workers compensation purposes. We may release your PHI to comply with workers compensation laws.

14. Marketing. We may send you information on the latest treatment, support groups and other resources affecting your health.

15. Fundraising activities. We may use your PHI to communicate with you to raise funds to support health care services and educational programs we provide to the community. You have the right to opt out of receiving fundraising communications with each solicitation.

16. Appointment reminders and health-related benefits and services. We may contact you with a reminder that you have an appointment.

B. You may object to the following uses of PHI:

1. Hospital directories. Unless you object, we may include your name, location, general condition and religious affiliation in our patient directory for use by clergy and visitors who ask for you by name.

2. Information shared with family, friends or others. Unless you object, we may release your PHI to a family member, friend, or other person involved with your care or the payment for your care.

3. **Health plan.** You have the right to request that we not disclose certain PHI to your health plan for health services or items when you pay for those services or items in full.

C. Your prior written authorization is required (to release your PHI) in the following situations:

You may revoke your authorization by submitting a written notice to the privacy contact identified below. If we have a written authorization to release your PHI, it may occur before we receive your revocation

1. Any uses or disclosures beyond treatment, payment or healthcare operations and not specified in parts A & B above.

2. Psychotherapy notes.

3. Any circumstance where we seek to sell your information.

WHAT RIGHTS YOU HAVE REGARDING YOUR PHI

Although your health record is the physical property of MUSC, the information belongs to you, and you have the following rights with respect to your PHI:

A. The Right to Request Limits on How We Use and Release Your PHI. You have the right to ask that we limit how we use and release your PHI. We will consider your request, but we are not always legally required to accept it. If we accept your request, we will put any limits in writing and abide by them except in emergency situations. Your request must be in writing and state (1) the information you want to limit; (2) whether you want to limit our use, disclosure or both; (3) to whom you want the limits to apply, for example, disclosures to your spouse; and (4) an expiration date.

B. The Right to Choose How We Communicate PHI with You. You have the right to request that we communicate with you about PHI in a certain way or at a certain location (for example, sending information to your work address rather than your home address). You must make your request in writing and specify how and where you wish to be contacted. We will accommodate reasonable requests.

C. The Right to See and Get Copies of Your PHI. You have the right to inspect and receive a copy of your PHI (including an electronic copy), which is contained in a designated record set that may be used to make decisions about your care. You must submit your request in writing. If you request a copy of this information, we may charge a fee for copying, mailing or other costs associated with your request. We may deny your request to inspect and receive a copy in

certain very limited circumstances. If you are denied access to PHI, you may request that the denial be reviewed.

D. The Right to Get a List of Instances of When and to Whom We Have Disclosed Your PHI. This list may not include uses such as those made for treatment, payment, or health care operations, directly to you, to your family, or in our facility directory as described above in this Notice of Privacy Practices. This list also may not include uses for which a signed authorization has been received or disclosures made more than six years prior to the date of your request.

E. The Right to Amend Your PHI. If you believe there is a mistake in your PHI or that a piece of important information is missing, you have the right to request that we amend the existing information or add the missing information. You must provide the request and your reason for the request in writing. We may deny your request in writing if the PHI is correct and complete or if it originated in another facility's record.

F. The Right to Receive a Paper or Electronic Copy of This Notice: You may ask us to give you a copy of this Notice at any time. For the above requests (and to receive forms) please contact: Health Information Services (Medical Records), Attention: Release of Information / 169 Ashley Avenue / MSC 369 / Charleston, SC 29425. The phone number is (843) 792-3881.

G. The Right to Revoke an Authorization. If you choose to sign an authorization to release your PHI, you can later revoke that authorization in writing. This revocation will stop any future release of your health information except as allowed or required by law.

H. The Right to be Notified of a Breach. If there is a breach of your unsecured PHI, we will notify you of the breach in writing.

HEALTH INFORMATION EXCHANGES

MUSC, along with other health care providers belongs to health information exchanges. These information exchanges are used in the diagnosis and treatment of patients. As a member of these exchanges, MUSC shares certain patient health information with other health care providers. Should you require treatment at another location that is a part of one of these exchanges, that provider may gather historical health information to assist with your treatment. You have the option of saying that this cannot be done. If you choose not to take part in these alliances, please contact the MUSC Privacy Office at 792-4037.

HOW TO COMPLAIN ABOUT OUR PRIVACY PRACTICES

If you think your privacy rights may have been violated, or you disagree with a decision we made about access to your PHI, you may file a complaint with the office listed in the next section of this Notice. **Please be assured that you will not be penalized and there will be no retaliation for voicing a concern or filing a complaint. We are committed to the delivery of quality health care in a confidential and private environment.**

PERSON TO CONTACT FOR INFORMATION ABOUT THIS NOTICE OR TO COMPLAIN ABOUT OUR PRIVACY PRACTICES

If you have any questions about this Notice or any complaints about our privacy practices please call the Privacy Officer (843) 792-4037, the Privacy Hotline (800) 296-0269, or contact in writing: HIPAA Privacy Officer / 169 Ashley Avenue / MSC 332 / Charleston SC 29425. You also may send a written complaint to the Office of Civil Rights. The address will be provided at your request.

CHANGES TO THIS NOTCE

We reserve the right to change the terms of this Notice at any time. We also reserve the right to make the revised or changed Notice effective for existing as well as future PHI. This Notice will always contain the effective date. You may view this notice and any revisions to it at: http://www.musc.edu/privacy.

EFFECTIVE DATE OF THIS NOTICE

This Notice went into effect on April 14, 2003.
Revised September 2013.

MUSC
IRB Number: Pro00053060
Date Approved 3/23/2016

APPENDIX G Recruitment Flyer

Congratulations

You Have a New Addition

Would you like to participate in a research study about experiences with your new baby?

Sharing your thoughts about the first days with your new baby could help other Moms like you

Payment for Participation in Available

If you delivered at McLeod, are an African American Mother with a newborn infant, and you are 18 years of age or older, please contact:

Allison Munn

843-319-1465

Munnac@musc.edu

MUSC
MEDICAL UNIVERSITY of SOUTH CAROLINA
IRB Number: Pro00053060
Date Approved 3/23/2016

APPENDIX H Letters of Permission from Journal Editor to Use Published Paper in Compendium

Reply Reply All Forward

FW: Breastfeeding Medicine - Manuscript ID BFM-2015-0135.R2

Ballen, Karen [KBallen@liebertpub.com]

To: Munn, Allison

Thursday, August 25, 2016 4:48 PM

Flag for follow up

Retention Policy: Inbox (6 Months) Expires: 2/21/2017

CAUTION: External

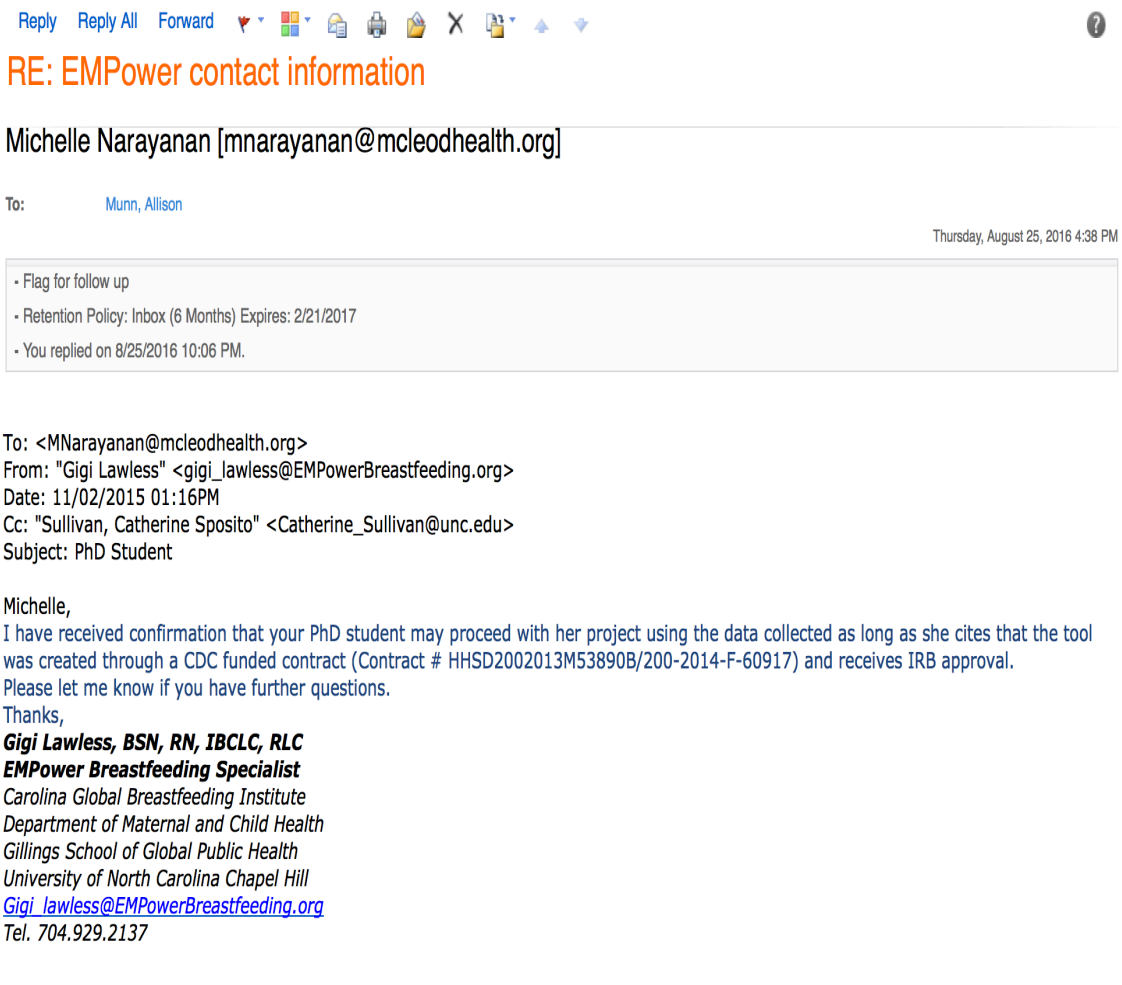
Dear Allison:

Copyright permission is granted for inclusion of your article from BREASTFEEDING MEDICINE in you dissertation.

