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The Association of Hospital Practices to Breastfeeding Behaviors in South Carolina: Analysis of 2013-2015 Pregnancy Risk Assessment Monitoring System (PRAMS) Data

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THE ASSOCIATION OF HOSPITAL PRACTICES TO BREASTFEEDING BEHAVIORS IN SOUTH
CAROLINA: ANALYSIS OF 2013-2015 PREGNANCY RISK ASSESSMENT MONITORING
SYSTEM (PRAMS) DATA

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DEDICATION

I would like to dedicate this project to my family. My children, Tyler Bruner, Ashley Bruner, Jordan Bruner and Tommy Bruner, are the loves of my life. You all are so amazing and you have been the driving force behind everything that I have done. I would like to thank my father, Larry Bruner for being the example of hard work and dedication. You have always believed in me and supported my dreams and goals. I would like to thank my little sisters Nichelle McClain, Nina Young, Erica Bruner, Tyesha Wilcots-Gordan and Afefa Bruner for being such amazing young ladies who have motivated me to be a positive example to them. Finally, I would like to thank my beloved mother, Ayisha Ruth Wilcots, who God called home. She was so beautiful inside and out. Mommy I love and miss you so much. You gave love freely and saw the best in everyone. You showed me how to love unconditionally and forgive endlessly. I love all of you with all of my heart and soul. I could not have done it without any of you. I thank God for all of you!!

With all of my love!!

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Finally, I would like to acknowledge all of the mothers who took the time to complete the survey. This helps us all have a better understanding of the experiences of new mothers in South Carolina.

ABSTRACT

Objective: The purpose of this study was to determine whether hospital practices are associated with breastfeeding initiation and breastfeeding duration for ≥ 10 weeks.

Methods: We analyzed the 2013-2015 South Carolina Pregnancy Risk Assessment Monitoring System (PRAMS) data. The population of interest was mothers who delivered a single live birth in the hospital. The infant was alive and living with the mother at the time of the survey. Chi-square and logistic regression were used to examine breastfeeding initiation and duration among all women who delivered in a hospital and those who stated that they initiated breastfeeding while in the hospital.

Results: Logistic regression was used to analyze hospital staff practices, categorized as the eight steps of the *Ten Steps to Successful Breastfeeding*, to determine if they were significantly associated with mothers initiating breastfeeding in the hospital as well as the duration of breastfeeding for ≥ 10 after discharge. In an analysis breastfeeding initiation, six of the eight Steps were found to have a significant association. The Steps that were found to be significantly associated were STEP 3 (OR 6.43, $p=0.0011$), STEP 4 (OR 28.12, $p<.0001$), STEP 5 (OR 4.31, $p=0.0006$), STEP 6 (OR 4.91, $p<.0001$), STEP 7 (OR 3.14, $p=0.0057$), and STEP 8 (OR 6.56, $p<.0001$).

For breastfeeding duration, there were three Steps significantly associated with breastfeeding duration of ≥ 10 weeks. They were STEP 5 (OR 0.41, $p=0.0031$), STEP 6 (OR 4.55, $p<0.0001$) and STEP 8 (OR 2.06, $p=0.051$).

Conclusions: Our finding suggests that if hospitals focus on policies that support the increase of hospital staff practices that are positively associated with mother's breastfeeding initiation while she is in the hospital, breastfeeding rates in those hospitals could potentially increase. Hospitals that are not designated as baby-friendly but implement or continue practices that support/facilitate breastfeeding could potentially experience rates similar to those facilities deemed Baby-Friendly.

Hospital practices that were found to be significantly associated with breastfeeding initiation and duration were significant regardless of the mother's race, marital status, education, poverty level, BMI, or mental health status. However, cultural competency is important and should be included in their processes.

Keywords: breastfeed, health behaviors, hospital practices, initiation, duration, health disparities, Ten Steps to Successful Breastfeeding, PRAMS, South Carolina

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LIST OF ABBREVIATIONS

BFHI	Baby-friendly Health Initiative
CDC	Centers for Disease Control and Prevention
DHEC.....	Department of Health and Environmental Control
PRAMS	Pregnancy Risk Assessment Monitoring System
SEM	Social-Ecological Model
WHO.....	World Health Organization

CHAPTER 1

INTRODUCTION

Breastfeeding is a health behavior that has a positive health effect on an infant that can span throughout childhood years (“Breastfeeding: Healthy People 2020 | DNPAO | CDC,” n.d.). Breastfeeding also has positive health outcomes for the mother by reducing the risk of ovarian and breast cancers. Increasing breastfeeding rates has the potential of reducing childhood morbidity by decreasing the risk of illnesses such as sudden death syndrome the unexpected death of a seemingly healthy baby usually during sleep and necrotizing enterocolitis an inflammatory bowel disease with significant morbidity and mortality in preterm infants (Ip et al., 2007).

Breastfeeding gives a healthy start to both mother and baby by providing positive physiological support (Hauck, Thompson, Tanabe, Moon, & Vennemann, 2011; Vennemann et al., 2009), developmental protections (Kramer, Aboud, et al., 2008; Kramer, Fombonne, et al., 2008; Persad & Mensinger, 2007) and nutritional value (Chapman & Pérez-Escamilla, 2012; Eidelman, 2012; Horta, Loret de Mola, & Victora, 2015; A. Johnson, Kirk, Rosenblum, & Muzik, 2015; K. M. Jones, Power, Queenan, & Schulkin, 2015; Rollins et al., 2016) .

The Baby-Friendly Health Initiative (BFHI) was sponsored by The World Health Organization (WHO) and the United Nations Children’s Fund (“WHO | Implementation of the Baby-Friendly Hospital Initiative,” n.d.). The BFHI was designed to increase the initiation and duration rates of exclusive breastfeeding through hospital practices. Baby-

Friendly practices are arguably the standard of best practice for hospitals' practices with mother and new infant to help establish breastfeeding initiation and longer duration.

The BFHI includes the Ten Steps to Successful Breastfeeding practices that every hospital maternity ward should follow to increase breastfeeding rates in their facility.

The steps are the following:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within one hour of birth. (Interpreted as: Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour. Encourage mothers to recognize when their babies are ready to breastfeed and offer help if needed).
5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk unless medically indicated.
7. Practice rooming in - allow mothers and infants to remain together - 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

Hospitals must also demonstrate an exclusive breastfeeding rate of at least 75% at mother's discharge, and follow the International Code of Marketing Breast-milk Substitutes at which time they can achieve Baby-Friendly Hospital accreditation through the Baby-Friendly Hospital Initiative (BFHI) ("WHO | Implementation of the Baby-friendly Hospital Initiative," n.d.).

Although there is extensive literature regarding breastfeeding and its positive health benefits to mother and infant, U.S rates are not meeting the public health goals set by Healthy People 2020. In addition, there are evident disparities when comparing ethnic

groups in the 2015 National immunization survey and it is greatest for African-American women (“National Immunization Survey (NIS) | Breastfeeding | CDC,” n.d.)

BACKGROUND STATEMENT OF THE PROBLEM

Breastfeeding has been shown to be the optimal natural, most nutritious form of feedings for infants. For the purpose of this study, breastfeeding will be broadly defined as “feeding infant breast milk, whether at the breast, or expressed and fed through a bottle.” We are including all breastfeeding responses whether the type of breastfeeding is exclusive, only breast milk, or non-exclusive breastfeeding.

The current goal of Healthy People 2020 is to meet national breastfeeding initiation rates of 81.9%. African-American women are initiating breastfeeding at a rate of merely 60% (Centers for Disease Control and Prevention (CDC), 2010). The goal for breastfeeding at 6 months postpartum is 61%, and no racial group is meeting this goal (“Breastfeeding: Healthy People 2020 | DNPAO | CDC,” n.d.).

Breastfeeding Disparities for African-American Women

According to U.S Centers for Disease Control and Prevention (CDC), African-American women initiate breastfeeding at a lower rate than other racial groups and they breastfeed for shorter periods of time although they are well aware of the physical and psychological health benefits (Reeves & Woods-Giscombe, 2015). This group has lagged behind for over a quarter century (Sankar et al., 2015). Due to the breastfeeding practices of the African-American women, the community is experiencing the greatest health disparities (A. M. Johnson, Kirk, & Muzik, 2015).

