DOES PRENATAL BREASTFEEDING EDUCATION IMPACT EXCLUSIVE BREASTFEEDING IN THE HOSPITAL?

AN EXAMINATION OF PRENATAL CLASSES, SELF-EFFICACY, PREVIOUS EXPERIENCE, HOSPITAL PRACTICES, RACE, AND INTENTION AS CONTRIBUTING FACTORS.

by

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Abstract

Objectives: The purpose of this paper is to examine whether prenatal breastfeeding education, possibly mediated by breastfeeding self-efficacy, is associated with exclusive breastfeeding during the hospital stay. It will also address whether or not the impact of this association varies by race. Previous breastfeeding experience, exclusive breastfeeding supportive hospital practices, and breastfeeding intention are observed as possible confounding factors.

Background: As rates of breastfeeding initiation are rising, the focus is increasing on methods to support improved duration. Research shows that prenatal breastfeeding promotion and education are helpful in terms of building confidence in new mothers and preparing them for what to expect once their infant arrives. This paper is based on an on-going evaluation of the Ready, Set, Baby (RSB) prenatal breastfeeding education program offered at the University of North Carolina Chapel Hill (UNC) Women’s Hospital. Researchers are especially interested in program effectiveness and potential barriers to program participation as expansion of RSB is a future goal. Data collected during the 2013 summer phase was used to create this paper.

Methods: The student researcher collaborated with the Carolina Global Breastfeeding Institute at UNC and the UNC Women’s Hospital to conduct postpartum interviews with mothers who received prenatal care at UNC hospital and who, therefore, were in the population that could have been offered the RSB educational sessions.

Results: Of the 76 women in the study, 28% identified as African American/Non-Hispanic, 43% as Caucasian/Non-Hispanic, 1% as Asian/Non-Hispanic, 3% as Other/Non-Hispanic and 25% as Hispanic. About 61% of the population, the majority of whom were Caucasian, exclusively breastfed their infants during the entire hospital stay. Caucasian women also had the highest breastfeeding self-efficacy scores. The mean score among all women in the study was 60 out of 70; the score was slightly higher at 62.7 in women who exclusively breastfed. About 25% of women took a prenatal breastfeeding class to prepare for the arrival of their infant; 26% of whom exclusively breastfed. Among this group 60% exclusively breastfed their infants. The mean breastfeeding intention score was 7.9 out of 16. Yet the mean score for intention was lower (5.6) among exclusive breastfeeding women. African American and Hispanic women took prenatal breastfeeding classes more often than Caucasian women, had more previous breastfeeding experience and higher intentions to breastfeed. All women in the study rated their exclusive breastfeeding supportive hospital care as “8 out of 10” or better. The mean score was 9.5 with Caucasian and Hispanic women reporting slightly higher ratings than African Americans.

Discussion and Conclusions: In contrast with most current research, this study did not strongly support the idea that factors of prenatal breastfeeding education, self-efficacy, previous breastfeeding experience, exclusive breastfeeding supportive hospital practices and breastfeeding intention predict exclusive breastfeeding in the hospital. This study did not explain the racial/ethnic disparities that exist and may need to be expanded to include a larger sample size to obtain significant findings. Other factors are important to consider especially among minority populations and support and breastfeeding education alone may not be enough for all women to achieve exclusive breastfeeding. The benefits of breastfeeding (and the costs of not breastfeeding) can be seen throughout the lifespan; by addressing racial/ethnic disparities among infants, researchers may also address racial/ethnic health disparities that exist in adults.
Introduction

Background: The Importance of Human Milk

The recommended source of nutrition and preventive healthcare for infants for the first six months of life is breastfeeding\(^1\). Many organizations are aware of the benefits of breastfeeding and have created statements supporting this behavior as well as the use of human milk for those unable to breastfeed. The American Academy of Pediatrics (AAP) policy statement on Breastfeeding and the Use of Human Milk states, “breastfeeding and human milk are the normative standards for infant feeding and nutrition”.\(^2\) Organizations such as the AAP,\(^2\) American Congress of Obstetricians and Gynecologists (ACOG),\(^3\) the United States Breastfeeding Committee (USBC),\(^4\) the Academy of Breastfeeding Medicine (ABM),\(^5\) the Association of Women’s Health, Obstetrics and Neonatal Nurses (AWHONN),\(^6\) the Academy of Nutrition and Dietetics (AND),\(^7\) the National Association of Pediatric Nurse Practitioners (NAPNAP),\(^8\) the Department of Health and Human Services’ Offices on Women’s Health (US DHHS-OWH),\(^9\) and the Maternal and Child Health Bureau,\(^10\) the American Public Health Association (APHA),\(^11\) and the Center for Disease Control (CDC)\(^12\) all recommend exclusive breastfeeding (EBF) for six months, followed by continued breastfeeding for at least one year and generally for as long as the mother and child desire.

Human milk has been shown to have significant health benefits for infants and there is a significant cost to not breastfeeding. Breastfeeding is associated with a decrease in the risk of acute otitis media,\(^13,14\) nonspecific gastroenteritis,\(^15\) asthma,\(^16\) lower respiratory infection,\(^17\) atopic dermatitis,\(^18\) obesity,\(^19\) childhood leukemia,\(^20\) type I\(^21\) and type II diabetes,\(^14,21\) and sudden infant death syndrome (SIDS).\(^14\) Human milk, rather than preemie formula, protects against necrotizing enterocolitis (NEC).\(^22\) It is also prescribed for infants for a variety of reasons such
mal-absorption, congenital anomalies, feeding intolerance, gut priming and immunologic deficiencies. Infants fed manufactured infant formulas suffer more acute illness than breastfed infants. The USBC recognizes that “In situations where a mother’s own milk is not available to meet the infants’ needs, pasteurized donor milk is the ideal replacement.” Similarly the World Health Organization (WHO) and the AND suggest that if mother’s milk is not available, providing pasteurized donor human milk is the next best option. 