Kind regards,

Karen Ballen
Manager, Reprints, Permissions and Open Access
>
> ---------- Forwarded message ----------

APPENDIX I Letter of Permission to Use EMPower Data Collection Tool for Baby-Friendly Study



Reply Reply All Forward

RE: EMPower contact information

Michelle Narayanan [mnarayanan@mcleodhealth.org]

To: Munn, Allison

Thursday, August 25, 2016 4:38 PM

- Flag for follow up
- Retention Policy: Inbox (6 Months) Expires: 2/21/2017
- You replied on 8/25/2016 10:06 PM.

To: <MNarayanan@mcleodhealth.org>
From: "Gigi Lawless" <gigi_lawless@EMPowerBreastfeeding.org>
Date: 11/02/2015 01:16PM
Cc: "Sullivan, Catherine Sposito" <Catherine_Sullivan@unc.edu>
Subject: PhD Student

Michelle,
I have received confirmation that your PhD student may proceed with her project using the data collected as long as she cites that the tool was created through a CDC funded contract (Contract # HHSD2002013M53890B/200-2014-F-60917) and receives IRB approval.
Please let me know if you have further questions.
Thanks,
Gigi Lawless, BSN, RN, IBCLC, RLC
EMPower Breastfeeding Specialist
Carolina Global Breastfeeding Institute
Department of Maternal and Child Health
Gillings School of Global Public Health
University of North Carolina Chapel Hill
Gigi_lawless@EMPowerBreastfeeding.org
Tel. 704.929.2137

APPENDIX J Study Protocol

Factors Influencing African American Mothers' Adoption of Baby-Friendly Practices: A Mixed-Methods Study Proposal

Allison C. Munn

Medical University of South Carolina

SPECIFIC AIMS

In the United States (U.S.), low rates of breastfeeding persist despite evidence that breast milk is imperative for optimal infant nutrition, essential immunological and anti-inflammatory benefits, and protection from illnesses and diseases [1-5]. Nevertheless, the decision to breastfeed is ultimately a mother's personal choice [1, 2, 4-7]. The U.S. Surgeon General has estimated that if 90% of U.S. families followed the recommended guidelines to breastfeed exclusively for at least six months, the U.S. would save $13 billion dollars annually on associated morbidity and mortality [5].

In 2001, the World Health Organization (WHO) and the United Children's Fund (UNICEF) launched the Baby-Friendly Hospital Initiative (BFHI) to establish supportive environments and educational services that enhance mothers' initial breastfeeding experiences and influence maternal decisions to initiate maintain, and exclusively breastfeed for longer durations [3, 4, 15-18]. International studies suggest that BFHI maternal support and breastfeeding promotion practices, demonstrated through implementation of the *Ten Steps to Successful Breastfeeding (Ten Steps),* increase breastfeeding initiation and exclusivity rates on a national level; however, the effect of these Baby-Friendly initiatives on breastfeeding decisions in the U.S. is less clear [1, 24, 26-28]. Currently, there is little evidence assessing the characteristics and essence of mothers' perceptions and experiences with Baby-Friendly practices which hinder the accumulation of knowledge about factors that contribute to maternal adoption of the Baby-Friendly practices and breastfeeding initiation, exclusivity, and duration [10, 26, 30, 31]. Studies of breastfeeding among racial/ethnic minorities, mothers with lower education, and low-income mothers have demonstrated that the BFHI positively affected breastfeeding decisions for disadvantaged mothers living in urban settings [27, 32]. However, no studies have reported mothers' breastfeeding perceptions, experiences, or decisions for disadvantaged women living in rural areas of the southeastern U.S., thus limiting knowledge of potential barriers and facilitators to breastfeeding for this population [11].

The purpose of this convergent parallel mixed-methods study is to explore rural African American mothers' perceptions of barriers and facilitators to adoption of Baby-Friendly practices, along with their associated breastfeeding experiences and decisions after participation in Baby-Friendly practices. Quantitative methods will include data collection from chart reviews of mother/infant dyads to determine if those who participated in more than half of the *Ten Steps* have higher rates of breastfeeding initiation, longer postpartum hospital breastfeeding duration, and increased breastfeeding exclusivity as compared to mothers who did not participate in more than half of those same Baby-Friendly practices [48]. Additionally, analysis of demographic data, including race/ethnicity, county of residence, and insurance type, will determine if participation in more than half of the *Ten Steps* is associated with racial/ethnic, socioeconomic, and geographic factors. The qualitative arm of the study will include in-depth interviews with as many as 20 participants recruited during postpartum hospitalization. The interviews will be conducted up to 4 weeks post-discharge and will include an exploration of barriers and facilitators to maternal adoption of the BFHI, perceptions and experiences with Baby-Friendly practices, and self-reported current breastfeeding status.

Aim 1. Investigate potential relationships of racial/ethnic, insurance type, and geographic factors with participation in more than half of the *Ten Steps,* and

breastfeeding initiation, duration, and exclusivity through retrospective medical record review of all mothers who deliver during the two-month study time frame.
Aim 2. Identify barriers and facilitators to maternal adoption of Baby-Friendly practices, including maternal experiences and perceptions for a subset of rural-dwelling African American mothers (n ≤ 20) who deliver during the two-month study time frame in a U.S. southeastern regional hospital.

Aim 2.1. Explore maternal breastfeeding and Baby-Friendly experiences and decisions and obtain current breastfeeding status through in-depth interviews.

Aim 2.2. Compare mothers' reported experiences of Baby-Friendly practices to documentation of those practices in the medical record to determine consistencies or inconsistencies between the medical record and mothers' perceptions of Baby-Friendly care practices**.**
Aim 3. Explore the influence of barriers and facilitators to maternal adoption of Baby-Friendly practices, maternal perceptions, and experiences on breastfeeding decisions by merging and synthesizing qualitative and quantitative results.

Impact. The long-term goal of the exploration is to identify best breastfeeding promotion initiatives for African American women while offering insight into interventions that will support mothers, improve breastfeeding practices, improve maternal and infant health outcomes, and decrease healthcare expenditures from preventable illnesses and diseases in the southeastern U.S.

A. SIGNIFICANCE:

This study addresses a highly significant and multidimensional health promotion and maintenance concern in the United States (U.S.): improving mother/infant dyad bonding and health outcomes through improved rates of breastfeeding initiation, exclusivity, and duration [2, 5]. The research addresses the maternal support processes associated with the Baby-Friendly Hospital Initiative (BFHI) in a regional hospital in the southeastern U.S.
A.1. Low rates of breastfeeding in the U.S. lead to poorer infant health outcomes and increased healthcare costs. Maternal decisions to formula feed or to cease breastfeeding before infants are six months of age lead to increased healthcare costs by precluding the health benefits breastfeeding provides [2, 5]. Breastfeeding has been associated with providing immunologic and anti-inflammatory benefits that reduce infants' risk of common illnesses such as upper respiratory infections, otitis media, and pneumonia as well as the life threatening gastrointestinal condition, necrotizing enterocolitis [5, 19]. Babies who are breastfed are less likely to develop asthma, and babies who receive breast milk for six months have a decreased risk of childhood obesity [5, 19]. Additionally, mothers who breastfeed have a decreased risk for breast and ovarian cancer. The U.S. Surgeon General has estimated that families who follow exclusive breastfeeding recommendations can save between $1,200-$1,500 dollars in formula expenditures. Furthermore, the U.S. could save up to $13 billion dollars in annual medical costs if 90% of families exclusively breastfed for six months [5].
A.2. Studies of evidence-based methods to enhance breastfeeding in the U.S. are needed. The Baby-Friendly Hospital Initiative (BFHI) was introduced by the World Health Organization (WHO) and the United Children's Fund (UNICEF) in 2001 to establish supportive environments and educational services that enhance initial

breastfeeding experiences for mothers and infants [3, 4, 15]. Hospitals and birthing centers gain Baby-Friendly designation status by demonstrating implementation of the *Ten Steps to Successful Breastfeeding* and compliance with the WHO's *International Code of Marketing for Breast Milk Substitutes* [3, 20]. The "Ten Steps" include ten maternal support and breastfeeding promotion practices, and "The Code" includes limiting the advocacy and marketing of formula to new mothers, along with paying a fair market price for formula within the centers [17, 18, 21]. Baby-Friendly practices are based on the premise that individual attitudes towards breastfeeding are largely influenced by breastfeeding education during the early prenatal period, positive birth and initial breastfeeding experiences, and continued provider support [2, 3, 22]. While international studies suggest that Baby-Friendly practices increase breastfeeding initiation and exclusivity rates on a national level, the impact of the BFHI on breastfeeding practices in the U.S. is less clear [5, 27, 28, 58, 59]. There remains uncertainty about how the underlying mechanisms of the initiative influence maternal breastfeeding perceptions, experiences, and decisions to initiate, maintain and exclusively breastfeed [26-28].