Breastfeeding protects mother and child from adverse health conditions, many of which are plaguing the African-American communities more than any other racial group.

Increasing the breastfeeding rate of African-American women and extending the length of time that they continue to breastfeed could have a strong impact on closing the gap of health disparities that the African-American community faces by improving the health status of this population.

Closing the Knowledge Gap

More research is needed to help us better understand why the target rates are not being met and if there is an association with hospital interaction and these rates. Hospital practices with mother and the association with breastfeeding rates have significant policy implications for addressing disparities in these rates. There is also additional research needed to determine how hospital staff practices are associated with breastfeeding practices of African-American women, in particular.

The findings from this study has the potential to result in appropriate policy changes leading to increased breastfeeding rates and longer duration, better health outcomes for mother, child, and ultimately the community as a whole. Having a better understanding of what is occurring, can better inform policy decisions that reinforce positive, supportive behaviors in the hospital setting.

RATIONALE FOR THE STUDY

This study aims to increase the body of knowledge regarding best practices to assist hospitals in their support of new mothers with breastfeeding initiation and longer continuation. The standards that we used for best practices are included in the BFHI. We reviewed and analyzed 8 of the *Ten Steps to Successful Breastfeeding* to determine which ones were associated with higher rates of initiation and longer duration. This information will be valuable in assisting hospitals in identifying those steps that are associated with

the greatest impact on breastfeeding practices. Facilities may not be fully prepared to pursue Baby Friendly designation, but they may incorporate practices that are determined to be associated with higher rates of initiation and duration based on the finding of this study.

We have evaluated whether the eight steps are associated with increased initiation and/or duration rates and if those rates differ by race. The steps we evaluated were steps 3-10 since they demonstrate direct contact with mother and/or infant. Our goal was to examine how hospital staff behaviors are experienced by women in South Carolina who have delivered a baby in the hospital, how those practices are associated with their health behaviors regarding breastfeeding, and if those behaviors differ by race/ethnicity. We also wanted to determine if there were disparities in initiation and duration rates among those same racial groups.

We analyzed 2013-2015 data from the South Carolina Pregnancy Risk Assessment Monitoring System (PRAMS) survey. Currently, this population has not been analyzed to evaluate women's experiences with hospital staff and the association with breastfeeding practices. There is limited understanding regarding the disparities in breastfeeding initiation and duration rates among women in South Carolina and their association with women's interactions with hospital staff practices. We analyzed PRAMS data to see what practices facilitate breastfeeding initiation and duration and if these practices differ by race.

Due to the public health implications for all races and ethnic groups, but especially for African-American women, there is a need to increase the knowledge regarding the association between hospital staff practices and breastfeeding initiation and

duration. Following the 10 Steps to Successful Breastfeeding can help facilitate positive breastfeeding behaviors. By having a better understanding of how these practices may impact mothers' decisions to initiate and sustain breastfeeding, the appropriate policies and procedures can be implemented to increase supportive environments that promote breastfeeding.

This study contributes to the literature by investigating the association between mothers' reported hospital experiences while they were delivering their babies, and their breastfeeding behaviors. We examined the hospital staff practices' association with breastfeeding initiation and duration by analyzing PRAMS 2013-2015 data. We are unaware of any studies that used this dataset to analyze South Carolina women's experiences regarding hospital staff practices and the association to initiation and duration of breastfeeding. There have been other studies that analyzed hospital practices with women and the association with breastfeeding practices but not using the dataset 2013-2015 PRAMS for South Carolina women who have initiated breastfeeding.

OVERALL DISSERTATION STRUCTURE

The Chapter 1 is the Introduction chapter. Chapter 2 includes a relevant literature review of studies related to the eight selected steps of the *Ten Steps to Successful Breastfeeding* and how those steps are associated with breastfeeding initiation and duration. There are other factors associated with breastfeeding behaviors that these hospital practices address.

Chapter 2 is comprised of sub-categories related to the goals and guidelines for breastfeeding initiation and duration on a global and national level; the importance and benefits of breastfeeding for mother and infant; disparities in breastfeeding rates and

duration among African-American women compared to other races and ethnic groups; hospital health care providers' practices with women and their infants; the association of those practices with breastfeeding initiation and duration; and conclusion.

Chapter 3 is the study research methodology section which contains the conceptual framework, description of dataset, research design, and analytic plan. The study analyzed associations between the dependent variables, initiation and duration, and the relevant independent variables related to hospital health care providers' practices with the women and infants while accounting for covariates. First, we performed univariate analysis to describe characteristics of the sample population, including frequency distribution for categorical variables. Second, we performed Chi-square tests to assess differences in proportions, for categorical variables. Last, logistic regression was used to perform bivariate and multivariate analysis on weighted data. We used SAS version 9.4 to analyze the data.

The hospital staff interactions are defined by the *Ten Steps to Successful Breastfeeding* and we examined eight of the ten steps. Hospital staff interactions and Steps will be used interchangeably. Those eight Steps are as follows:

Step 3: Inform all pregnant women about the benefits and management of breast feeding.

Step 4: Help mothers initiate breastfeeding within one hour of birth. (Interpreted as: Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour. Encourage mothers to recognize when their babies are ready to breastfeed and offer help if needed).

Step 5: Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.

Step 6: Give newborn infants no food or drink other than breast milk unless medically indicated.

Step 7: Practice rooming in - allow mothers and infants to remain together - 24 hours a day.

Step 8: Encourage breastfeeding on demand.

Step 9: Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.

Step 10: Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

Chapters 4 and 5 are manuscripts that will be submitted to peer-reviewed journals for publication. Both Chapter 4 and 5 include policy and health services implications as well as study strengths, limitations, and suggestions for future research. Chapter 4 examines the results of testing the hypothesis that respondents who were exposed to the eight steps relating to hospital staff interactions; were more likely to have initiated breastfeeding in the hospital than those who were not exposed to the eight steps. In addition, African-American women were the least likely to have been exposed to the eight steps. Furthermore, of those who were exposed to the eight steps, African-American women were the least likely to have initiated breastfeeding in comparison to other races.

Chapter 5 examines the results of testing the hypothesis that among respondents who initiated breastfeeding, those who were exposed to the eight steps relating to hospital

staff practices, were more likely to have longer breastfeeding duration than those who were not exposed to the eight steps.

Furthermore, of those who initiated breastfeeding and were exposed to the eight steps, African-American women were most likely to have shorter breastfeeding duration in comparison to other races.

Chapter 6 is the discussion and conclusion section of the entire study including the study for initiation and the study for duration. We discuss the results and address the strengths, study limitations, and directions for future research.

Conclusion

Breastfeeding is a vital health behavior that has multiple health benefits for mother and infant. Breastfeeding is so important that hospitals should make it a priority to develop procedures that are proven to help mothers initiate breastfeeding and continue as long as they are able. Hospital practices that would support these health behaviors are our focus. Finding practices that are associated with these health behaviors is important in informing required hospital systems and practice changes to support breastfeeding.

CHAPTER 2

RELEVANT LITERATURE REVIEW

In 2011, the Surgeon General released a *Call to Action to Support Breastfeeding*, which states that breastfeeding is “One of the most highly effective preventative measures a mother can take to protect the health of her infant and herself” (Mass, 2011). The call is for everyone to commit to making breastfeeding easier for mothers and infants by providing needed support. The support is needed from the family, the community, the health care system, employers, the education system, the entire public health infrastructure, and research and surveillance (Mass, 2011).

Healthy People 2020, a United States health promotion and disease prevention initiative which sets goals aimed at improving national health outcomes, has set goals for the initiation and duration rates of breastfeeding in the U.S. Healthy People 2020 adopted the World Health Organization (WHO) guidelines and definition of exclusive breastfeeding. The WHO’s definition of “exclusive breastfeeding” is that the infant only receives breastmilk and vitamin/mineral drops. This means no introduction of any food or drinks, including water, until after 6 months of age. The WHO guidelines for breastfeeding states that infants should be breastfed within the first hour of birth to help increase the likelihood of successful breast-feeding initiation. Infants should be breastfed exclusively for the first 6 months and continue for 24 months with the introduction of age appropriate complementary foods (“WHO | Breastfeeding,” n.d.).