The Agency for Healthcare Research and Quality (AHRQ) produced meta-analyses of infant health outcomes for those infants who were formula fed versus those fed with human milk. Infants who were fed formula, especially those that were preterm, were at a higher risk for developing NEC, feeding intolerance as well as a higher rate of mortality. In general, the length of time that an infant receives human milk is associated with their reduction of risk for particular health outcomes. Compared to infants who were formula fed, infants who were ever fed human milk experienced a 23% reduction in the risk of acute otitis media and those who were exclusively fed breast milk for 3 months had a 50% reduction in risk. Human milk was also associated with a 64% decreased risk of non-specific gastroenteritis and those infants who were given human milk for 4 months or longer had a 72% reduction in the risk of hospitalization for lower respiratory tract infections. Infants that are given human milk for at least 6 months have a 15 to 19% reduction in their risk for childhood leukemia. Also, infants who are formula fed have a 4.6 fold increased risk of developing pyloric stenosis (the most common condition requiring surgery in infants often developing in the first few weeks after birth) than breastfed infants. As a result, breastfed infants have a reduced need for medical care outside of routine visits because the frequency and severity of illness in infants is inversely related to the amount of the diet that comes from breast milk.
Lack of breastfeeding is also detrimental to maternal health. Mothers who do not breastfeed their infants are more likely to develop health problems such as premenopausal breast cancer, ovarian cancer and osteoporosis. \(^{24}\) Non-breastfeeding women with diabetes will not have the same freedom from symptoms as breastfeeding mothers and healthy women who do not breastfeed are more likely to develop type 2 diabetes later in life. \(^{24}\) Lack of breastfeeding may also lead to quicker additional pregnancies as women are not allowed to experience fertility reduction associated with lactation amenorrhea that occurs during amenorrhea when they are fully breastfeeding. \(^{24}\) Breastfeeding also increases uterine contractions that help women recover faster as their uterus returns to its normal size. \(^{24}\) The gastric changes that occur in breastfeeding women also allow them to metabolize food more efficiently, which is important due to the additional output of about 500 calories a day. \(^{24}\) This change often leads to quicker weight loss. \(^{24}\)

Commercial formula feeding also adds significant costs to families and communities. About 150 cans of formula are used in the first six months for infants who are not breastfed. \(^{24}\) This cost may exceed the cost of additional food for a lactating mother by two to three times and may cause other members of the family to eat poorly as well. \(^{24}\) In the United States (U.S.) formula is a $2.5 billion per year industry and the cost during the first year of life for treating breastfed infants is about $1400 less than treating artificially fed infants. \(^{24}\) A minimum of $3.6 billion would be saved in the U.S. alone if breastfeeding were increased from current levels to those recommended by the U.S. Surgeon General (75% initiation and 50% continuation at 6 months). \(^{24}\) Another researcher, Melissa Bartick, estimates that if 90% of U.S. families could comply with recommendations to breastfeed exclusively for 6 months, the country would save as much as $13 billion per year and prevent approximately 911 excess deaths, most of which would be in infants. \(^{25}\)
Initiation and Duration of Breastfeeding: Existing Disparities

Racial/ethnic disparities exist in breastfeeding initiation and duration. Caucasian women are generally more likely to initiate breastfeeding and tend to breastfeed longer than African American and Hispanic women in the U.S. There are many hypotheses as to why this is true, and the issue is complex and multi-factorial. One factor that may contribute is that there are also existing racial/ethnic disparities to prenatal care in general with less African Americans receiving care. The benefits of breastfeeding can be seen throughout the lifespan and it is possible that addressing the disparities among infants may also address many of the racial/ethnic health disparities that exist in adults. Much research supports the idea that women who receive prenatal breastfeeding education and support from medical professionals are more likely to initiate and continue breastfeeding.

A study by Kornides and Kitsantas found that mothers with greater knowledge about breastfeeding benefits were 11.2 times more likely to initiate breastfeeding than those with lower levels of knowledge. These researchers also found that women whose families prenatally supported EBF were 8.21 times more likely to initiate and continue breastfeeding and clinicians who supported breastfeeding only also increased the odds of a woman initiating breastfeeding. Therefore, knowledge of benefits and support of breastfeeding from those individuals within a woman’s network have been shown to increase both initiation and duration of breastfeeding.

A systematic review of literature conducted in 2011 by Imdad et al, identified the studies to date that evaluated the impact of breastfeeding promotional strategies on any breastfeeding and EBF at 4-6 weeks and 6 months. There were 53 randomized and quasi-randomized controlled trials selected for examination and 32 studies gave the outcome of EBF at 4-6 weeks postpartum. There were 15 studies that reported EBF outcomes at 6 months. Prenatal
counseling had a significant impact on breastfeeding outcomes at 4-6 weeks, while both prenatal and postnatal counseling were important for EBF at 6 months.\textsuperscript{29}

Another study by Caine et al was designed to evaluate the impact of prenatal education on breastfeeding specifically among minority populations. Most participants (63\%) were non-Hispanic blacks less than 25 years old (56\%), without a high school diploma or general education development (53\%).\textsuperscript{30} Results showed that prenatal education program participants were more likely to initiate breastfeeding than nonparticipants, and 22\% continued to breastfeed for 6 months.\textsuperscript{30} Hispanic women were more likely to breastfeed for at least 6 months.\textsuperscript{30} Therefore, education and support may be able to increase the rates of initiation and duration of breastfeeding among African American and Hispanic women.