A.3. Racial/ethnic, socioeconomic, geographic disparities exist in the U.S. that negatively influence breastfeeding practices. African American mothers and low-income mothers have historically had low rates of breastfeeding initiation, duration, and exclusivity resulting in health disparities associated with increased infant morbidity and mortality; yet little is known about contributing factors affecting this trend [1, 5, 10, 11]. African American mothers have 50% lower breastfeeding rates than white mothers of similar income or education level [5]. However, evidence also indicates that income and education level have a positive association with breastfeeding [5, 12]. Women who qualify for Women, Infants, and Children (WIC) services and those with less than a high school education are at a higher risk for poorer breastfeeding rates than women of higher education and income levels. Similarly, geographic disparity exists, as evidenced by low rates of breastfeeding for women living in rural areas of the country and in the southeastern U.S. [13]. Evidence suggests that a combination of factors including cultural beliefs, maternal breastfeeding perceptions, lack of access to breastfeeding education resources, return to work issues, and lack of social support may contribute to lower rates of breastfeeding for these groups, with rural African American mothers having the greatest risk of low breastfeeding rates [13, 14]. Qualitative aspects of this mixed-methods study will further explore potential contributing factors to disparity and low breastfeeding rates for mothers in these disadvantaged groups. Additionally, mothers' perceptions will help determine how methods associated with the BFHI influence breastfeeding decisions.

INNOVATION:

B.1. Population innovation. Studies of racial/ethnic minorities, mothers with lower education, and those with lower incomes have demonstrated that the BFHI positively affects breastfeeding practices for disadvantaged mothers living in urban settings [27, 32]. However, there are no studies of mothers' breastfeeding perceptions, experiences, and practices for these groups living in rural areas of the southeastern U.S. Thus, there is limited knowledge of potential barriers and facilitators to breastfeeding for this population [11, 60].

B.2. Study design innovation. Identifying and exploring maternal perceptions is important because a mother's attitudes and beliefs largely determine if she will initiate and maintain breastfeeding. Unfortunately, few studies exist that examine mothers'

perceptions and experiences with breastfeeding in Baby-Friendly environments [7, 10, 61]. Most evidence regarding breastfeeding outcomes in the U.S. comes from retrospective observational survey studies. Utilizing only retrospective studies presents several barriers to drawing conclusions about causal effects with Baby-Friendly practices and breastfeeding practices [62-64]. History, maturation, and participant report biases present threats to validity when utilizing data from these retrospective self-reports. This proposed mixed-methods exploration will address these gaps through both retrospective chart reviews and prospective in-depth interviews to identify barriers and facilitators to adoption of Baby-Friendly practice in a rural African American U.S. southeastern population [2, 5, 23, 50]. Information gained from the study will serve as a foundation for implementing new breastfeeding promotion strategies that support racially, ethnically, economically, and educationally diverse rural mothers residing in the southeastern U.S.

C. APPROACH

C. 1. Baby-Friendly Practices Defined. While Baby-Friendly status is a global designation, Baby-Friendly USA is responsible for the initiative's implementation in this nation [22]. Successful acquisition of the Baby-Friendly status requires facilities to commit time, staff training expenses, and designation fee expenses when following the 4D pathway to Baby-Friendly designation [22, 23]. This pathway is a 4-phase designation process involving changes in institution "policies, curriculum, action plans, quality improvement projects, staff training, and competency verification" [22, para. 3], as well as a site interview during a certification visit. Moreover, successfully following the 4D pathway requires nurses to commit to the Baby-Friendly philosophy, as operationalized through the *Ten Steps to Successful Breastfeeding* (Appendix A) [24, 25]. The *Ten Steps* document outlines the systematic changes necessary to support mothers and to influence breastfeeding attitudes. Saadeh (1996, 2012) noted that the *Ten-Steps* can be categorized into the following five elements: (1) maternal education and support, (2) unrestricted mother infant contact, (3) infant feeding on demand, (4) an exclusive breast milk diet, and (5) maternal postnatal support [17, 18]. In short, Baby-Friendly Practices are defined as breastfeeding promotion interventions in a birthing facility or hospital that align with the *Ten Steps to Successful Breastfeeding*. An operational definition of Baby-Friendly practices can be obtained by examination of the guidelines and evaluation criteria outlined by Baby Friendly USA (2012a), followed by the collection of data on mothers' rates of breastfeeding initiation, exclusivity, and duration [22].

C.2. Social Ecological Model. The Social Ecological Model (SEM) provides a theoretical framework to explain how multi-level factors affecting mothers' breastfeeding attitude, knowledge, beliefs, experiences, and perceptions, including maternal demographic characteristics, infant characteristics and clinical health indicators, and delivery variables, influence maternal participation in Baby-Friendly practices and breastfeeding decisions. The SEM provides insight on how factors at the intrapersonal, interpersonal, environment, and policy level interact within social environments to influence health behavior and outcomes [65, 66]. Application of the SEM to the BFHI (Appendix B) explains how breastfeeding outcomes are influenced by factors on multiple levels, including the patient (mother/infant dyad), provider, organizational, and systems levels [65, 66]. Examination of the interaction of multiple factors within the social environment, beyond the influence of a single level factor, provides deeper understanding of a phenomenon and offers insights to create effective and innovative

solutions. Thus, the conceptual model of the BFHI using the SEM is used to guide this exploration.

C.3. Overall Strategy. The overall strategy of this study is to use a convergent parallel mixed-methods design to explore rural African American mothers' experiences with Baby-Friendly environments, perceptions of Baby-Friendly practices, barriers and facilitators to adoption of Baby-Friendly practices, and associated breastfeeding decisions. The study location is a U.S. southeastern regional hospital, McLeod Regional Medical Center (McLeod), in Florence, South Carolina (S.C.). For ***Aim 1 (quantitative outcomes)***, the Principal Investigator (PI) will perform a retrospective medical record review to investigate the relationship of maternal demographic characteristics and both participation in more than half of the *Ten Steps* and maternal breastfeeding decisions for all mothers who deliver in McLeod during a two-month time period. For ***Aim 2 (qualitative outcomes),*** the PI will perform both retrospective medical record review and prospective in-depth interviews for a subset of rural-dwelling African American mothers ($n \leq 20$) to identify factors influencing breastfeeding decisions, barriers and facilitators to maternal adoption of Baby-Friendly practices, and consistencies or inconsistencies between mothers' reported Baby-Friendly experiences and documentation of those Baby-Friendly practices in the medical record. Duration of enrollment is approximately 2 months and includes strategies to execute both quantitative (Aim 1) and qualitative (Aim 2) aims. Aim 1 includes obtaining a waiver of consent to review retrospectively the medical records of all available mother/infant dyads during the 2-month enrollment period. Aim 2 will transpire during the same 2-month period and includes recruitment, consent, and enrollment of up to 20 participants for maternal/infant medical record review and for an in-depth interview occurring up to 4 weeks post-discharge. ***Aim 3*** will involve the merging and synthesizing of qualitative and quantitative data after individual data set analysis to produce a more comprehensive understanding of factors that influence maternal adoption of Baby-Friendly practices and breastfeeding decisions. Aim 1 will provide data for mothers of all ethnicities/races, while Aim 2 will provide specific data on African American mothers. Additional demographic factors of interest that may contribute to mothers' breastfeeding decisions and acceptance of Baby-Friendly initiatives will include insurance type (as a proxy for income level), county of residence (to determine rurality), maternal age, marital status, employment status, number of children, prior breastfeeding experience, and education level. Infant characteristics and clinical indicators of infant health including birth weight, Apgar scores, gestational age, blood glucose levels, bilirubin levels, and temperature, along with delivery related factors of mode of delivery, time and day of the week infant is delivered, and unit census are also factors for consideration in the data synthesis section. The study will be approved by the Institutional Review Board at the Medical University of South Carolina (MUSC) and McLeod Regional Medical Center.