Healthy People 2020's breastfeeding targeted goals are as follows:

- 1) Ever breastfeed, target is 81.9%; 2) Breastfed for 6 months, target is 60.6%; 3) Breastfed for 12 months, target is 34.1%; Breastfed exclusively for 3 months; target is 46.2%; Breastfed exclusively for 6 months, target is 25.5% ("Breastfeeding: Healthy People 2020 | DNPAO | CDC," n.d.).

The American Academy of Pediatrics supports exclusive breastfeeding for 6 months. Once the child reaches 6 months, age appropriate complementary foods may be introduced however, breastfeeding should continue through 12 months (Eidelman, 2012).

BENEFITS OF BREASTFEEDING

The immediate health and survival of an infant, is the greatest benefit of breastfeeding (Vulanovic, n.d.). Breastfed infants experience decreased incidence and severity of common infections and illnesses, including gastrointestinal illnesses, bacterial meningitis, otitis media, respiratory tract infection, urinary tract infection, pneumonia, and late-onset sepsis in preterm infants, (Ahluwalia, Morrow, & Hsia, 2005; Alexander, Dowling, & Furman, 2009; Allen & Hector, 2005; Eidelman, 2012; Hurley, Black, Papas, & Quigg, 2008) (Alexander et al., 2009; Hurley et al., 2008). Breastfeeding reduces the risk of sudden infant death syndrome (SIDS) (Ip et al., 2007), which is an unexpected death of a seemingly healthy baby usually during sleep. It also reduces incidence of necrotizing enterocolitis (NEC) (Ip et al., 2007), an inflammatory bowel disease with significant morbidity and mortality in preterm infants. Infants who are breastfeed are less likely to get sick or have hospital stays due to illness ("Breastfeeding: Healthy People 2020 | DNPAO | CDC," n.d., "It's Only Natural |," n.d.).

Studies have also shown that breastfeeding protects against childhood chronic diseases such as Crohn's disease, hypertension, overweight, obesity, diabetes, asthma, allergies, cancers (lymphoma, leukemia and Hodgkin's disease), hypercholesterolemia, and ischemic heart disease (Allen & Hector, 2005; Eidelman, 2012; Khoury, Moazzem, Jarjoura, Carothers, & Hinton, 2005; Vulcanovic, n.d.). The better and more consistent the infant is breastfed, the more protection the infant receives against morbidity and mortality (Sankar et al., 2015).

Infants 0-5 months who were not exclusively breastfed primarily had significantly higher risk of all-cause and infection related mortality (Sankar et al., 2015) Children 6-23 months who were continuously breastfed had significantly lower risk of all-cause and infection related mortality (Sankar et al., 2015). Increasing breastfeeding rates for all children world-wide, could prevent 12% of deaths of infants under 5 years old annually saving about 800,000 lives in low- and middle-income countries (Rollins et al., 2016).

Breastfed infants and mothers experience closer bonds due to the breastfeeding experience (Breastfeeding, 2012; Eidelman, 2012). There is more skin to skin contact between breastfeeding mothers and infants, which helps facilitate a more intimate emotional bond between mother and child (Breastfeeding, 2012; Eidelman, 2012). Mothers experience faster return to pre-pregnancy organ placement and weight (Breastfeeding, 2012; Eidelman, 2012). They naturally have increased spacing between pregnancies due to breastfeeding (Breastfeeding, 2012; Eidelman, 2012). The longer the duration of breastfeeding for the mother, the risk of developing ovarian or breast cancer diminishes ("Breastfeeding: Healthy People 2020 | DNPAO | CDC," n.d.).

BREASTFEEDING DISPARITIES

A Public Health Issue

As with many public health issues and their complexity, breastfeeding and the reason for such low rates and disparities in rates, have many influences. These influences may be direct such as family influences or indirect such as hospital practices that appear to support a certain infant feeding method. The general culture may be ambivalence towards breastfeeding (Kaufman, Deenadayalan, & Karpati, 2010). There may be contradictory ideas about breastfeeding within the culture. Individuals with minimum experience or exposure to breastfeeding, who also have a lack of understanding regarding the health benefits of breastfeeding, may not have a strong position regarding whether to breastfeed. The abundance in the availability of formula (Cricco-Lizza, 2006) supports the perception that formula is just as good if not better than breastfeeding. According to the literature, participation in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) program was associated with lower breastfeeding rates among these women especially if they were exposed to lower intensity of WIC breastfeeding support (Cricco-Lizza, 2006; (Evans, Labbok, & Abrahams, 2011). Women who had high levels of comfort with formula feeding (Nommsen-Rivers, Chantry, Cohen, & Dewey, 2010) were less likely to breastfeed.

Nationally, for children born from 1999-2005, 77.7% of White women initiated breastfeeding and 45.1% continued to 6 months (Centers for Disease Control and Prevention (CDC), 2010), 2010). The highest rate of breastfeeding initiation and duration for the children born from 1999-2005 was by Hispanic women (Centers for Disease Control and Prevention (CDC), 2010). They initiated breastfeeding at a rate of

80.6% and 46% continued to 6 months (Centers for Disease Control and Prevention (CDC), 2010). During this same time, 58.1% of African-American women initiated breastfeeding, where 27.5% continued to 6 months (Centers for Disease Control and Prevention (CDC), 2010).

Maternal Socio-Demographics

Breastfeeding rates have increased over the years, but socio-demographic disparities within these increases, still exist (Mass, 2011). The literature supports the position that socio-demographic characteristics of the mother that are associated with higher breastfeeding initiation rates and longer breastfeeding duration are race, age, marital status, education level, and socioeconomic status (McDowell, Wang, & Kennedy-Stephenson, 2008). The older the mother at time of delivery, the higher the education attained, married women, and women with higher incomes are associated with higher rates of initiation and longer duration of breastfeeding (McDowell et al., 2008).

Other factors associated with the mother are her knowledge regarding the health benefits associated with breastfeeding for her and her infant (Flower et al., 2008). The health benefits of breastfeeding are the most important factor when a woman decides to breastfeed (Alexander et al., 2010; Murimi, Dodge, Pope, & Erickson, 2010; Robinson & VandeVusse, 2009).

(J. R. Jones, Kogan, Singh, Dee, & Grummer-Strawn, 2011), found that three-fourths (3/4) of children 6 months through 5 years were ever breastfed or fed breastmilk at least once. Breastfeeding initiation rates were highest for babies born to mothers over 30 years of age, with some college education, and whose annual income was 400% of the 2007 federal poverty level. Hispanic mothers breastfeed at a rate of (81.8%) which was

significantly higher than any other racial group. Non-Hispanic black mothers breastfed at a rate of (55.5%) which was significantly lower than the other racial groups. Non-Hispanic White mothers breastfed at a rate of (76.2%). Non-Hispanic black children were significantly less likely to be breastfed than non-Hispanic White children AOR 0.54 [CI: 0.44-0.66]. Children living with a smoker in the home were significantly less likely to be breastfed than a child that did not have a smoker living in the home AOR 0.66 [CI: 0.56-0.78]. Exclusive breastfeeding for 6 months was reported by 16.8% of those who ever breastfed which was 12.6% of all children. Mothers who were thirty years of age or older, were emotional and mentally healthy, and who lived with non-smokers, had higher rates of exclusive breastfeeding. Significantly associated with breastfeeding initiation were mother's education level and nativity adjusting for all other covariates.

Community and Relationships

Sociocultural factors that can influence breastfeeding practices deal with the relationship the mother has with others in her home and within the community. Comments from friends and family, opinions and information, can positively or negatively affect feeding choices. These practices may cause a mother to doubt her ability to breastfeed. She may question whether breastfeeding is even appropriate.

Sociocultural factors, such as opinions of family members, affect all women but they have a stronger effect on African-American women's initiation and therefore the health disparities that are burdening the African-American racial group (McDowell et al., 2008). These sociocultural factors have a stronger influence on the behavior of African-American mothers than their socioeconomic status (McDowell et al., 2008).

HINDRENCES TO BREASTFEEDING PRACTICES

Breastfeeding Difficulties

Breastfeeding difficulties may cause a woman to cease breastfeeding or not to initiate (Alexander et al., 2009; Hurley et al., 2008; Robinson & VandeVusse, 2009). The fear of pain that is perceived to be associated with breastfeeding (Alexander et al., 2009; Hurley et al., 2008; Robinson & VandeVusse, 2009) influences a woman's decision to initiate breastfeeding. The actual pain that she may have experienced with breastfeeding may cause her to cease breastfeeding.