Additional research conducted in 2012 described women's prenatal breastfeeding confidence and how their socio-demographic characteristics, breastfeeding knowledge, and attitudes related to it. The study indicated that breastfeeding confidence was higher among the women who regarded breastfeeding as not so difficult or exhausting.\textsuperscript{31} A reasonable correlation between confidence and breastfeeding knowledge was found in this study. In short, the women who knew a lot about breastfeeding had greater confidence regarding breastfeeding.\textsuperscript{31} A similar study also revealed that maternal self-efficacy for breastfeeding may contribute to success in breastfeeding. The women who were assigned to a breastfeeding self-efficacy intervention showed significantly greater increases in self-efficacy than did the women in the control group.\textsuperscript{32} At 4 weeks postpartum, women in the intervention group also showed a trend toward breastfeeding their infants longer and more exclusively than did those in the control group.\textsuperscript{32}

Although all of the above mentioned interventions have proven effective, there are still racial/ethnic disparities illustrating that African American and Hispanic women have lower rates of initiation and duration of breastfeeding than Caucasian women despite being exposed to
knowledge and receiving support. Yet, an effective solution for addressing the disparities has yet to be provided and these interventions alone may not be enough to resolve the issue of lower rates of breastfeeding among these minority populations of women. Other studies have attempted to examine a variety of other potential factors influencing breastfeeding that may provide reason for the disparities. Some studies conclude that historical context (slavery and breastfeeding of Caucasian infants or those they birthed as a result of rape) makes African American women see breastfeeding as inferior. Other researchers propose that the disparities exist because Caucasian women are more likely to participate in breastfeeding education and seek help from medical providers such as lactation consultants. Caucasian women may also have more immediate support from family and friends.

In an effort to increase rates, breastfeeding support for full and pre-term infants is becoming the norm. However, there is still an issue with the duration of time with which new mothers are breastfeeding and pain and perceived low milk supply are among the primary reasons that women discontinue breastfeeding. Pregnant women, especially in minority populations where rates tend to be lower, need information about managing potential breastfeeding problems and the physiology and interventions designed to promote and enhance breastfeeding knowledge and confidence should be focused on these women who lack the knowledge, on primiparas and on minority women. Interventions focused in this way will increase the likelihood that mothers will initiate and continue EBF. Therefore, while Hispanic and African American women tend to have lower rates of breastfeeding, and while researchers are not completely sure of all of the factors that come into play affecting these rates, it is evident that a combination of education and support (especially during the prenatal period) that builds confidence, knowledge and desire among other factors has the potential to change these circumstances and decrease disparities among racial/ethnic groups.
Study Objectives

The purpose of this paper is to examine whether prenatal breastfeeding education (possibly mediated by breastfeeding self-efficacy) is associated with EBF specifically during the hospital stay (from infant birth to discharge) and if that association varies depending on one’s race. Previous breastfeeding experience, EBF supportive hospital practices, and breastfeeding intention are considered as possible contributing factors.

Hypothesis

Prenatal breastfeeding education equally impacts EBF in the hospital among African American, Caucasian and Hispanic women when controlling for breastfeeding self-efficacy, previous experience, perception of supportive hospital practices and breastfeeding intention as contributing factors.

Conceptual Framework
Methods

Ready, Set, Baby

Ready, Set, Baby (RSB) is a low-cost, interactive, prenatal intervention offered to women receiving prenatal care at the University of North Carolina Chapel Hill (UNC) Obstetrics and Gynecology (OB-GYN) Clinics at the UNC Women's Hospital. Each woman and/or couple coming for their 20th or 24th week prenatal appointment are also scheduled to attend this one-time, 15 to 20 minute individual educational session in the Women's Health Information Center located off the hospital lobby. The sessions are built upon evidence-based maternity care practices that support breastfeeding and are intended to initiate a conversation regarding the hospital's family oriented culture. RSB content was compiled by students of lactation consulting from 2010-2011 and further developed and edited collaboratively by the International Board Certified Lactation Consultants (IBCLCs) at the Carolina Global Breastfeeding Institute (CGBI) and UNC Women's and Children's Hospital.

Each session is designed to ensure that all pregnant women have exposure to maternity care issues, particularly concerning newborn care, breastfeeding, and what to expect at the hospital. In the session each family is encouraged to practice skin-to-skin contact, rooming-in, feeding on demand and families also learn about the benefits of EBF. Teaching aids are provided to the health care worker or educator conducting the session. This brief curriculum and additional handouts covering referral at home, breastfeeding positions, latching, and maintaining mom's milk are available in both English and Spanish. The RSB sessions are an added resource that encourages patients to become better informed about the benefits of breastfeeding. RSB also meets the requirements of Step 3 of the Baby-Friendly Hospital designation (inform all
pregnant women about the benefits of breastfeeding), as well as the NC Maternity Center Breastfeeding Friendly designation.

**Design**

CGBI at UNC Chapel Hill is funded by the W.K. Kellogg Foundation to do an evaluation of RSB, with the intent to create a replicable approach to prenatal education that promotes breastfeeding. The evaluation includes a prenatal survey and a postpartum survey. An internship, centered on a portion of the IRB-approved study (12-2585), was designed to include the planning and execution of the postpartum survey, as well as the collection and analysis of data. This paper is based on this internship, conducted May to August 2013.