Table 1: Strategies to address study aims

Strategy	Sample	Goal	Analysis
Medical Record Review (Aim 1 and Aim 2.1)	Medical records of mother/infant dyads during the 2-month	• Identify demographic characteristics of mothers and divide mothers into subgroups based	Aim 1. Descriptive analysis of demographic characteristics will break population into subgroups. Chi-square tests for

Strategy	Sample	Goal	Analysis
	study enrollment period	upon findings. • Identify mothers who participated in more than half of the *Ten Steps* for each demographic subgroup. • Identify breastfeeding initiation, duration, and exclusivity for each demographic subgroup. • Identify which demographic, clinical, and delivery variables contribute to participation in more than half of the Ten Steps and breastfeeding initiation, duration, and exclusivity.	dichotomous variables and one-way Analysis of Variance (ANOVA) for continuous variables will compare outcomes among subgroups. Multiple stepwise regression will determine which predictor variables contribute to the overall prediction of the dependent variables (DVs). Binary logistical regression will be used for categorical DVs. Linear regression will be used for continuous DVs Aim 2.1. Identify demographic characteristics and breastfeeding decisions for all mothers (n ≤ 20) to link medical record data to mothers' qualitative data and to look for similarities or discrepancies between mothers' reports of Baby-Friendly support practices and documentation of practices in the medical record
In-Depth Interviews (Aim 2.2)	Purposive sample of up to 20 mother/infant dyads during the 2-month study enrollment period	Identify barriers and facilitators to maternal adoption of Baby-Friendly practices for rural African American mothers by exploring maternal perceptions and experiences with Baby-Friendly practices.	Directed Content Analysis including division of data into thematic categories, and focused coding based upon key concepts from the BFHI SEM conceptual model (Appendix B)
Synthesizing of Quantitative and Qualitative data (Aim 3)	Data from Aim 1 and Aim 2 presented in tables and charts	• Merge data after individual data set analysis to gain insight into the factors affecting maternal adoption of Baby-Friendly Practices for the study population.	Qualitative and quantitative data presented in charts and tables. Comprehensive analysis of findings in the discussion section. Discuss the association of demographic variables and both participation in the *Ten Steps* and breastfeeding initiation, duration, and exclusivity. Use qualitative data to gain a

Strategy	Sample	Goal	Analysis
			more complete understanding of rural African American mothers' experiences with the *Ten Steps,* barriers and facilitators to breastfeeding related to demographic characteristics, and decisions about breastfeeding.

C.4. Preliminary Studies. Philipp et al. [32] conducted the first major BFHI study in the U.S. at Boston Medical Center (BMC); the patient population consisted of a majority of Black mothers with low education level and low socio-economic status. The BMC report is a landmark study for the BFHI in the U.S. because of reported successful breastfeeding outcomes in a disadvantaged group. Breastfeeding initiation increased from 58% pre-BFHI designation to 86.5% post-BFHI designation. Evidence indicates mothers' breastfeeding beliefs and perceptions largely contribute to breastfeeding decisions; however, few studies have investigated mothers' perceptions and experiences in Baby-Friendly environments [10, 27, 61, 67, 68]. In two separate studies, researchers reported maternal perceptions related to Baby-Friendly practices and breastfeeding; however, those perceptions were collected through provider sources rather than maternal interviews [10, 27]. Providers reported that mothers are eager to breastfeed, but challenges such as perceived insufficient milk supply, infant hunger, return to work issues, body image issues, sore nipples, and lack of breastfeeding education contributed to early breastfeeding cessation [10, 27]. Finally, the Centers for Disease Control (CDC) released a new report in October 2015, reporting U.S. hospitals' adherence to the *Ten Steps* [48]. Data from the Maternity Practices in Infant Nutrition Care (mPINC) survey was collected from "all birth facilities in all states, the District of Columbia, and territories [48, para. 2] to characterize birthing facilities' adherence to Baby-Friendly practices. A portion of the CDC's report characterizes regions by implementation of more than half of the *Ten Steps* or implementation of half or less than half of the *Ten Steps* in birthing facilities. For this reason, the proposed study will examine successful completion of more than half of the *Ten Steps* versus successful completion of half or less than half of the *Ten Steps* to align with the current CDC report [48]. This proposed study provides an opportunity to collect information from mothers to reveal new insights into factors affecting maternal adoption of Baby-Friendly initiatives and breastfeeding decisions using the most current information on adherence to the *Ten Steps* in varied regions of the U.S.

C.5. Setting and participants. The study recruitment location is McLeod Regional Hospital in Florence, S.C. McLeod serves 15 counties, including all six counties of the Pee Dee Region [33, 34, 69]. The Pee Dee is mostly rural, with state researchers classifying Florence as the only urban county within the region. The region is "known for its small towns, agricultural output, and isolation" [69, p. 3]. The population of the surrounding counties is of low-socioeconomic status, falling below national and state standards in poverty, income, and unemployment. The racial make-up of the area is approximately 43% African American/Black, 55% White or White-non-Hispanic and 5% other. This accounts for a large African American subgroup when compared to the racial

composition of the entire state that is 29% African American, 68% White, and 6% other. The population served by McLeod is representative to reflect current racial/ethnic, geographic, and socioeconomic disparity in this region of S.C.

The sample population is drawn from mothers living in the Pee Dee Region who delivered their infants in McLeod. McLeod typically has 180 deliveries per month with African American mothers comprising approximately 47% of the delivery population. This is similar to the African American population of the Pee Dee Region and should serve as a representative sample [70]. Spanish speaking mothers are excluded because they comprise only 1% of deliveries, and McLeod has not yet adopted Baby-Friendly education materials translated in other languages. For these reasons, all non-English speaking mothers are excluded from the study. Mothers of multiples are included because it is important to understand barriers and facilitators to breastfeeding for mothers of multiples who face extra feeding challenges.

Table 2: Inclusion and Exclusion Criteria for the study (Applies to both Aims 1 & 2 unless otherwise noted):

Inclusion Criteria	Exclusion Criteria
Mothers aged 18 years and older (Aim 1) African American mothers aged 18 years and older (Aim 2)	Infants with congenital abnormalities that prevent breastfeeding or require admission to the NICU
Infants 38 weeks gestation and older	Infants admitted to the NICU
Infants delivered at McLeod Regional Medical Center	Mothers with HIV
	Mothers unable to breastfeed due to illness or complication with delivery
	Infant death
	Mothers prescribed medications or taking recreational substances contraindicated with breastfeeding
	Mothers with Department of Social Services involvement
	Non-English speaking mothers

C.6. Design Overview and Investigation Components. This convergent parallel mixed-methods study will utilize qualitative and quantitative components to provide data to increase understanding of the complex issue of adoption of best breastfeeding promotion practices in the study population [36].

C.6.1. Aim 1 (Quantitative).

Design. The purpose of the Aim is to investigate the relationship of maternal demographic characteristics and both participation in more than half of the *Ten Steps* and maternal breastfeeding decisions for all mothers delivering at McLeod during a two-month time period. Aim 1 is the larger, quantitative portion of the study and is accomplished through obtaining a waiver of consent for de-identified data through retrospective medical record review for all maternal/infant dyads who deliver during the study time period.

Sample Size Determination. Study enrollment time frame is the study driver rather than sample size. McLeod services approximately 180 deliveries per month. The PI expects to collect data from approximately 150 to 200 eligible maternal/infant dyads over two months. Maternal/infant dyad medical records will be searched to obtain information on number and type of participation in the *Ten Steps*, race/ethnicity, insurance type, geographic factors, and breastfeeding initiation, duration, and exclusivity. Additional maternal demographic variables and infant clinical health outcome variables will be included in the medical record review and will aid in identification of barriers and facilitators to maternal adoption of Baby-Friendly practices and breastfeeding decisions.

Data collection and measures. Measures will be collected through retrospective medical record review of all eligible mother/infant dyads. The PI will collect each measure following specific study guidelines to ensure consistency and fidelity in determination of variable definitions and in data collection processes.

Operational Definitions. Participation in Baby-Friendly practices is operationalized through the *Ten Steps* (Appendix A) and documented in McLeod's Electronic Medical Record (EMR) to reflect maternal participation in each step. Participation in the *Ten Steps* is determined by using the Baby-Friendly Hospital Initiative Evaluation Criteria, and is collected using a chart review tool developed by EMPower Breastfeeding Enhancing Maternity Practices (EMPower) [45, 46]. EMPower was created through a Centers for Disease Control and Prevention (CDC) funded contract (Contract # HHSD2002013M53890B/200-2014-F-60917) and is a "hospital-based quality improvement initiative focusing on maternity practices leading to Baby-Friendly designation" [47, para. 1]. EMPower aids hospitals and birthing centers to implement the steps necessary to follow the 4D pathway and to become designated as Baby-Friendly. Operational definitions and measures to determine participation in each of the *Ten Steps* are explained in the EMPower Chart Review Form (See Appendix C). Breastfeeding initiation, duration, and exclusivity are defined in McLeod's EMR according to the Baby-Friendly Guidelines and Evaluation Criteria and are charted accordingly by the nursing staff and lactation consultants [46]. This standardized documentation will minimize confusion in the definition of exclusive breastfeeding and will provide reliable results for mean duration of exclusive breastfeeding. Geographic Factors or Rurality will be determined by using the Office of Management and Budget (OMB) definition of Metropolitan, Micropolitan, and Nonmetro areas [37, 38, 71, 72]. A Metropolitan area is generally defined as an urban county with 50,000 or more people. A Micropolitan area contains between 10,000-49,000 persons, and Nonmetro areas are all remaining counties that are not part of a metro or micro area. Florence is the only county served by McLeod that is considered a metropolitan statistical area. The PI will gather zip code and/or county of residence from maternal medical records to determine mothers' classification of urban or rural dwelling. Mothers who reside in or have a zip code associated with Florence county will be classified as urban dwelling. Mothers residing in counties of the Pee Dee Region classified as Micropolitan or Nonmetro statistical areas will be classified as rural dwelling.