A study by McCann et al. (2007), performed structured interviews of a nationally representative sample of WIC mothers and found that the pain and difficulty of breastfeeding was associated with shorter duration of breastfeeding.

Comfort with Formula feeding

The strategical marketing of formula through media (Stevens, Patrick, & Pickler, 2009) and the fact that formula is provided in hospitals helps support the idea that formula provides more nutrition and is the better feeding method for infants (Kaufman et al., 2010) than breastfeeding. Women stated that it was just easier to fit formula feeding into a busy schedule (Lewallen & Street, 2010). Women's comfort level with formula is associated with shorter breastfeeding duration (Kaufman et al., 2010).

Participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), are more likely to formula feed than non WIC participants (Hedberg, 2013). WIC is a national nutritional grant program funded by The US Department of Agriculture to help states provide supplemental foods, health care referrals, and nutrition education to women, infants, and children whose income qualifies them for WIC services ("Women, Infants, and Children (WIC) | Food and Nutrition

Service,” n.d.). The increased level in formula feeding could also be due to a fear or concern regarding the mother’s milk. African-American women experienced generational formula feeding which was supported by free formula given at hospitals after delivery and supplemental feeding programs such as WIC (Kaufman et al., 2010).

Nommsen-Rivers et al., (2010), examined the modifiable psychosocial factors related to breastfeeding and formula feeding choices that are associated with disparities in breastfeeding intentions and found that a mother’s comfort level with formula was associated with shorter breastfeeding duration.

Social/Cultural Norms

The social norms in a family or community can influence a mother’s decision to breastfeed and influence how long she breastfeeds. If a family or community’s norms do not support breastfeeding and view breasts as more of sexual objects than for feeding of infants, mothers may perceive breastfeeding as taboo resulting in whether breastfeeding is initiated (Reeves & Woods-Giscombe, 2015).

Women who are embarrassed to breastfeed in front of others, experience more difficulty breastfeeding and are at risk of decreasing their duration (Kaufman et al., 2010). Finding privacy can be more difficult for low-income women, due to living in smaller homes and they may live with extended family making it more difficult to breastfeed (Kaufman et al., 2010).

Breastfeeding around other people also exposed women to their opinions and comments. Women who had to defend themselves for breastfeeding by responding to negative comments, reported this made it more difficult to continue to breastfeed (Lewallen & Street, 2010).

According to the literature, cultural and social perceptions regarding breastfeeding may have been shaped by the historical challenges experienced by African-Americans. It is important to recognize these challenges that have resulted in a negative perception (Asiodu & by, 2011) of breastfeeding causing lower rates of initiation (K. M. Jones et al., 2015). African-American cultural beliefs regarding breastfeeding have an important role in their infant-feeding decision making process (Reeves & Woods-Giscombe, 2015).

Employment, school, and childcare issues

Work environment's that are not supportive of breastfeeding may hinder breastfeeding initiation and duration (Ogbuanu, Glover, Probst, Liu, & Hussey, 2011). Returning to work may not provide a private place for a mother to express her milk or adequate clean storage for expressed milk. Her place of employment may not be close enough to her child's caregiver for her to take breaks and nurse her infant. She may also not receive sufficient time needed for her to express her milk. The duration of breastfeeding is influenced by the mother's need to return to work (Ogbuanu, Glover, Probst, Liu, & Hussey, 2011).

African-American women tend to cease breastfeeding due to returning to work and they tend to return to work sooner because of shorter maternity leave or none at all (Murimi et al., 2010; Ogbuanu et al., 2011). They discontinue breastfeeding due to necessity rather than a decision or choice to stop (Lewallen & Street, 2010). They anticipate problems when returning to school or work (Lewallen & Street, 2010) and this influences initiation of breastfeeding and the duration that they breastfeed.

How to breastfeed: The need for increased knowledge and/or experience

New mothers need additional knowledge about the actual act of breastfeeding (Reeves & Woods-Giscombe, 2015). They need to have someone that has experience breastfeeding. A lactation consultant or their health care provider should physically show them how to breastfeed successfully. Health service providers are not providing enough educational opportunities for mothers to be better prepared for the breastfeeding challenges that may occur and therefore they are not initiating breastfeeding at all or they are ceasing breastfeeding sooner (Reeves & Woods-Giscombe, 2015). There is a need for practical day-to-day information regarding breastfeeding from professionals and other women including what breastfeeding sensations are normal and what they should expect (Lewallen & Street, 2010).

Negative perceptions

Breastfeeding is an intimate, one-on-one activity between mother and child. The literature suggests that breastfeeding may be perceived as a practice that would drastically reduce the mother's free time (Alexander et al., 2009) due to the level of commitment required. There may also be a perception, especially for male infants, that breastfeeding would spoil the child (Alexander et al., 2009). This may be due to the fact that breastfed infants are primarily held close to the mother during feeding and the perception is that the attachment may result in a child that is overly dependent on the mother (Alexander et al., 2009).

Mothers concerns with their ability to produce enough milk, that their milk is nutritious enough, and that it is able to satisfy their baby are all negative perceptions that

mothers may hold (Kaufman et al., 2010; McCarter-Spaulding & Gore, 2009) that may influence breastfeeding initiation and duration.

Some other negative influences on a mother's initiation and duration of her breastfeeding practices are her perception that her breastmilk may be a conduit to pass on her illness to her infant (Kaufman et al., 2010). She may have concerns of passing unhealthy foods or products that she may consume to her infant (Alexander et al., 2009). The perception that breastfed milk is too sweet and could cause tooth decay resulted in the notion that the mother should not breastfeed (Lewallen & Street, 2010) and may also cause hesitation in breastfeeding initiation.

SUPPORTS BREASTFEEDING PRACTICES

There are many reasons that a woman will initiate breastfeeding. The knowledge of the benefits of breastfeeding is one of the primary reasons a mother initiates breastfeeding (Alexander et al., 2010; Murimi, Dodge, Pope, & Erickson, 2010; Robinson & VandeVusse, 2009). Mothers who know it is a healthy choice for the infant are more likely to breastfeed. Mothers who are aware of the fact that breastfeeding is a good way to bond with the baby are more likely to breastfeed (Lewallen & Street, 2010). As previously mentioned, the socio-demographic characteristics of the mother that are associated with higher breastfeeding initiation rates and longer breastfeeding duration are older women, married, higher level of education, and higher socioeconomic status (McDowell et al., 2008).

Self-Efficacy

Self-efficacy in relation to breastfeeding is defined as a mother's confidence in her ability to initiate breastfeeding and be successful enough to continue breastfeeding

(Reeves & Woods-Giscombe, 2015). Self-efficacy is an important factor that helps predict breastfeeding initiation and duration and in analyzing breastfeeding disparities (Reeves & Woods-Giscombe, 2015). Breastfeeding initiation and duration increased with the level of a mother's confidence in breastfeeding (Avery et al., 2009).

The study conducted by McCarter-Spaulding & Gore (2009), among a sample of 125 African-American women, found that a high degree of self-efficacy with breastfeeding is associated with increased breastfeeding initiation and duration. The results determined that higher levels of self-efficacy were associated with longer duration of breastfeeding and a more exclusive pattern of feeding at 1 and 6 months.

Personal success with breastfeeding, psychological responses, breastfeeding experiences through others such as family and friends, emotional support, and encouragement (Furman et al., 2013; McCarter-Spaulding & Gore, 2012) influences a mother's level of self-efficacy (Nommsen-Rivers et al., 2010). Those who were themselves breastfed, have increased self-efficacy to breastfeed and see it as the norm (Furman et al., 2013).

Positive Family Support and Encouragement

Positive family support and experiences are an important influence for mothers to initiate and continue breastfeeding (Lewallen & Street, 2010). According to Alexander et al., (2009), the baby's father's degree of support has more of an influence than that of other family members or friends. There are many reasons that the father may or may not support the mother's choice to breastfeed (Furman et al., 2013). Although the father, especially if he cohabitates with the mother (Reeves & Woods-Giscombe, 2015), has the greatest external degree of influence on the mother initiation and duration of

breastfeeding, other family members also have influence on the mother's feeding practices as well. The maternal grandmother and friends also influence the mother's breastfeeding patterns (Alexander et al., 2009; Kaufman et al., 2010).