**Sampling and Data Collection**

The student research assistant (RA) involved in the internship assisted with the evaluation of this prenatal breastfeeding education program by doing the following:

- Conducting on-site postpartum interviews on the day women were discharged
- Accessing medical records to extract demographic information and load to an Excel file
- Transferring interview data to Qualtrics (an online survey software program)
- Data analysis using Qualtrics and STATA software

Each day, for ten weeks, from May 27, 2013 to August 2, 2013, the RA arrived at the UNC Women’s Hospital and obtained a copy of the daily census. The RA then browsed each patient’s electronic medical record to see if they were eligible to participate in the interview process. Eligibility requirements included: being over age 18, having received prenatal care at one of the UNC clinics on the first floor (throughout the pregnancy or at any point during), and having an infant that was not admitted to the neonatal intensive care unit (NICU) at anytime following the birth.
A total of 82 patients were interviewed for the study, yet 76 were examined in the final analysis due to 6 women being excluded for having prenatal care off site. Once the list of eligible patients was determined, the RA spent the day going to rooms asking new mothers to participate in a survey which was to be read aloud to them. The survey was designed to determine each patient’s perception of the EBF supportive care she received, feeding plans and intentions, work/school plans, confidence level regarding certain breastfeeding topics, skin-to-skin time with her infant, and to confirm location of prenatal care and whether or not she attended and felt she benefited from RSB or other form of prenatal breastfeeding education (Appendix A).

The RA also looked up demographic and medical information from the electronic medical records including:

- Age
- Preferred language
- Race/ethnicity
- Marital status
- Years of education
- Gravida/parity
- Smoking/drug use prior to and during pregnancy
- Insurance coverage
- Income bracket
- WIC eligibility
- EBF in the hospital (along with reason for formula supplement, if not)
- Previous breastfeeding experience (Appendix B)

For each patient, verbal responses were cross-checked with data available from her chart. Prior to beginning the survey, the RA discussed forms regarding HIPPA policies and details of the study with each patient that both the RA and the patient signed. Each patient also received a gift of a bilingual children’s book for their participation and copies of both consent forms. Surveys and consent forms were administered and reviewed in English by the RA and in Spanish by an interpreter from the UNC Women’s Health and Information Center with the RA present when necessary.

Once each patient’s information was retrieved, the RA entered the data into an online survey database called Qualtrics that, along with another database, STATA, was later used to
analyze information. In addition to conducting interviews and collecting data, the RA also started a literature review on prenatal breastfeeding education and breastfeeding outcomes to develop a sense of the work that is currently being done to expose more women to breastfeeding education early on in their pregnancies.

**Description of Measures**

**EBF in the Hospital**

The outcome variable of interest, EBF in the hospital, was defined as an infant receiving only breast milk (no formula) either from his or her own mother or from a donor during the entire hospital stay (birth to discharge). This variable was coded in STATA as “Exclusive” with 0=no (mother did not exclusively breastfeed) and 1=yes (mother exclusively breastfed).

**Prenatal Breastfeeding Education Classes**

The primary independent variable of interest was participation in prenatal breastfeeding education. Women who received any type of prenatal education (about 40 of the 76) had that information recorded (i.e. RSB, another breastfeeding class, a childbirth preparation class, or other). Yet, for the purpose of this study analysis will only focus on prenatal breastfeeding education (i.e. RSB or another breastfeeding class). This variable was coded in STATA as “Bfeducation” with 0=no (mother did not receive breastfeeding education) and 1=yes (mother did receive breastfeeding education).

**Breastfeeding Self-Efficacy**

Breastfeeding self-efficacy refers to a mother’s perceived confidence in her ability to successfully breastfeed, and was measured using the Breastfeeding Self-Efficacy Scale Short Form (BSES-SF). The BSES-SF contains 14 items preceded by the stem “I can always. . .” (i.e. “I can always successfully cope with breastfeeding like I have with other challenging tasks’’). 35
Responses range from 1 (not at all confident) to 5 (always confident) and are summed for a score range of 14 to 70 for each woman. Higher scores indicate higher perceived breastfeeding self-efficacy (Appendix A). For the purpose of this study, and to provide a general analysis, the mean self-efficacy score was taken for each woman and then an overall average among all women was recorded. The mean score was also calculated for each racial/ethnic group. This variable was coded in STATA as “Selfeff”.

**Previous Breastfeeding Experience**

Previous breastfeeding experience was defined as having breastfed (or provided only breast milk to) another infant and or child at an earlier period in time prior to the birth of each mother’s newborn. This variable was coded in STATA as “Experience” with 0=no (mother did not have previous experience) and 1=yes (mother had previous breastfeeding experience).

**EBF Supportive Hospital Practices**

During the interview process, all women were asked to rate the care that they received in the hospital related to EBF supportive practices (assistance with rooming in, skin-to skin and feeding cues) using a scale of 1 (being the worst of care) to 10 (being the best care). The mean score was taken for all women instead of individually and also calculated for each racial/ethnic group. This variable was coded in STATA as “Q1_1”.

**Breastfeeding Intention**

Intention was obtained using the Infant Feeding Intentions (IFI) scale, which provides a quantitative measure of maternal breastfeeding intention. There are 5 question items used. The first two ask about how much a women intends to formula feed or breastfeed and the last three address how much a woman intends to breastfeed for 1, 3 and 6 months respectively. The following is the formula for determining a breastfeeding intention score:
Total score = (mean of items 1+2) + (sum of items 3+4+5)\(^{36}\)

IFI score ranges from 0 (no intention to breastfeed) to 16 (very strong intentions to fully breastfeed for 6 months) (Appendix A).\(^{36}\) Similar to the analysis for the self-efficacy and EBF supportive hospital practice variables, the mean score was taken for all women instead of individually and was also calculated for each racial/ethnic group. This variable was coded in STATA as “Intended”.