Variable Measures. Maternal demographic categorical variables include race/ethnicity, insurance type (as a proxy for income level), county of residence (urban/rural), marital status (married/not married), employment status (unemployed, part-time, full-time), prior breastfeeding experience (yes/no), and education level (less

than high school, high school graduate, some college, Bachelor's degree, Graduate degree). Maternal continuous variables include maternal age and number of children. These demographic characteristics will be divided into subcategories based on findings to form independent variables for the overall study analysis to determine the relationship between maternal demographic characteristics and both participation in Baby-Friendly practices and breastfeeding decisions.

The PI will collect data on maternal participation in each individual step of the *Ten Steps* using the EMPower data collection tool. McLeod is currently working to implement each of the Ten Steps into practice for all eligible mothers who deliver at the facility. Thus, the PI expects to have adequate participation in each of the *Ten Steps* to dichotomize the measure into mothers who participated in more than half of the *Ten Steps* and mothers who did not participate in more than half of the *Ten Steps*. However, if few mothers participate in more than half of the Ten Steps, analysis will be conducted on maternal participation in each individual step or on a combination of steps wherein there was adequate participation from the maternal population.

Data on breastfeeding decisions will primarily be collected through reports generated from McLeod's EMR and, when necessary, by using the EMPower data collection tool. The current rate of breastfeeding initiation at McLeod is approximately 50%, thus the PI will dichotomize breastfeeding initiation (did or did not initiate breastfeeding). Additionally, length of time after delivery until breastfeeding is initiated will be collected for each mother who initiates breastfeeding and will serve as a continuous measure for breastfeeding initiation. Breastfeeding exclusivity will be reported and analyzed as both a dichotomous variable (yes/no) and as a continuous variable (length of exclusivity). The amount of formula given to breastfed infants will also be collected to determine proportions of breast milk received. The continuous variable of breastfeeding duration will be reported based on totally length of time mothers feed their infants any breast milk.

Infant characteristics and clinical health indicators will be collected from the EMR and are the continuous measures of 1 minute and 5 minute Apgar Scores, birth weight, gestational age, the first infant temperature, and first collected blood sugar and bilirubin levels. The collection of infant variables will help to determine the association of infant health to maternal adoption of Baby-Friendly practices and breastfeeding decisions.

Delivery variables that will also be considered in the analysis include the dichotomous variable of method of delivery (vaginal or C-section), the categorical variable of day of the week, and the continuous variables of time of day and unit census.

Analysis Plan. The password protected web-based data management system, Research Electronic Data Capture (REDCap) will be used for all data entry. RECap is password protected, guarded by multiple firewalls, and will only be accessible to the PI and members of the dissertation committee for data entry and analysis. SPSS (Version 22.0. Armonk, NY: IBM Corp.) software will be used for statistical data analysis. Data will be exported from REDCap into SPSS, then pre-analysis screening of the data will be done to check for missing data, outliers, normality, linearity, and homoscedasticity [52].

Descriptive analysis. The study population will be described in terms of demographic, clinical, and delivery characteristics with categorical variables race/ethnicity, insurance type, county of residence, mode of delivery, day of the week of delivery, marital status, employment status, prior breastfeeding experience and education level, and continuous variables maternal age, unit census, time of day of delivery, number of children, infant Apgar Scores, birth weight, gestational age, temperature, blood sugar, and bilirubin

levels. Results from this descriptive analysis will be represented using proportions, frequency distributions and measures of central tendency and will be used to form sample sub-categories for subsequent analyses. Impact measures. Outcome variables such as participation in more than half of the *Ten Steps* and breastfeeding decisions including initiation, duration, and exclusivity will be compared by sample sub-categories. Chi-square tests will determine significance of the dichotomous variables of completion of more than half of the *Ten Steps*, breastfeeding initiation, and exclusivity by each subgroup formed from the descriptive analyses. One-Way Analysis of Variance will determine if there are statistical differences in durations of breastfeeding, length of breastfeeding exclusivity, and time until breastfeeding is initiated among the subgroups. For continuous variables, mean differences will be reported using 95% confidence intervals with alpha set at 0.05 to determine statistical significance. For categorical variables, proportions and 95% confidence intervals will be obtained. Stepwise multiple regression is a useful modeling tool when the study is exploratory in nature, there are a large number of predictor variables, and the modeling can adjust for covariables to help determine which of the predictor variables contribute to the overall prediction of the dependent variable [52]. Thus, stepwise multiple regression modeling will be conducted to determine which of the demographic and clinical independent variables make "meaningful contributions" [52, p. 168] to the dependent variables of participation in more than half of the *Ten Steps*, breastfeeding initiation, duration, and exclusivity. For categorical dependent variables, binary logistical regression analysis will be conducted, and for continuous dependent variables linear regression analysis will be conducted.

C.6.2. Aim 2. (Qualitative).

Design. The purpose of this Aim is to identify barriers and facilitators to maternal adoption of Baby-Friendly practices, including maternal experiences and perceptions for a subset of up to 20 rural-dwelling African American mothers who deliver at McLeod during the two-month study time frame. PI will perform both retrospective medical record review and prospective in-depth interviews to identify factors influencing breastfeeding decisions, barriers and facilitators to maternal adoption of Baby-Friendly practices, and consistencies or inconsistencies between mothers' reported Baby-Friendly experiences and documentation of those Baby-Friendly practices in the medical record.

Sample. Aim 2 is conducted during the same 2-month study time period and includes mothers recruited from the same sample as those in Aim 1. This Aim proposes to use purposeful criterion sampling to select up to 20 mothers who fit inclusion criteria and express an interest in providing data through medical record review and an in-depth interview [64]. The target population includes rural dwelling African American mothers, aged 18 years and older, who deliver their infants at McLeod. Mothers who are unable to breastfeeding due to maternal or infant complications or illnesses, mothers who are HIV positive, mothers who are taking prescribed or recreational substances that are contraindicated with breastfeeding, and mothers who have involvement with the Department of Social Services are excluded from the study. A full description of the inclusion and exclusion criteria is presented in Table 2.

Sample Size Determination. For Aim 2, the qualitative portion of the study will guide sample size determination. Up to 20 participants will be recruited, consented, enrolled, and interviewed until the data are saturated. Interviews will be conducted using an iterative coding and analysis process.

Recruitment, Consent, and Enrollment. Mothers will be recruited while on the Labor and Delivery or Post Partum units of McLeod. Staff on the Labor and Delivery and Post Partum units will be provided the inclusion/exclusion criteria for the study and will be asked to give mothers who appear to meet the criteria a printed flyer. The flyer will include the PI's contact information and a brief description of the study. The staff will also ask each potentially eligible mother if she is accepting of the PI approaching her regarding the study. Interested mothers may then contact the PI using the information from the flier, or the PI can approach the mothers in the hospital setting. The PI will ask questions to determine appropriateness for enrollment, review the study in greater detail, and ask whether the mother agrees to participate. The PI will review the study with the mother, and the mother will be asked if she has any questions. After obtaining informed consent, enrollment, and examination of the medical record, the PI will collect contact information and schedule an in-depth interview with the mother for up to 4 weeks post hospital discharge. The goal will be to schedule the interview at 1 week post discharge; however, a time-frame of 4 weeks allows the PI time to provide flexibility of scheduling for the new mothers to decrease burden from study participation. A date and time for the interview will be arranged with enrolled mothers and additional contact information will be obtained. The contact information will be used to contact participants prior to the scheduled interview to confirm the scheduled interview time. The PI will travel to the mothers' residence or meet the mother at a neutral site to conduct the interviews. The mothers' input and preferences will help determine the setting and location of the interview. The PI has prior experience with home health visits and is aware of potential risks involved when entering participants' home environments. The PI will use experience and judgment to avoid any potentially dangerous situations. If the PI determines the interview environment is unsafe, interviews will be rescheduled at a different location. The benefits of conducting the interviews in mothers' homes are of great value. At one week postpartum, mothers are not usually medically cleared to drive by a physician; thus, conducting the interview outside of the home places an unnecessary burden on the mothers. In their homes, mothers will be in a safe and comfortable environment and will have the opportunity to breastfeed their new infant at any point during the interaction. This will decrease anxiety new mothers may feel about breastfeeding in public or taking their new infant into a public environment. If mothers' prefer a neutral location, such as a public park or coffee shop, the interviews will be scheduled accordingly. A mutually agreed upon public location between the PI and mother will allow for an easily accessible and safe environment to conduct the interview. At the end of the session, mothers will be given a gift card valued at $30 in compensation for their time.