Support from health care providers

Merewood et al., (2007), analyzed the association with the Baby Friendly Hospital Initiative and breastfeeding initiation rates. The Baby Friendly Hospital Initiative, established in 1991 by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), is an international hospital-based initiative to increase breastfeeding rates. The study found that the Baby Friendly Hospital Initiative was associated with an increase in breastfeeding initiation rates.

Disparities for African-American Women

As previously mentioned, significant disparities exist between African-American mothers and other races in breastfeeding rates (Alexander, O'Riordan, & Furman, 2010; Breastfeeding, 2012; Murimi et al., 2010; Robinson & VandeVusse, 2009); ("mm6205.pdf," n.d.), 2010). These disparities are supported extensively in the literature.

Individual demographic characteristics of the mother that are associated with higher rates of breastfeeding include the mother's income, education, and age groups ([U.S. DHHS] Centers for Disease Control and Prevention (CDC), 2010). However, when all of these factors are taken into consideration, there are still racial/ethnic disparities with African-American women having the lowest rates of breastfeeding initiation and duration ([U.S. DHHS] Centers for Disease Control and Prevention (CDC), 2010). A study by McDowell et al. reported that African-American with higher income women initiated

breastfeeding at 58% compared to 74% to 76% for other races (McDowell et al., 2008). Similarly, low income African-American women initiated breastfeeding at a rate of 37% compared to 55% to 74% for other races (McDowell et al., 2008).

African-American women tend to have a strong understanding of the physical and psychological health benefits of breastfeeding (Reeves & Woods-Giscombe, 2015) but with all of the socio-demographic characteristics taken into account, African-American women continue to have a lower rate of initiation and shorter breastfeeding duration than other races. The reasons for these breastfeeding rate disparities between African-American women and other races are not clear (Cricco-Lizza, 2006).

HOSPITAL STAFF PRACTICES

“Successful breastfeeding depends on a number of factors, including a re-normalization of breastfeeding as the infant feeding method of choice through antenatal counselling and education and breastfeeding support to prevent and resolve breastfeeding difficulties (“WHO | Implementation of the Baby-friendly Hospital Initiative,” n.d.). The healthcare provider practices selected for our study are included in the *Ten Steps to Successful Breastfeeding* as defined by the joint WHO/United Nations Children’s fund (UNICEF) statement, “Protecting, promoting, and supporting breast-feeding: The special role of maternity services” which describes the Ten Steps that every facility providing maternity services and care for newborn infants should do (“WHO | Protecting, promoting and supporting breast-feeding,” n.d.). The *Ten Steps to Successful Breastfeeding* state that every facility providing maternity services should:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.

2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within one hour of birth. (Interpreted as: Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour. Encourage mothers to recognize when their babies are ready to breastfeed and offer help if needed).
5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk unless medically indicated.
7. Practice rooming in - allow mothers and infants to remain together - 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

The “Step” does not refer to a chronological order or hierarchy regarding implementation. Each Step is equally important and ideally should be implemented at the same time or as the hospital builds capacity or changes system and practices.

Hospitals that successfully implement the *Ten Steps to Successful Breastfeeding*, must also demonstrate an exclusive breastfeeding rate of at least 75% at mother’s discharge, and follow the International Code of Marketing Breast-milk Substitutes at

which time they can achieve Baby-Friendly Hospital accreditation through the Baby-Friendly Hospital Initiative (BFHI) (“WHO | Implementation of the Baby-friendly Hospital Initiative,” n.d.).

For this study, we evaluated hospital health care provider practices that we hypothesize to have an association with initiation and duration. We analyzed 8 of the 10 steps in the *Ten Steps to Successful Breastfeeding* guidelines. We further analyzed steps 3, 4, 5, 6, 7, 8, 9, and 10 to determine whether there was an association of the 8 steps and the initiation and duration rates for mothers that delivered in a hospital. We analyzed the data to compare the exposure rates of each race category as well as breastfeeding practices. We analyzed the exposure of these hospital practices that African-American women experience in comparison to other racial groups to determine whether any disparities are evident.

Eight Steps of Interest

The hospital practices of interest are as follows:

Step 3: Inform all pregnant women about the benefits and management of breastfeeding.

Step 4: Help mothers initiate breastfeeding within the first hour of birth.

Step 5: Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.

Step 6: Give newborn infants no food or drink other than human milk, unless medically indicated.

Step 7: Practice rooming-in—that is, allow mothers and infants to remain together—24 hours a day.

Step 8: Breastfeeding on demand

Step 9: Give no artificial teats or pacifiers to breastfeeding infants.

Step 10: Foster the establishment of breastfeeding support groups and refer mother to them on discharge from the hospital or clinic.

We chose to only measure Steps 3 through 10. First, although we believe Steps 1 and 2 are important, they are not direct care activities provided to patients by hospital staff.

Steps 3 through 10 are measurable behaviors that the mother may experience and could report about. Second, there are no questions included in the PRAMS survey that ask the respondents about these hospital staff behaviors.

RELEVANT STUDIES

The study by Lewallen & Street, (2010), conducted three focus groups with 15 self-identified African-American women who recently breastfed. They were recruited by lactation consultants and word of mouth through the community. Three themes came out of the discussions: “perceived lack of information about benefits and management of breastfeeding, difficulties breastfeeding in public, and lack of a support system to continue breastfeeding”. All stated they started breastfeeding because it was healthy for the infant and a good way to bond. Some mothers pointed to the positive influences of the family to breastfeed. Reasons to cease breastfeeding included that the mother stopped due to necessity and not by choice. This included the fact that she would be returning to work or school and anticipated problems with continuation of breastfeeding. Some were frustrated with the process of breastfeeding. The logistics of using formula was easier especially with a busy schedule (Lewallen & Street, 2010).

Women needed advice that they perceived to be useful. They needed to have practical information on the physical difficulties and complications of breastfeeding from

professionals or others who have breastfed successfully. This included feelings and sensations associated with breastfeeding. They expressed a need for a better understanding of what the normal emotions and feeding sensations would be and how to recognize those which were not normal (Lewallen & Street, 2010).

African-American cultural issues regarding breastfeeding included comments from friends and family. These comments could either be negative or positive. Some women felt that they had to defend their choices to breastfeed when they received negative comments regarding breastfeeding (Lewallen & Street, 2010) .

Breastfeeding was viewed as an activity that was a private issue and needed to be kept as such. However, the scheduling of the need to feed or express milk made it a public issue (Lewallen & Street, 2010). The need to express milk was a barrier when they needed to return to work. It was difficult to find a private place to pump and cold storage for expressed breastmilk was an issue (Lewallen & Street, 2010).

Lack of support from family and health care providers was experienced by participants. This lack of support made breastfeeding mothers feel isolated. Some women experienced health care providers reinforcing the use of formula or complementary feeding with infant cereal instead of breastfeeding, exclusively or at all (Lewallen & Street, 2010). Some participants expressed a need to receive support when they encountered negative comments. They were grateful for any support they received but also still felt unsupported by some that said they supported their choice to breastfeed (Lewallen & Street, 2010).

Hurley et al., (2008), performed a one (1) year longitudinal study. The interviews were conducted with mothers or enrolled in WIC in the fall of 1994. The sample of 1095

eligible mothers, of which 970 (89%) reported at least once on their breastfeeding status, had to be enrolled in WIC during pregnancy (n=874). Overall, over half of respondents (56%) initiated breastfeeding. Non-Hispanic Black mothers initiated at 34% (n=202); non-Hispanic White mothers at 53% (n=449); and Hispanic mothers 84% (n=168). By the end of the second month, one-half of the breastfeeding mothers had ceased to breastfeed. The median duration of breastfeeding was 57 days Black women breastfed the shortest at 42 days, White mothers 52 days and Hispanic mothers 77 days.

CONCLUSION

Breastfeeding rates in the U.S are on the rise but they have not met the rates set by Healthy People 2020. As shown throughout the literature, there are many reasons that could contribute to this issue. Breastfeeding is an extremely personal decision that is affected by intrapersonal characteristics as well as external influences. An external influence that has been shown to have an association with increased rates of initiation while in the hospital is their experiences with the hospital staff. Health care provider actions during delivery and post-partum could help play a vital part in increasing initiation rates of breastfeeding while in the hospital as well as longer continuation after discharge.