**Data Analysis**

Data analysis was performed with the STATA 13.0 Special Edition (StataCorp, College Station, TX) statistics and data analysis software package. Bivariate analyses were performed to describe associations between exclusive breastfeeding in the hospital, prenatal education, self-efficacy, previous breastfeeding experience, exclusive breastfeeding supportive hospital practices and breastfeeding intention. These categorical variables were compared by use of multiple logistic regression tests to determine odds ratios and 95% confidence intervals. Statistical significance was defined as a \(P\) value less than or equal to 0.05.
Results

Sample

Women in the study ranged from ages 18 to 42 (mean 29.1 years). About 34% of mothers had annual household incomes lower than $25,000, 68% had public health insurance, and 47% responded that they were enrolled in WIC. Approximately 21% of mothers were unmarried. Of the 68% of mothers who planned to return to work after the birth of the child, the mean time to return to work was 10.2 weeks postpartum, and 60% planned to work full time. Women had experienced parity from 0 to 5 (mean 1.2, 30% primiparous), and gravitas 1 to 8 (mean 2.8). 62 out of the 76 women reported English as their preferred language and the remaining 14 reported Spanish as their preferred language. Of the 76 women interviewed during the study, 28% (n=21) identified as African American/Non-Hispanic, 43% (n=33) as Caucasian/Non-Hispanic, 1% (n=1) as Asian/Non-Hispanic, 3% (n=2) as Other/Non-Hispanic and 25% (n=19) as Hispanic. The results of this analysis will focus on the African American, Caucasian and Hispanic women and a summary can be found in Table 1 and Table 2.

Bivariate Associations

EBF in the Hospital

There was one woman from the Caucasian population whose medical record did not contain this information, leaving 75 total observations. Among all women, 61% fed only breast milk to their infants during the entire hospital stay. About 52% of African American, 66% of Caucasian and 63% of Hispanic women fed only breast milk from the birth of their infant to the time of discharge.
**Prenatal Breastfeeding Education Classes**

About 25% of women took some type of prenatal breastfeeding class to prepare for the arrival of their infant. Of those who received this education, about 26% EBF. Among the African American population, about 29% participated in either RSB or another breastfeeding class. Among the Caucasian population, 18% participated in either RSB or another breastfeeding class. And in the Hispanic population of women, 26% participated in either RSB or another breastfeeding class.

**Breastfeeding Self-Efficacy**

The breastfeeding self-efficacy questions were only supposed to be administered to women who were exclusively or partly breastfeeding. However, the first question was asked to all mothers (including those who were solely formula feeding). Therefore this analysis will only include mean scores for mothers who were exclusively or partly breastfeeding, illustrating 70 respondents instead of 76 and eliminating one African American, four Caucasian and one Hispanic woman from the reflected results.

Among all women who exclusively or partly breastfed, the mean self-efficacy score was 60.1 (SD=9.70) out of 70. In the African American population (n=20) the mean self-efficacy score was 56 (SD=12.76). In the Caucasian population (n=29) the mean score was 62.5 (SD=6.68). And in the Hispanic population (n=18) the mean score was 60.1 (SD=9.40). Among all women who EBF the mean self-efficacy score was 62.7 (SD=6.05) out of a possible 70.

**Previous Breastfeeding Experience**

This information was only available in 68 of the 76 medical records, leaving 8 women with missing data for this variable. About 56% of women reported having previously breastfed. About 52.6% of the African American population (n=19) interviewed for this survey question
explained that they had previous experiences with breastfeeding and 46.7% of Caucasian population (n=30) had experience. About 76.5% of Hispanic population (n=17) had experience. Among all women with previous breastfeeding experience 60% EBF their infants.

**EBF Supportive Hospital Practices**

All women in the study rated their care as being an “8 out of 10” or better regarding assistance they received with rooming in, feeding cues and skin-to-skin. The mean rating among the entire population of women was 9.5 (SD= 0.72). The mean rating was 9.4 (SD=0.80), 9.6 (SD=0.67) and 9.8 (SD=0.54) among African American, Caucasian and Hispanic women respectively. Among all women in the population who EBF their infants the mean rating for supportive practices was 9.5 (SD=0.72).

**Breastfeeding Intention**

The mean breastfeeding intention score among all women was 7.9 (SD=5.12) out of 16. In the African American population the mean score was 8.9 (SD=4.98). Among Caucasian women the score was 7.4 (SD=5.57) and in the Hispanic population the mean score was 8.1 (SD=4.70). Among all women in the population who EBF their infants the mean score for breastfeeding intention was 5.6 (SD=2.59).
Table 1: Characteristics of women from the "Ready, Set, Baby" Evaluation, UNC Women's Hospital, 2013

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Exclusive Breastfeeding in the Hospital*</th>
<th>Overall % or Mean for All Women (n=total available data)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prenatal Breastfeeding Education, %</td>
<td>26.1% (n=46)</td>
<td>24.1% (n=29)</td>
</tr>
<tr>
<td></td>
<td>62.7, 6.05 (n=46)</td>
<td>54.6, 13.17 (n=23)</td>
</tr>
<tr>
<td>Breastfeeding Self-Efficacy, mean, SD</td>
<td>60% (n=40)</td>
<td>50% (n=28)</td>
</tr>
<tr>
<td></td>
<td>9.5, 0.72 (n=46)</td>
<td>9.6, 0.74 (n=29)</td>
</tr>
<tr>
<td>Previous Breastfeeding Experience, %</td>
<td>60% (n=40)</td>
<td>50% (n=28)</td>
</tr>
<tr>
<td></td>
<td>9.5, 0.72 (n=46)</td>
<td>9.6, 0.74 (n=29)</td>
</tr>
<tr>
<td>Intention to Breastfeed, mean, SD</td>
<td>5.6, 2.59 (n=46)</td>
<td>11.5, 6.11 (n=29)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Caucasian, %</td>
<td>65.6% (n=32)</td>
<td>34.4% (n=32)</td>
</tr>
<tr>
<td></td>
<td>52.4% (n=21)</td>
<td>47.6% (n=21)</td>
</tr>
<tr>
<td>Hispanic, %</td>
<td>63.2% (n=19)</td>
<td>36.8% (n=19)</td>
</tr>
</tbody>
</table>