Directed Content Analysis. This Aim utilizes a directed content analysis approach to provide a more thorough description of African American mothers' experiences and social interactions within a Baby-Friendly environment [49]. The directed content analysis approach is deductive in nature and can offer information about variables of interest and predictions about the interactions of those variables. The directed approach is structured in nature with a goal to "validate or extend conceptually a theoretical framework or theory" [49, p. 1281]. For this Aim, the directed approach will be used to validate the conceptual model of the BFHI using the SEM (Appendix B) by providing a more comprehensive understanding of the relationship of the variables within the model using an ecological perspective. This research method is appropriate for the proposed

study because the focus is to understand how mothers' perceptions of their labor, delivery, and first breastfeeding experiences influence their values, attitudes, beliefs about breastfeeding as well as their motivation to maintain breastfeeding.

Data collection. McLeod is not currently Baby-Friendly certified but is on the 4D certification pathway. Current hospital practice is to employ Baby-Friendly practices *(Ten Steps-Appendix A)* with mothers who chose to participate in these practices. Participation in the type and number of the *Ten Steps*, maternal demographic information, infant characteristics and clinical health indicators, delivery variables, as well as breastfeeding initiation, duration, and exclusivity will be collected for these mothers using the same variable definitions and measures that are outlined in Aim 1. For Aim 2, identified maternal/infant data will be collected from the medical record using the EMPower chart review tool. Identified information is necessary in this Aim to allow maternal/infant dyad medical record data to be linked to the mothers' qualitative data gathered during the in-depth interviews. The information obtained from the medical record will be compared to mothers' reported experiences of Baby-Friendly practices to assess for consistencies or inconsistencies in mothers' perceptions of the Baby-Friendly practices and in documentation of the practices in the medical record. A semi-structured interview guide (Appendix D) was designed to elicit open dialog about the participants' birth and breastfeeding experiences. In adherence to the tenets of directed content analysis, the questions will begin as open-ended and broad [49]. An example of a broad question would be: "What types of Baby-Friendly practices did you participate in during your hospital stay?" Follow-up questions and probes will be more direct to explore each specific Baby-Friendly step and mothers' perceived experiences with each Baby-Friendly practice. Direct questions and probes will guide the mother to identify barriers and facilitators to participation in Baby-Friendly practices and breastfeeding from an ecological perspective [49, 50] . All interviews will be audio recorded and digitally stored on a protected electronic database such as Box with approved security by MUSC Office of the Chief Information Officer (OCIO). The PI and dissertation committee members will have access to the audiofiles to ensure privacy and confidentiality.

Analysis Plan. Data from the interviews will be transcribed verbatim by use of an external transcription service. The transcribed data will be transferred to the qualitative software analysis package, NVivo (version 10.2.0, 1999-2015 QSR International Pty Ltd.). The NVivo software will be used to facilitate constant comparison, coding, and thematic categorizing of qualitative data. Using a directed content analysis, initial coding will be based upon key concepts from the BFHI SEM model (Appendix B) and will be divided into categories based upon the following levels: policy/systems factors, organizational/hospital factors, intrapersonal provider factors, and intrapersonal mother/infant dyad factors. Focused coding will further solidify themes, identify major topic areas, and will provide data on any unidentified categories or gaps in the theoretical model [49]. A goal of the directed content analysis is to determine whether the data obtained through the in-depth interviews supports the BFHI SEM conceptual framework. More participants will be enrolled and interviewed, as necessary, until the researcher determines the data are saturated. Data will be organized based on a timeline of events: (1) labor and delivery, (2) postpartum hospitalization, (3) postpartum period after hospital discharge. Additionally, after the in-depth interview, the PI will link maternal/infant demographic data from the chart reviews with qualitative interview data using pseudonyms to protect the mothers' identities. The PI will look for congruence or

discrepancies between maternal reports of Baby-Friendly practices versus what is charted in the medical record. A second researcher will review transcripts and coding to establish agreement in the data discovery and to ensure rigor in the research methods.

C.6.3. Aim 3. (Data Integration)

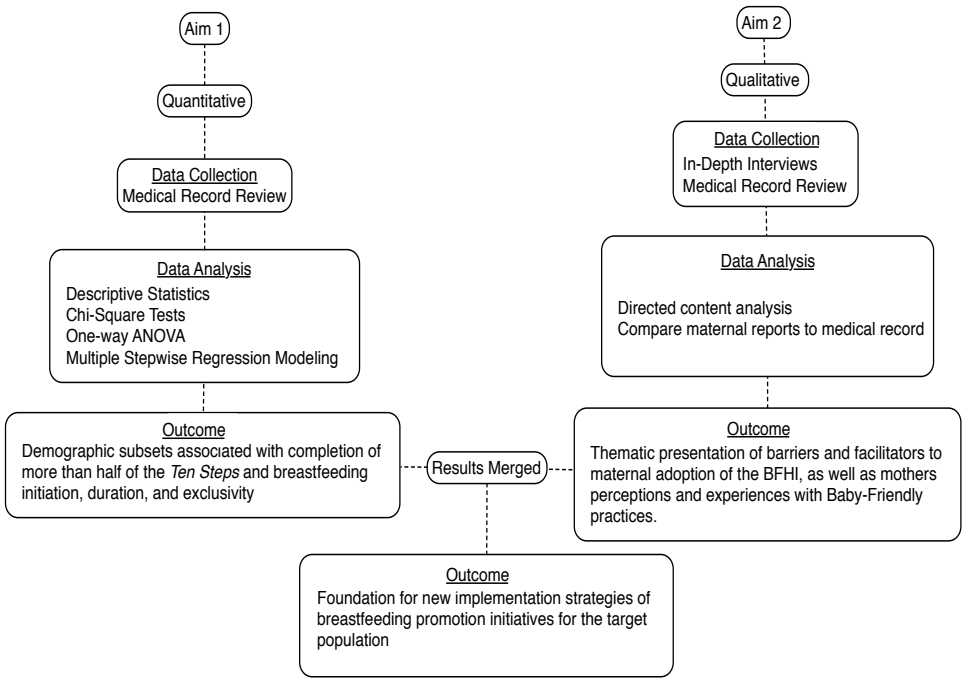
Overview. The purpose of this Aim is to explore the influence of barriers and facilitators to maternal adoption of Baby-Friendly practices, maternal perceptions, and experiences on breastfeeding decisions by merging and synthesizing qualitative and quantitative results.

Analysis. Qualitative and quantitative data will be collected, stored and analyzed separately, then the data will be merged after individual data analysis to provide a more comprehensive understanding of the interaction of mothers' Baby-Friendly experiences and perceptions as well as maternal breastfeeding decisions [35, 36]. The data will be analyzed in a side-by-side comparison to look for parallel or similar themes [36]. The themes will then be presented in both table form and in paragraph form in the discussion section of the manuscript reporting the findings. Data display will reduce quantitative data into charts and tables representing trends in breastfeeding duration and exclusivity, as well as trends according to demographic characteristics through participant sub-category designation. Qualitative data will be represented in charts and tables with categorized themes. Themes that are identified from both quantitative and qualitative data will be presented in a side by side comparative table. The relationship between themes will then be analyzed and discussed more in-depth in the discussion section. Qualitative information will be used to further explain trends in quantitative data.

Table 3: Time table for data collection, analysis, and interpretation

Month	**1**	**2**	**3**	**4**	**5**	**6**
Flyers available to potential study participants						
Enrollment of first patient						
Two-month study enrollment period						
Medical record review of all mother/infant dyads during the 2-month study enrollment period						
Interviews conducted						
Medical record review data analysis and interview data analysis						
Medical record review and interview data merged and interpreted						
Study and findings write-up with dissemination						

Figure 1: Model of study flow and components



C.7. Potential problems, alternative strategies and benchmarks for success. Challenges include**:**

***Difficulty with recruiting*.** Mothers may not show interest in breastfeeding, participation in Baby-Friendly practices, or in sharing information with the primary researcher. Additionally, mothers who have no interest in breastfeeding may be hesitant to enroll in the study or to share medical record information. Potential participants may not have interest in participating in an in-depth interview during the first month postpartum. A potential solution to these problems is utilization of the nursing supervisor and lactation consultants of the Labor and Delivery and Postpartum Units at McLeod. The nursing supervisor and lactation consultants have received Baby-Friendly education courses, and they are Baby-Friendly practice advocates. If there are recruitment difficulties, those personnel will be educated as to study purposes and will be named study champions. They can assist the PI in study recruitment by educating mothers of study purposes and by addressing maternal questions and concerns regarding the study. The

PI will obtain contact information from the mothers after informed consent is obtained for the purposes of contacting the mothers post-discharge. Follow-up calls or texts will be conducted at least once a week to maintain contact with the mothers and to confirm dates and locations of interviews. Contact between the PI and the mothers will potentially aid in study retention and in minimizing participant loss.

Lack of consistency in medical record documentation. Although McLeod is in the process of standardizing medical record documentation of Baby-Friendly practices in the electronic medical record, some inconsistency in Baby-Friendly processes and breastfeeding practices may remain. Frequent communication with hospital staff and administrators will serve to improve documentation consistency and decrease charting discrepancies.

Potential Maternal/Infant Health Complications. The primary researcher anticipates a low rate of maternal/infant health complications that will prevent participation in Baby-Friendly practices and breastfeeding. However, the potential for participant loss due to complications must be considered. The researcher anticipates that recruitment of up to 20 participants is a large enough sample size to account for loss due to maternal/infant complications. Additional participants will be enrolled until data are saturated.