Previous research suggests that hospital health care providers' practices during the mother and infants' stay in the hospital are associated with breastfeeding initiation and duration. Hospital practices are associated with increasing the rate of the desired breastfeeding practices. The *Ten Steps to Successful Breastfeeding* shows positive results even when partially implemented. It is important to understand women's experiences

with hospital staff so that the appropriate policies, practices, and programs can be recommended to facilitate the increase of breastfeeding initiation and duration rates.

There are still many unanswered questions regarding the lower rates of initiation for American women and why those women discontinue breastfeeding earlier than recommended. There are additional questions regarding the lowest rates of initiation and duration for African-American women in comparison to other races. There is a need to examine ways of assisting all women, especially African-American women, in making the decision to breastfeed their infants and for longer. This positive health behavior can result in better health care outcomes for both, African American women and their children.

CHAPTER 3

METHODOLOGY

DATA SOURCE AND STUDY POPULATION

The South Carolina Pregnancy Risk Assessment Monitoring System (PRAMS) is a survey surveillance system that collects the experiences before during and after pregnancy of South Carolina's new mothers' as well as their health behaviors. The South Carolina PRAMS program was initiated in 1991 and has been included in the Centers for Disease Control and Prevention's multistate PRAMS program. The South Carolina PRAMS was implemented through a collaborative agreement between the South Carolina Department of Health and Environmental Control (DHEC), Office of Public Health Statistics and Information Services (PHSIS) and Bureau of Maternal and Child Health, and the Centers for Disease Control and Prevention (CDC).

New mothers who delivered live infants in the past 2-6 months were randomly sampled monthly using birth certificate data. Mothers were mailed the surveys up to 3 times to their address on file approximately 2-6 months after delivery. If they do not respond to the surveys timely, they are telephoned and asked the survey questions via telephone in an attempt to complete the survey. The mother's responses are then linked to the birth certificate information. Therefore, the PRAMS data consist of survey responses and birth certificate information.

Population of interest

Our study was interested in the breastfeeding initiation and duration outcomes for all mothers who delivered infants from 2013-2015 in South Carolina and responded to the PRAMS survey. The mother had to have delivered a singleton birth in a hospital. The infant had to be alive and living with the mother.

South Carolina PRAMS Design and Methodology

The South Carolina PRAMS collected breast-feeding practices among mothers of infants who lived with them at time of the survey. The data collected included whether mothers initiated breastfeeding and how long they breastfed. Breastfeeding initiation was defined as skin to skin contact, as well as expressing milk in which the infant was given the breastmilk in a bottle. The survey also collects data on; mother and infant's experiences with hospital staff.

We combined 2013 through 2015 data and examined hospital staff behaviors with women and their infants and the association with rates of breastfeeding initiation and length of duration in this population. We analyzed responses of mothers who initiated breastfeeding and the duration in which they continued to breastfeed after discharge. We analyzed the rates of exposure to the 8 Steps and if these rates differed by race. We also analyzed the type of hospital associated with exposure rates, including non-Baby Friendly or Baby Friendly designation, as well as the location of the hospital as either rural or urban.

RESEARCH DESIGN

Theoretical Model: Social Ecological Model (SEM)

We used and adapted the Social Ecological Model (SEM) as our theoretical model to explain the association between breastfeeding health behaviors and the mother and infant's experiences with hospital staff. The SEM is a theory-based conceptual framework that helps explain the personal and environmental characteristics that influence health behaviors. Whether directly or indirectly, it takes into account the individual, interpersonal relationships with family, friends, co-worker, the community, organizational influences, and policy implications (Johnston & Esposito, 2007; McLeroy et al., 1988). Due to the complexity of a mother's decision to initiate breastfeeding and how long she continues, a comprehensive approach is necessary to fully understand the determinates associated with this decision. The SEM is a comprehensive approach allowing the analysis of individual and environmental influences that drive health related decisions that affect individual behaviors which affect health outcomes (Johnston & Esposito, 2007; McLeroy et al., 1988). The SEM also provides information regarding which sphere of interventions should be leveraged to gain the greatest results on influencing positive changes in health behaviors.

The SEM is defined by spheres of influences. These spheres of influence are Individual, Interpersonal, Community, Organizational, and Policy. The Individual sphere consists of the individual's characteristics that influence behavior and decision making. The Individual sphere includes biological/physical characteristics, attitudes, behavior, age, race/ethnicity, marital status, personal history, health status (perceived/actual) and socioeconomic status.

The Interpersonal sphere (Relationships) examines formal and informal social networks and social support systems that can influence decision making and health behavior of the individual. The Interpersonal sphere can include family members, partners, colleagues, supervisors, classmates, the individual's closest social circle which also overlap with and contribute to the individual sphere, and health care providers. They can influence a mother's decision whether to breastfeed and for how long by influencing her attitude toward breastfeeding.

The Community (Environment) sphere examines relationships between organizations/institutions and environmental settings in which social relationships form and the characteristics of these settings that influence breastfeeding decisions which lead to observed health behaviors. This would include designated places to breastfeed in public settings, the view of breastfeeding practices in general, limited positive portrayals of breastfeeding, and the high prevalence of formula advertisements (Dunn, Kalich, Henning, & Fedrizzi, 2014).

The Organizational sphere consists of established institutions with formal or informal policy, procedures, and regulations regarding how they operate (McLeroy et al., 1988). This may include information from and level of support by hospital staff, Baby-Friendly Hospital designation, private hospital rooms, locations to pump at schools or worksites, free formula samples, and availability of breast pumps (Dunn et al., 2014).

The Policy sphere explores governmental policy at the global, federal, state, and local levels (McLeroy et al., 1988). It examines allocation of government resources and the programs and policies that these allocations support or fund (Dunn et al., 2014).

Policies that support or restrict breastfeeding behavior may influence a mother's decision

therefore her actions. Political and economic policies influence the societal norms that establish rules, regulations, programs, and funding allocation. Policies established at all levels of government influence what supports or barriers are in place that a mother has to consider when deciding whether to breastfeed. These policies can also hinder or support breastfeeding continuation if she chooses to initiate in the first place. These policies could include breastfeeding legislation, welfare reform, family and medical leave act, Women, Infant, and Children (WIC) policy, and the World Health Organization (WHO) code (Dunn et al., 2014).

For the purpose of this study, we did not address all spheres of influence since the data do not support such analysis and it would be much broader than the scope of this study. The data contained the participants' responses to questions regarding the behaviors of hospital staff with new mothers and infants while in the hospital as well as individual characteristics of the mother and infant. Thus, we focused on the Organizational sphere of influence since that is where the hospital resides while controlling for mother's demographic characteristics which included her place of residence.

Although the hospital resides in the "Organizational" sphere of influence, the hospital staff behaviors that the mother experiences may affect the relationships, issues, and circumstances that occur in other spheres of influence. The hospital staff practices may originate in the "Organizational" sphere but may affect other spheres of influence as the mother moves through them. For example, increasing a mother's self-efficacy and confidence regarding breastfeeding through education and training efforts by hospital staff affects her personally. She is equipped to educate others in her family and

community. She is more confident when dealing with adversity from others in her community regarding her feeding practices. If she chooses to breastfeed, she exposes others in her community to breastfeeding. She can become support for others that decide to breastfeed.

Dependent Variables

Breastfeeding Initiation Breastfeed (Yes or No)

Breastfeeding Duration (<10 Weeks, ≥10 Weeks)

Questions associated with these dependent variables

Did you ever breastfeed (or pump breast milk to feed your new baby), even for a short period of time? (Yes, No)

Are you currently breastfeeding (or pump breast milk to feed your new baby)? (Yes, No)

If no, how many weeks or months did you breastfeed? (weeks or months; less than 1 week)

Independent Variables

Step 3: Inform all pregnant women about the benefits and management of breastfeeding.

Step 4: Help mothers initiate breastfeeding within one hour of birth.

Step 5: Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.

Step 6: Give newborn infants no food or drink other than human milk, unless medically indicated.

Step 7: Practice rooming-in—that is, allow mothers and infants to remain together—24 hours a day.

Step 8: Breastfeeding on demand

Step 9: Give no artificial teats or pacifiers to breastfeeding infants.

Step 10: Foster the establishment of breastfeeding support groups and refer mother to them on discharge from the hospital or clinic.