*Exclusive Breastfeeding in the Hospital
  - Total: n=75

Adjusted Associations

Model 1, in Table 2, illustrates non-significant increased odds of EBF among prenatal breastfeeding education, breastfeeding self-efficacy and previous breastfeeding experience. Rating of EBF supportive hospital practices and intention to breastfeed showed non-significant and significant decreased odds of EBF respectively. Model 2, which adjusts prenatal breastfeeding education for breastfeeding self-efficacy, demonstrates a non-significant decreased
odds of EBF and in Model 3, which adjusts for race/ethnicity a non-significant increased odds of EBF in the hospital is shown among all independent variables.

Table 2: Multivariate logistic regression analysis of factors associated with exclusive breastfeeding in the hospital

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Model 1: Crude OR(^a) (95% CI)</th>
<th>Model 2: Adjusted OR(^b) (95% CI)</th>
<th>Model 3: Adjusted OR(^c) (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prenatal Breastfeeding Education</td>
<td>1.11 (0.38-3.25)</td>
<td>0.83 (0.23-3.01)</td>
<td>1.07 (0.79-1.45)</td>
</tr>
<tr>
<td>Breastfeeding Self-Efficacy</td>
<td>1.10 (1.03-1.17)**</td>
<td></td>
<td>1.00 (0.71-1.42)</td>
</tr>
<tr>
<td>Previous Breastfeeding Experience</td>
<td>1.50 (0.57-3.97)</td>
<td></td>
<td>1.01 (0.73-1.40)</td>
</tr>
<tr>
<td>Rating of Exclusive Breastfeeding Supportive Hospital Practices</td>
<td>0.90 (0.47-1.74)</td>
<td></td>
<td>1.08 (0.79-1.47)</td>
</tr>
<tr>
<td>Intention to Breastfeed</td>
<td>0.75 (0.66-0.86)**</td>
<td></td>
<td>1.06 (0.74-1.51)</td>
</tr>
</tbody>
</table>

Abbreviations:
CI, confidence interval;
OR, odds ratio

\(^a\) Crude ORs  
\(^b\) Adjusted for self-efficacy  
\(^c\) Adjusted for race/ethnicity  
\(*p<.05 \quad **p<.01 \quad ***p<.001\)
Discussion of Results

EBF in the Hospital

Over one half of all women in the study EBF their infants during the entire hospital stay. This was true when broken down by race and, as many other research studies have shown, Caucasian women had a slightly higher percentage than Hispanics who had a slightly higher percentage than African American women.

Prenatal Breastfeeding Education Classes

There was a non-significant increased crude odds of EBF in the hospital with prenatal education and this association remained after adjusting for race/ethnicity. However, after adjusting for breastfeeding self-efficacy, there was a non-significant inverse association of EBF in the hospital and prenatal breastfeeding education, which does not correspond with current research which suggests increased breastfeeding self-efficacy increases odds of EBF. Self efficacy therefore did not show the hypothesized mediator effect for this study because it did not increase the odds of EBF when combined with prenatal education. Also, contrary to the majority of current literature, more African American and Hispanic women participated in prenatal breastfeeding education classes than Caucasian women. This would suggest that African American and Hispanic women were more likely to EBF but this was not the case in this study and both groups fell behind Caucasian women. It may also suggest that the Caucasian women offered the prenatal breastfeeding education class did not participate due to self-perceived knowledge. Therefore, in this study, prenatal breastfeeding education did not appear to significantly increase odds of EBF.
**Breastfeeding Self-Efficacy**

Caucasian women had higher self-efficacy scores than Hispanic women who had higher scores than African American women. EBF women in the study had higher self-efficacy scores than those who partly breastfed. There was a significant increased crude odds of exclusive EBF in the hospital with greater self-efficacy; however this became non-significant after adjusting for race. Greater breastfeeding self-efficacy illustrated a positive effect on EBF in the hospital until researchers adjusted for race and prenatal education. This suggests that while having greater self-efficacy may help, it is not the only factor of importance when examining EBF outcomes.

**Previous Breastfeeding Experience**

A little over half of all women reported having previous breastfeeding experience and about 60% of those women EBF. Hispanic women had the highest amount of previous experience, followed by African Americans and then Caucasians. There was an increased crude odds of EBF in the hospital among women with previous breastfeeding experience, a finding congruent with current literature, and this association remained after adjusting for race. However, neither association was significant. The outcomes of this study suggest that Hispanics and African Americans had higher rates of EBF. Yet, this was not illustrated here. It could be that their previous experiences were negative or they did not receive adequate education or the support needed from healthcare providers, family and friends.

**EBF Supportive Hospital Practices**

All women rated their EBF supportive hospital care as “8 out of 10” or better with Hispanic and African American women providing ratings slightly higher than Caucasians. There was a non-significant decreased crude odds of EBF with higher hospital ratings but the odds increased after adjusting for race. Yet, the relationship remained non-significant. This suggests
that, like current literature supports, assistance with practices promoting EBF are more likely to result in EBF. For this study that would mean that the women in the minority populations would again have higher EBF rates.