Participant Retention Through Study Completion. The study design requires that participants will be followed up to one month during the postpartum period. In-depth interviews will be conducted in participants' homes or at a neutral location to assess perceptions and experiences with Baby-Friendly practices, as well as barriers and facilitators to maternal adoption of the Baby-Friendly practices. The PI may have difficulty contacting the participants to schedule the interviews, and participants may be reluctant to allow the researcher into their homes. Contact information will be gathered from the mothers upon enrollment in the study so the researcher can text or call the participant prior to the scheduled interview. The reminder phone call will serve to increase retention of mothers and will facilitate scheduling the in-depth interview. The researcher anticipates that recruitment of up to 20 participants is a large enough sample size to account for loss to follow-up.

C.7. Potential for Translation to Practice. Information gathered from the study will help provide a foundation to inform innovative implementation strategies for breastfeeding promotion initiatives in rural African American mothers in the southeastern U.S. The identification of barriers and facilitators to maternal adoption of Baby-Friendly practices can help discern appropriate individualized measures to support African American mothers, improve breastfeeding rates, and improve maternal and infant health outcomes for the population.

D. Protection of Human Subjects

This convergent parallel mixed-methods study is designed to explore rural African American mothers' perceptions of barriers and facilitators to adoption of Baby-Friendly practices, along with their associated breastfeeding experiences, perceptions, and decisions after participation in Baby-Friendly practices. The study will collect quantitative data from all participants in a rural southeastern U.S. hospital to investigate potential relationships of maternal demographic characteristics with participation in more than half of the *Ten Steps to Successful Breastfeeding (Ten Steps*), and maternal decisions to initiate, maintain, and exclusively breastfeed. The qualitative portion will evaluate a smaller subset of African American mothers to determine how their Baby-Friendly experiences and perceptions along with their demographic characteristics influence their breastfeeding decisions.

D.1. Risks to Human Subjects

Human Subjects Involvement, Characteristics, and Design

Medical records of all mothers who deliver during the two-month study will comprise the sample for the quantitative portion of the study, and no human subjects will be actively be involved in this portion (Aim 1). Maternal/infant dyad medical records will be searched retrospectively to obtain de-identified information on participation in more than half of the *Ten Steps*, race/ethnicity, insurance type, geographic factors, and breastfeeding initiation, duration, and exclusivity. Additional demographic variables of interest are maternal age, number of children, marital status, employment status, prior breastfeeding experience, education level, and infant clinical health indicators of Apgar Scores, birth weight, gestational age, temperature, blood sugar, and bilirubin levels. Hospital related factors are mode of delivery, unit census, time of delivery and day of the week of delivery.

For the qualitative portion of the study, up to 20 African American mothers will be involved in the study exploration and analysis (Aim 2). IRB approval will be obtained from both McLeod Regional Medical Center (McLeod) and the Medical University of South Carolina (MUSC) prior to the start of the study. Purposive sampling will be used to identify potential participants for in-depth interviews. African American mothers aged 18 years and older will be given information about the study, and study candidates will be recruited for an in-depth interview up to 4 weeks after hospital discharge. One-week post discharge will be the goal for interview conduction; however, the PI will allow up to 4 weeks in case it is difficult to contact the mother and to schedule the interview. Up to 20 mothers will be recruited for interviews. Participants will be recruited, enrolled, and interviewed during the 2-month study period until data saturation occurs [73]. It is anticipated that no more than 20 maternal interviews are needed to achieve data saturation.

Table 1: Inclusion and Exclusion Criteria for the study (Applies to both Aims 1 & 2 unless otherwise noted):

Inclusion Criteria	Exclusion Criteria
Mothers aged 18 years and older (Aim 1) African American mothers aged 18 years and older (Aim 2)	Infants with congenital abnormalities that prevent breastfeeding or require admission to the NICU
Infants 38 weeks gestation and older	Infants admitted to the NICU
Infants delivered at McLeod Regional Medical Center	Mothers with HIV
	Mothers unable to breastfeed due to illness or complication with delivery
	Infant death
	Mothers prescribed medications or taking recreational substances contraindicated with breastfeeding
	Mothers with Department of Social Services involvement
	Non-English speaking mothers

Table 2: Targeted/Planned Enrollment Table

Total Planned Enrollment 20

TARGETED/PLANNED ENROLLMENT: Number of Subjects			
Ethnic Category	Sex/Gender		
	Females	Males	Total
Hispanic or Latino	0	0	0
Not Hispanic or Latino	20	0	20
Ethnic Category: Total of All Subjects*	20		
Racial Categories			
American Indian/Alaska Native	0	0	0
Asian	0	0	0
Native Hawaiian or Other Pacific Islander	0	0	0
Black or African American	20	0	0
White	0	0	0
Racial Categories: Total of All Subjects*	20		20

**The "Ethnic Category: Total of All Subjects" must be equal to the "Racial Categories: Total of All Subjects".*

Recruitment Site

All participants will be recruited from the Labor and Delivery or Post Partum units at McLeod. There are no additional study sites.

Sources of Materials

Sources of materials to be gathered during the study include medical record information, audio recordings of in-depth interviews, and transcripts from interviews. All data will be accessible to the Principal Investigator (PI) and to dissertation committee members. The PI and dissertation committee members have completed the University of Miami Collaborative IRB Training Initiative (CITI) course. The password protected web-based data management system, Research Electronic Data Capture (REDCap) will be used for all data entry. RECap is password protected and guarded by multiple firewalls. Throughout the study, REDCap will only be accessible by the PI and members of the dissertation committee for data entry and analysis. All interviews will be audio recorded and digitally stored on a protected electronic database such as Box with approved security by MUSC Office of the Chief Information Officer (OCIO). The PI and dissertation committee members will have access to the audiofiles to ensure privacy and confidentiality. SPSS (Version 22.0. Armonk, NY: IBM Corp.) software will be used for statistical data analysis. The qualitative software analysis package, NVivo (version 10.2.0, 1999-2015 QSR International Pty Ltd.) will be used to facilitate constant comparison, coding, and thematic categorizing of data. Data will be stored in a locked box during transport, in a locked file in the PI's home for data analysis, and on the PI's password protected computer. Data will be kept in a locked or password-protected location at all times when not in use by the PI.

Potential Risks

Overall risks to participants are minimal and are primarily related to disclosing information about the potentially sensitive subject of breastfeeding. During the interviews, participants are at risk for emotional or psychological distress from sharing personal experiences and perceptions of their Baby-Friendly hospital experiences or breastfeeding difficulties. Obtaining open and unbiased responses from the participants also may be difficult. Breastfeeding is a sensitive topic, and mothers may craft answers based upon socially acceptable behavior versus true beliefs, attitudes, and feelings [61]. For example, a mother may cite insufficient milk production as a reason to cease breastfeeding, when the burden of pumping or concern for body image may have factored into the decision. A risk for loss of confidentiality is also present for mothers who participate in an in-depth interview because their medical record information will be compared to their interview responses. The PI will look for discrepancies between maternal reports of Baby-Friendly practices versus what is charted in the medical record. This risk will be minimized by obtaining minimal Protected Health Information (PHI), destroying PHI after conversion to another form or analysis, and using pseudonyms rather than patient names, as well as by storing data in a protected database on a password-protected computer, and in locked files. Medical record data will be extracted from the mothers' medical record prior to the in-depth interview. The names/identities of interview participants will then be replaced with pseudonyms on all study documents. Pseudonyms will be used for comparison of in-depth interview responses to documentation in the medical record.
Additional participant risks include fatigue during interviews or interrupting maternal/infant bonding and breastfeeding time by conducting the interview. To avoid participant fatigue or maternal/infant routine interruption, interviews will last approximately 30-45 minutes.

D.2. Adequacy of Protection Against Risks

Recruitment and Informed Consent

For the quantitative portion of the study, de-identified information will be used. For the qualitative portion, mothers will be recruited while on the Labor and Delivery or Post Partum units of McLeod. Staff on the Labor and Delivery and Post Partum units will be provided the inclusion/exclusion criteria for the study and will be asked to give a print flyer to mothers who appear to meet the criteria. The flyer will include the PI's contact information and a brief description of the study. The staff will also ask each potentially eligible mother if she is accepting of the PI approaching her regarding the study. Interested mothers may then contact the PI using the information from the flier, or the PI can approach the mothers in the hospital setting. The PI will ask questions to determine appropriateness for enrollment, review the study in greater detail, and ask whether the mother agrees to participate. The PI will review the study with the mother, and the mother will be asked if she has any questions. After questions and concerns are addressed, informed consent will be obtained. The mother will also be provided a printed copy of the informed consent document. After obtaining, informed consent, enrollment and examination of the medical record, the PI will collect contact information and schedule an in-depth interview with the mother for up to 4 weeks post hospital discharge. The goal will be to schedule the interview at 1 week post discharge; however, a time-frame of 4 weeks allows the PI time to provide flexibility of scheduling for the new mothers to decrease burden from study participation. A date and time for the interview will be arranged with enrolled mothers and additional contact information will be obtained. The contact information will be used to contact

participants prior to the scheduled interview to confirm the scheduled interview time. The PI will travel to the mothers' residence or meet the mother at a neutral site to conduct the interviews. The mothers' input and preferences will help determine the setting and location of the interview. At the end of the session, mothers will be given a gift card valued at $30 in compensation for their time.