Questions associated with these independent variables

- Step 3 - Hospital staff gave me information about breastfeeding.
(Best Practice-Yes)
- Step 4 - Mother breastfed in the first hour after baby was born.
(Best Practice-Yes)
- Step 5 - Hospital staff helped me learn how to breastfeed.
(Best Practice-Yes)
- Step 6 - Baby was fed only breastmilk in the hospital.
(Best Practice-Yes)
- Step 7 - My baby stayed in the same room with me at the hospital.
(Best Practice-Yes)
- Step 8 - Hospital staff told me to breastfeed whenever my baby wanted
(Best Practice-Yes)
- Step 9 - Hospital staff gave baby a pacifier.
(Best Practice-No)
- Step 10 - The hospital gave me a telephone number to call for help with breast feeding. (Best Practice-Yes)

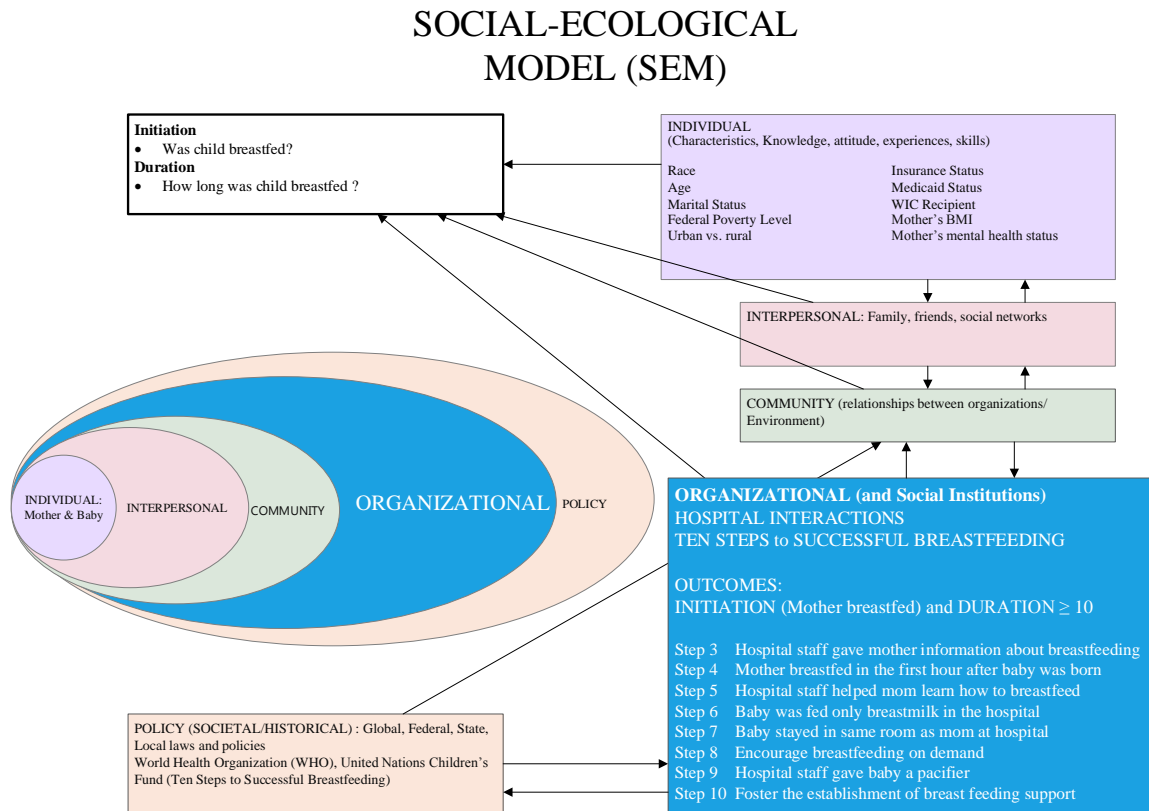
Covariates

Mother's race/ethnicity
Mothers' age in years
Years of education
Marital status at birth or during this pregnancy
Federal Poverty Level
Hospital locations
Insurance Status
Medicaid Status
WIC Recipient
Mother's BMI
Mother's mental health status

Urban vs. rural variable designation was defined by using the Office of Management and Budgets definition regarding metropolitan designation. Baby-Friendly designation was based on the administrative status of the hospital as of the date of delivery. If the hospital had received a Baby-Friendly designation prior to the baby's date of birth, it was included in the dataset as Baby-Friendly. Many of the covariates

regarding the mothers' demographics were retrieved from the birth certificate data that were linked to the South Carolina PRAMS survey data. The survey questions also provide the Medicaid status, smoking status, and pregnancy-related data.

Study Conceptual Model



Social-ecological framework: Psychosocial factors influencing breastfeeding (BF) among African-American mothers.

Source: Adapted from the Centers for Disease Control and Prevention (CDC), The Social Ecological Model: A Framework for Prevention, <http://www.cdc.gov/violenceprevention/overview/social-ecologicalmodel.html>

Figure 3.1 Social-Ecological Model (SEM)

DATA ANALYSIS

Analytic Approach

First, we described the findings in the dataset using univariate analysis. Second, we ran bivariate analysis to describe the associations between the outcomes of interest and the independent variables. The Chi square test for independence was used to test for a significant association between the variables.

Lastly, multivariable logistic regression models were used to assess independent association of staff behavior, categorized by the 8 steps, on breastfeeding initiation and duration, adjusted for a series of socio-demographic and health factors.

Research Questions

Outcomes of interest: Breastfed Initiation (Yes or No) and Breastfed Duration (<10 Weeks, ≥ 10 Weeks)

This study contributes to the literature by investigating the association between hospital staff practices and breastfeeding initiation and duration rates (outcomes of interest) using 2013-2015 SC PRAMS data. The hospital staffs' practices will be defined using eight Steps of the *Ten Steps to Successful Breastfeeding*. The eight Steps are as follows:

Step 3: Hospital staff helped mom learn how to breastfeed;

Step 4: Mother breastfed in the first hour after baby was born;

Step 5: Hospital staff gave mother information about breastfeeding;

Step 6: Baby was fed only breastmilk in the hospital;

Step 7: Baby stayed in same room as mom at hospital;

Step 8: Hospital staff told me to breastfeed whenever my baby wanted;

Step 9: Hospital staff did not give baby a pacifier; and

Step 10: The hospital gave me a telephone number to call for help with breastfeeding.

Specific Aim #1 – Among all women in South Carolina who delivered a live baby in the hospital, examine the association of the hospital staff practices, as categorized by eight of

the *Ten Steps to Successful Breastfeeding* with breastfeeding initiation and duration, and examine whether they differ by race.

Research Questions/Hypothesis

Hospital Staff Practices Association with Breastfeeding Initiation

(RQ1) Among all women in South Carolina who delivered a baby in the hospital, are those who were exposed to the eight Steps relating to hospital staff practices; more likely to have initiated breastfeeding than those who were not exposed to the eight Steps and do they differ by race?

Hypothesis:

Respondents who were exposed to the eight Steps are more likely to have initiated breastfeeding in the hospital than those who were not exposed to the eight Steps.

1a. African-American women are the least likely to have been exposed to the eight Steps relating to hospital staff practices.

1b. Of those who were exposed to the eight (8) Steps, African-American women are the least likely to have initiated breast feeding in comparison to other races.

Independent Variables:

Step 3: Hospital staff helped mom learn how to breastfeed; Step 4: Mother breastfed in the first hour after baby was born; Step 5: Hospital staff gave mother information about breastfeeding; Step 6: Baby was fed only breastmilk in the hospital; Step

7: Baby stayed in same room as mom at hospital;

Step 8: Hospital staff told me to breastfeed

whenever my baby wanted; Step 9: Hospital staff

did not give baby a pacifier; and Step 10: The

hospital gave me a telephone number to call for

help with breastfeeding

(Yes=Best practices)

Dependent Variable: Initiated Breastfeeding (Yes/No)

Covariates: (age, race, marital status, education, FPL, mental health status, maternal BMI, hospital's location)

Analysis: Logistic Regression

(RQ2) Among women in South Carolina who delivered a live baby and initiated breastfeeding, are those who were exposed to the eight Steps relating to hospital staff practices, more likely to report having breastfed ≥ 10 weeks than those who were not exposed to the eight Steps and do they differ by race?