**Breastfeeding Intention**

African American women had the highest intentions to breastfeed, followed by Hispanic and then Caucasian women. Of the women who EBF the scores were much lower around 5. There was a significant decreased crude odds of EBF in the hospital with women with greater intentions to breastfeed. After adjusting for race this association displayed non-significant increased odds with greater intention. Many women intend to breastfeed which often means they will “try it”. Even with high intentions women still need support and education to successfully achieve EBF. In this case, the sample size may have been too small to show a significant result that mirrors current research suggesting that higher intention leads to EBF. Therefore, while the minority populations of women also reported higher intentions, they may have been lacking other important factors in addition to education and support, resulting in lower rates of EBF when compared to Caucasian women.

**Limitations**

In the beginning of this study, researchers realized that 6 of the original 82 study participants had to be excluded due to the location of their prenatal care; having care anywhere other than UNC did not expose these women to RSB. Therefore, the RA did not interview as many women as previously envisioned and, with the study lasting only 10 weeks, the RA could only interview a limited number of eligible participants. Having such a small sample size makes it difficult to achieve significance in the analyses and to generalize the study results to other populations.
There were also common themes among some survey questions that frequently arose while the RA conducted interviews. In the question about rating EBF supportive hospital practices (assistance with skin to skin, feeding cues, and rooming in), women often wanted to rate different hospital units separately. Some had a wonderful experience in one unit and a terrible experience in another; this may have influenced the accuracy of responses. There may also have been some recall bias in the answers to the questions that deal directly with participants’ RSB session; that session could have occurred anywhere from 1-5 months earlier depending on the women’s gestation when taking the class.

This study was also conducted at UNC, a baby-friendly hospital, which already has strong implementation of maternity care practices that support breastfeeding. The medical staff and patients may not be representative of those among other hospitals. RSB is unique to UNC and when studying prenatal breastfeeding education in other settings, women often have to seek out classes or agree to be a part of a study. It can be difficult to prove efficacy of an educational tool such a RSB designed to support breastfeeding, in a baby-friendly facility because the extent to which the outcome of EBF was influenced by the class or by the hospital is not clear. Also, some women receive education during appointments with other caregivers. There are a variety of types of breastfeeding education and points in time when women can participate in it. Therefore, it can be difficult to compare one form of breastfeeding education to another. This study may not be able to contribute to the conversation of racial disparities because it only takes into account a specific form of prenatal breastfeeding education among a very small sample of women and does not address other factors that may contribute to disparities.
Conclusion

The non-significant increased odds of EBF in the hospital with prenatal education found in this study add to the current body of literature that supports the idea that education and support are helpful in increasing EBF. Yet the racial/ethnic breakdown of prenatal education in this study, while not achieving significance, would seem to conflict with other studies because more African American and Hispanic women received education than Caucasian women, yet Caucasian women achieved higher rates of EBF than both minority populations.

Although some findings are supportive of current research, overall this study did not strongly support the idea that factors of prenatal breastfeeding education, breastfeeding self-efficacy, previous breastfeeding experience, EBF supportive hospital practices and breastfeeding intention contribute to EBF in the hospital. The higher rates of prenatal education class attendance and previous experience among Hispanic and African American women, the higher ratings of EBF supportive hospital care among Hispanic women and higher intention scores among both minority populations (which all normally suggest higher rates of EBF) when compared to Caucasian women concludes that other factors may need to be examined to address the racial/ethnic existing disparities. This study did not explain the racial/ethnic disparities that exist in achieving EBF and this and future studies regarding factors contributing to EBF among racial/ethnic groups may need to be expanded to a larger sample size to obtain more significant findings.

Recommendations and Significance for Maternal and Child Health

Although the findings in this study did not strongly contribute to the literature on breastfeeding disparities they did suggest that other factors are important to consider and that
support and prenatal breastfeeding education alone may not be enough for all women to achieve EBF. There were several factors in this study that have been proven to increase breastfeeding initiation and duration in a large number of other studies that did not do so here. When considering African American and Hispanic women, researchers have yet to determine why these women have lower breastfeeding rates. Outside factors that may or may not have been considered to date, such as deeper cultural implications, ideas and norms that are preventing these women from achieving higher rates may need to be studied more in depth. It is important to continue to conduct research in this area because there are factors that have yet to be determined that have the potential to affect whether or not a woman breastfeeds and for how long. More importantly, the benefits of breastfeeding (and the costs of not breastfeeding) can be seen throughout the lifespan; by addressing racial/ethnic disparities in breastfeeding among infants researchers may also address many of the racial/ethnic health disparities that exist in adults. The effects of this would not only be seen in health improvements among individuals but may also positively impact an array of demographic (i.e. education level, income level, etc.) and economic factors (i.e. lower medical costs) in the U.S. society as a whole.
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The University of North Carolina (UNC) Chapel Hill Hospital - Women’s Hospital
Appendices

A. Ready, Set, Baby Postpartum Interview

B. Medical Record Data Collection Chart
Appendix A

CAROLINA GLOBAL BREASTFEEDING INSTITUTE
Department of Maternal and Child Health

Ready, Set, BABY Postpartum Interview

Date: __________________

Medical Record # or sticker:
Hello, I am a public health student at UNC and would like to confidentially ask you a few questions about your experience at Women’s Hospital so far. We plan to use your answers to help improve the experience of other patients here at UNC. It should take about 5 minutes and there is no follow up. If you participate you can choose one of these bilingual Spanish/English books to keep as a gift. Is it okay to proceed? (Surveyor: Consent Form and HIPPA Agreements must be reviewed and signed.)