Protections Against Risk

If necessary, protection against psychological or emotional distress will be provided through debriefing sessions following the interviews. The PI will protect mothers from physical risks of fatigue or interruption of maternal/infant bonding and breastfeeding time by allowing for breaks when needed. In the event the mother feels she cannot continue with the interview, the interview will be discontinued or rescheduled. Participants will be compensated for inconvenience in the form of a gift card. Risk regarding names/identities is addressed above in the potential risks section. Privacy will be protected by conducting interviews in the privacy of the mothers' residence or in a neutral location that allows for privacy and comfort. Data obtained during interviews will be stored in a locked or password-protected location, accessible solely by the PI. Additionally, caution will be used when presenting interview findings to ensure adequate descriptions of mothers' experiences and perceptions without disclosing participant identity. Digital audio recordings of interviews will be stored on a secure electronic server for a minimum of 6 years.

D.3. Potential Benefits of the Proposed Research to Human Subjects and Others
Mothers may benefit from participation in the study by having the opportunity to share their thoughts, feelings, and experiences, thus providing an opportunity to reflect on their Baby-Friendly, bonding, and breastfeeding experiences.

Benefits of the study include potentially gaining greater understanding of, African American rural mothers' experiences and perceptions of Baby-Friendly practices and breastfeeding. The benefits include gaining information to provide a foundation for change in implementation strategies of breastfeeding promotion practices with mothers in the target population. The risks to participants in the study are minimal, and the benefits outweigh the potential study risks.

Inclusion of Women and Minorities
Both women and minorities are included in this study. Mothers aged 18 years and older are the target population for the quantitative portion and rural dwelling African American mothers aged 18 years and older are the target population for the qualitative portion. The mothers served by McLeod include racial/ethnic minorities, with African American mothers comprising approximately 47% of deliveries. Hispanic mothers comprise approximately 1% of deliveries and are not included in the study.

Inclusion of Children
N/A

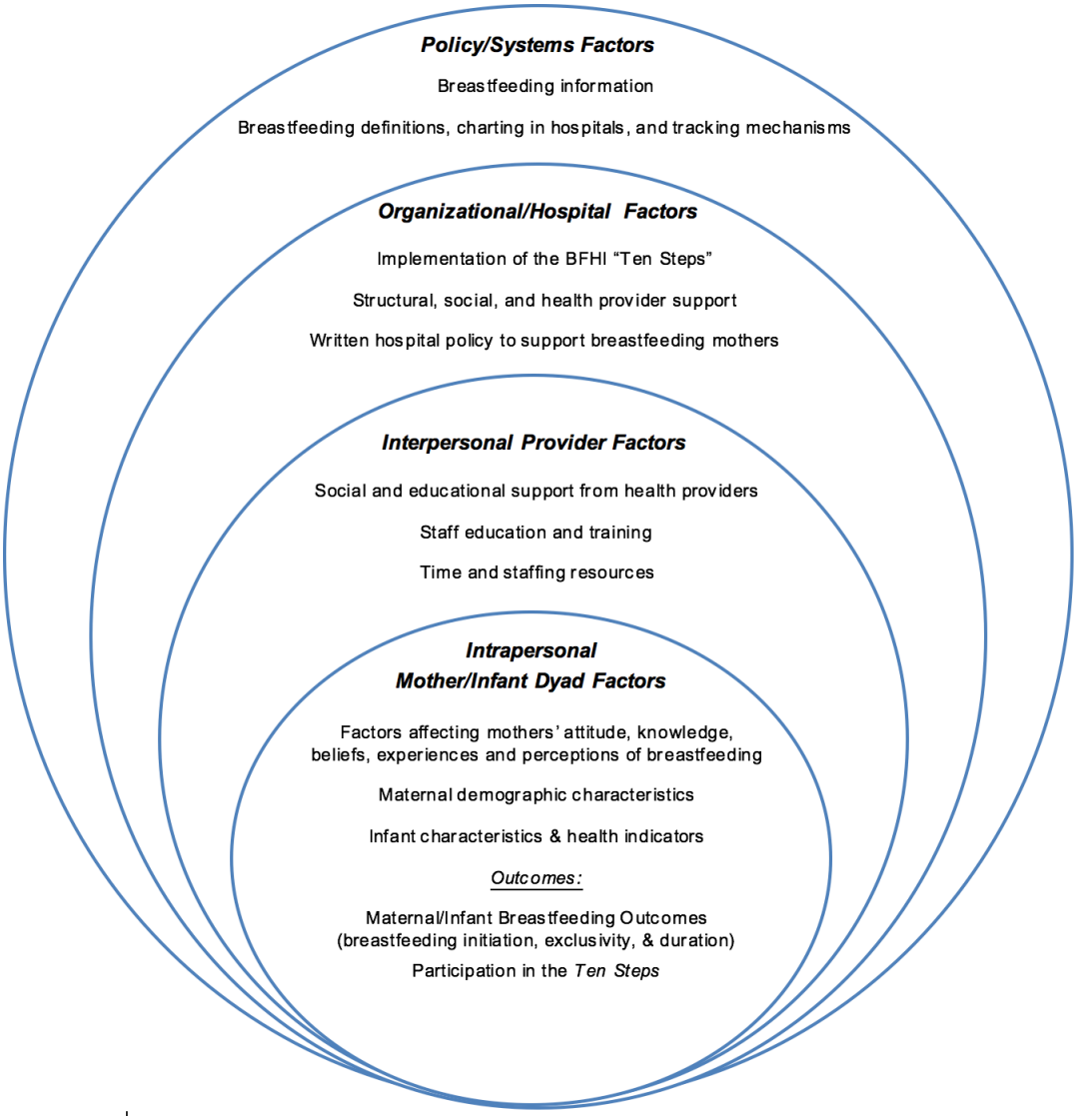
Appendix A

The *Ten Steps to Successful Breastfeeding* are*:*

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.

Appendix B

Conceptual Model of the BFHI using the SEM



BFHI = Baby-Friendly Hospital Initiative
SEM = Social Ecological Model
"Ten Steps" = 'Ten Steps to Successful Breastfeeding'

Appendix C
EMPower Chart Review Form

A	Was the infant ever breastfed or fed breast milk?	☐ Yes ☐ No ☐ Unable to determine from chart
B	Was the infant ever given formula or water?	☐ Yes ☐ No ☐ Unable to determine from chart
C	Was the delivery a vaginal delivery?	☐ Yes ☐ No *(Skip to D)* Was infant placed skin to skin within 5 minutes of birth, uninterrupted and continuous until first breastfeeding or at least 1 hour if formula fed? ☐ Yes *(Proceed to E)* ☐ No *(Proceed to E)* ☐ Unable to determine from chart *(Proceed to E)*
D	If delivery was by Cesarean section:	For this Cesarean section: was infant placed skin to skin as soon as the mother was responsive and alert, uninterrupted and continuous until first breastfeeding or at least 1 hour if formula fed? ☐ Yes ☐ No ☐ Unable to determine from chart
E	*(Answer only if A=YES)* Was the mother was taught hand expression?	☐ Yes ☐ No ☐ Unable to determine from chart
F	*(Answer only if A=YES)* Did the mother receive assistance with breastfeeding?	☐ Yes ☐ No ☐ Unable to determine from chart
G	Was baby out of the mother's room >1 hour/day?	☐ Yes ☐ No ☐ Unable to determine from chart
H	Did mother receive education about feeding infant on demand/cue?	☐ Yes ☐ No ☐ Unable to determine from chart
I	*(Answer only if A=YES)* Did the infant use a pacifier? (Do not include those used only for a surgical procedure)	☐ Yes ☐ No ☐ Unable to determine from chart

	(Do not include cup feeding without a nipple/teat.)	☐ No ☐ Unable to determine from chart
K	Did mother receive education on infant feeding support on discharge?	☐ Yes ☐ No ☐ Unable to determine from chart
L	Please only answer the following if your hospital has affiliated prenatal clinic: Did mother receive prenatal breastfeeding education?	☐ Hospital does not have an affiliated prenatal clinic *(Skip to M)* ☐ Yes ☐ No ☐ Unable to determine from chart
M	Mother's Ethnicity Mother's Race	Hispanic ☐ Yes ☐ No Race *(Check all that apply)* ☐ White ☐ Black ☐ Asian Hawaiian/Pacific Islander ☐ Native American Indian/Alaska Native ☐ Other

Appendix D

Semi-Structured Interview Questions:

1. Tell me about your recent labor and delivery experience?
2. What types of Baby-Friendly practices did you participate in during your hospital stay?
3. What were your feelings about breastfeeding and Baby-Friendly practices prior to your hospital stay?
4. What were your experiences with initiating breastfeeding?
5. What were your experiences with breastfeeding after discharge?
6. What factors helped you with breastfeeding?
7. What factors hindered you with breastfeeding?
8. Describe your feelings about breastfeeding or Baby-Friendly practices after participating in Baby-Friendly practices?
9. What concerns do you have as you continue to breastfeed at home? or What feeding concerns do you have now that you have ceased breastfeeding?

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