1. The first question I have for you is about the care that you and your baby have received so far. When it comes to things like skin-to-skin, having your baby kept in your room, and feeding your infant, how has the overall care you’ve received measured up to your expectations? Use this scale from 1 to 10 with 1 being the worst and 10 being the best. (Show clipboard of choices and notate any pertinent comments).

<table>
<thead>
<tr>
<th>Overall Satisfaction</th>
<th>(1) Very Dissatisfied (Expectations Not At All Met)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10) Very Satisfied (Expectations Fully Met)</th>
</tr>
</thead>
</table>

2. Do you plan to work after you get home? If so, when?
   ☐ Yes (please enter # of weeks postpartum when returning) _______________________
   ☐ Maybe / Not Sure
   ☐ No
   → 2A. If Yes, full-time or part-time?
      ☐ Full Time
      ☐ Part Time

3. Now that you have given birth, how do you know when to feed your baby? (Surveyor: Only if a cue is needed, say “Do you look at the clock or at your baby to decide when to feed him or her? Choose only one answer)
   ☐ On demand (look for baby’s cues)
   ☐ A schedule (look at clock)
4. The following statements are about feeding your baby. Please choose the answer that most closely matches your opinion, considering both your feeding plans and the likelihood that you will carry out those plans. (Surveyor: if a woman is planning to feed expressed breast milk, please apologize that her choice is not represented in this validated tool and that she can assume breastfeeding means feeding breast milk.)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Very Much Agree</th>
<th>Somewhat Agree</th>
<th>Unsure</th>
<th>Somewhat Disagree</th>
<th>Very Much Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am planning to only formula feed my baby (I will not breastfeed at all)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I plan to breastfeed my baby</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>When my baby is 1 month old, I will be breastfeeding without using any</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>formula or other milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When my baby is 3 month old, I will be breastfeeding without using any</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>formula or other milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When my baby is 6 month old, I will be breastfeeding without using any</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>formula or other milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. For the following set of questions, please mark on a scale from 1 to 5, please choose how confident you are about the following: (Surveyor: If needed, explain this is a validated tool)

<table>
<thead>
<tr>
<th>Statement</th>
<th>(1) Not at all Confident</th>
<th>(2) (3)</th>
<th>(4)</th>
<th>(5) Always Confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can determine if my baby is getting enough milk</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can successfully cope with breastfeeding like I have with other</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>challenging tasks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can breastfeed my baby without using formula as a supplement</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can ensure that my baby is properly latched on for the whole feeding</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can manage the breastfeeding situation to my satisfaction</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can manage to breastfeed even if my baby is crying</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can keep wanting to breastfeed</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can comfortably breastfeed with my family members present</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can be satisfied with my breastfeeding experience</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can deal with the fact that breastfeeding can be time-consuming</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can finish feeding my baby on one breast before switching to the other</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>breast</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I can continue to breastfeed my baby for every feeding
I can manage to keep up with my baby's breastfeeding demands
I can tell when my baby is finished breastfeeding

6. Which clinic did you go to for your prenatal care?
   - Clinic B (UOG, Midwives, Maternal-Fetal Medicine, Women’s Primary)
   - Clinic C (Resident clinic, High Risk, Diabetes, Low Risk)
   - Family Medicine Clinic
   - Timberlyne
   - Other/Unknown

7. Did you take any classes while you were pregnant to help you get ready for taking care of your baby?
   - Yes, Ready, Set, BABY
   - Yes, a childbirth preparation class (ex. Lamaze, Bradley, hypnobirthing, etc.)
   - Yes, a breastfeeding class
   - Yes, other ____________________
   - No

   7A. IF RSB Selected: Great, you attended the Ready Set Baby session. Regarding skin-to-skin, having your infant in your room with you and feeding your infant, do you think the RSB session helped you feel more prepared for what you’ve experienced since having your baby?
      - Yes
      - No
      - I don’t know
7B. IF RSB Not Selected: You may recall hearing about an opportunity to participate in a free educational program here at Women's Hospital to help you get ready for caring for your new baby called Ready, Set, BABY. You would have heard about it by the receptionist at your prenatal clinic sometime after your 20 week appointment. Do you remember hearing about it? (Surveyor: if not, “If you had known about it, do you think you would have attended?”)

- Yes
- No, not sure if would have attended ________________________________
- No, but probably would have attended ________________________________
- No, but probably would not have attended ________________________________

7C. IF YES Selected: Please share any reasons why you did not attend the free educational session about caring for your baby. (Surveyor: if necessary, show clipboard of choices)

8. This is the last question and it’s okay if you prefer not to answer it. We are hoping to get your household’s income bracket to help us understand the various responses to this survey. Is your annual

<table>
<thead>
<tr>
<th>Reason</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time issues - was in a hurry that day</td>
<td>Time issues – didn’t know ahead of time and hadn’t planned on staying that long</td>
</tr>
<tr>
<td>Time issues - waited a long time for my prenatal appointment and was ready to leave (frustrated)</td>
<td>Financial issues - didn’t want to pay the extra parking fee</td>
</tr>
<tr>
<td>Didn’t think it was needed (already know how to care for baby)</td>
<td>Not interested</td>
</tr>
<tr>
<td>Other children were with her and they were ready to go/needed attention</td>
<td>Other (describe)</td>
</tr>
</tbody>
</table>
household income above or below $50,000?

☐ Above  ☐ Below  ☐ Declined to Answer

8A. If Above, Thanks, and may I ask if it is above or below 75,000?

☐ Above  ☐ Below  ☐ Declined to Answer

8B. If Below, Thanks, and may I ask if it is above or below 25,000?

☐ Above  ☐ Below  ☐ Declined to Answer

Thank you so much for all your responses. Please choose the book you would like.