Hypothesis: Respondents who were exposed to the eight Steps relating to hospital staff practices are more likely to have breastfed ≥ 10 weeks than those who were not exposed to the eight Steps.

2a. Of those who were exposed to the eight (8) Steps relating to hospital staff practices, African-American women are the least likely to breastfed ≥ 10 weeks in comparison to other races.

Independent Variable:	<p>Step 3: Hospital staff helped mom learn how to breastfeed; Step 4: Mother breastfed in the first hour after baby was born; Step 5: Hospital staff gave mother information about breastfeeding; Step 6: Baby was fed only breastmilk in the hospital; Step 7: Baby stayed in same room as mom at hospital; Step 8: Hospital staff told me to breastfeed whenever my baby wanted; Step 9: Hospital staff did not give baby a pacifier; and Step 10: The hospital gave me a telephone number to call for help with breastfeeding</p> <p>(Yes=Best practices)</p>
Dependent Variable:	Breastfeeding Duration (<10 Weeks, ≥10 Weeks)
Covariates:	(age, race, marital status, education, FPL, mental health status, mother's location, maternal BMI, hospital's location)
Analysis:	Logistic Regression

CHAPTER 4

“HOSPITAL STAFF PRACTICES AND BREASTFEEDING INITIATION”¹

¹ Bruner, L.B, S.H. Glover, J.C. Probst, J.W. Hardin, and A. Diedhiou to be submitted to The Maternal and Child Health Journal

ABSTRACT

Objective: To examine the association between hospital staff practices and breastfeeding initiation.

Methods: 2013-2015 South Carolina Pregnancy Risk Assessment Monitoring System data were analyzed. Chi-square and logistic regression analyses were used to examine association between hospital staff practices and breastfeeding initiation among women who delivered a live infant, adjusting for mother's socio-demographics. Hospital staff practices were categorized as the eight Steps of the *Ten Steps to Successful Breastfeeding*.

Results: Six of the eight steps were found to have a significant association with whether a mother initiated breastfeeding. The two (2) Steps found to not have a significant association with breastfeeding initiation were Step 9 - Give no artificial teats or pacifiers to breastfeeding infants (OR 0.601 p=0.3199) and Step 10 - Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic (OR 0.43, p=0.0676).

Conclusions: Our finding suggests that if hospitals focus on policy and systems changes that support the increase of hospital staff practices that are positively associated with mother's breastfeeding initiation while she is in the hospital, breastfeeding rates in those hospitals should increase. Hospitals that are not designated as Baby-Friendly but implement or continue practices that support/facilitate breastfeeding could potentially experience breastfeeding initiation rates similar to those of facilities deemed Baby-Friendly.

Keywords: breastfeed, health behaviors, hospital practices, initiation, duration, health disparities

SIGNIFICANCE

Breastfeeding initiation increased with the level of a mother's confidence in breastfeeding (Avery et al., 2009). New mothers need additional knowledge about the actual act of breastfeeding (Reeves & Woods-Giscombe, 2015). The fear of pain that is perceived to be associated with breastfeeding influences a woman's decision to initiate breastfeeding. Breastfeeding difficulties may cause a woman to cease breastfeeding (Alexander et al., 2009; Hurley et al., 2008; Robinson & VandeVusse, 2009).

Support from health care providers increases initiation and duration rates. The Merewood et al., (2007) study found that the Baby Friendly Hospital Initiative was associated with an increase in breastfeeding initiation rates. Pain and difficulty of breastfeeding was associated with shorter duration of breastfeeding. (McCann et al., 2007). Public embarrassment and their comfort level with formula are associated with shorter breastfeeding duration (Kaufman et al., 2010). The knowledge of the benefits of breastfeeding is one of the primary reasons a mother initiates breastfeeding (Alexander et al., 2010; Murimi, Dodge, Pope, & Erickson, 2010; Robinson & VandeVusse, 2009).

This study examines associations between hospital practices and breastfeeding behaviors in South Carolina. It is essential that women's breastfeeding efforts are supported by hospital practices, the community, and government policies at all levels. Hospital practices play a vital role in supporting women to breastfeed. It is important to examine women's experiences with hospital staff so that the appropriate policies, practices, and programs can be implemented to promote breastfeeding.

INTRODUCTION

The Surgeon General's 2011 *Call to Action to Support Breastfeeding*, states that breastfeeding is "One of the most highly effective preventative measures a mother can take to protect the health of her infant and herself" (Mass, 2011). Breastfeeding is associated with better health outcomes for an infant that can span throughout their entire childhood years ("Breastfeeding: Healthy People 2020 | DNPAO | CDC," n.d.). Breastfeeding is associated with better health outcomes for mom as well ("Breastfeeding: Healthy People 2020 | DNPAO | CDC," n.d.).

Breastfeeding initiation rates in the United States are well below the current goal set by Healthy People 2020 ("Breastfeeding: Healthy People 2020 | DNPAO | CDC," n.d.). The goal of Healthy People 2020 is for mothers to initiate breastfeeding at a rate of 81.9% ("Breastfeeding: Healthy People 2020 | DNPAO | CDC," n.d.). This goal is not being met by all racial groups.

Sponsored by The World Health Organization (WHO) and the United Nations Children's Fund, the Baby Friendly Health Initiative (BFHI) was designed to utilize hospital practices to increase initiation and duration rates of exclusive breastfeeding ("WHO | Implementation of the Baby-friendly Hospital Initiative," n.d.). The BFHI is considered the standard that hospitals should implement when helping new mothers initiate breastfeeding in the hospital setting and lengthen her breastfeeding continuation once she returns home.

The purpose of this study is to determine whether hospital practices are associated with breastfeeding initiation. We examined whether these practices are associated with breastfeeding initiation rates and if different races experienced these practices differently.

We defined hospital practices as hospital staff behaviors listed in the *Ten Steps to Successful Breastfeeding*. We used eight of the ten steps of the *Ten Steps to Successful Breastfeeding* that were included in the Baby Friendly Health Initiative. Because the main objective of the BFHI is to increase the initiation and duration rates of exclusive breastfeeding through hospital practices, we used it as our standard to compare hospital practices and their breastfeeding initiation rates. We are only looking at the initiation rates of all hospitals in South Carolina who had a delivery from 2013-2015 whether they have a baby friendly designation on the date of delivery or not. When reviewing initiation rates, we looked at all breastfeeding initiation whether baby fed at the breast or expressed breastmilk fed through a bottle.

The Baby-Friendly Health Initiative

The BFHI includes the *Ten Steps to Successful Breastfeeding* practices that every hospital should follow to increase breastfeeding rates in there facility. The steps are the following:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within one hour of birth. (Interpreted as: Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour. Encourage mothers to recognize when their babies are ready to breastfeed and offer help if needed).
5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk unless medically indicated.
7. Practice rooming in - allow mothers and infants to remain together - 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.

10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

They must follow the International Code of Marketing Breast-milk Substitutes and 75% of the mothers must exclusively breastfeed at discharge. When these conditions are met, they can achieve Baby-Friendly Hospital accreditation through the Baby-Friendly Hospital Initiative (BFHI) (“WHO | Implementation of the Baby-friendly Hospital Initiative,” n.d.).

We have evaluated whether the eight Steps are associated with increased initiation rates and if those rates differed by race. The steps we evaluated were steps 3-10 since they demonstrate direct contact with mother and/or infant. We also evaluated whether African-American women receive these practices at the same rates as the other races.

METHODS

We analyzed data obtained from the South Carolina Pregnancy Risk Assessment Monitoring System (SC PRAMS). The SC PRAMS is a surveillance system that surveys mothers who had delivered a child in the previous 2-6 months. The SC PRAMS collects data regarding the mother’s experiences before, during, or after pregnancy (“DHEC,” n.d.). These experiences are regarding relationships, weight, financial status, mental health status and other life events that could have an effect on her pregnancy, her health outcomes, and the health outcomes of the baby. The SC PRAMS includes the survey questions and is combined with birth certificate data.

The SC PRAMS also collects a magnitude of information regarding the mother’s life experiences, demographics, and activities pertaining to her pregnancy and new born. For our study, we are interested in the breast feeding activities and what influences her initiation of breast feeding practices. We are specifically interested in how hospital

staff's practices, as defined by the eight (8) Steps, with mother and infant are associated with breast feeding initiation. We evaluated this relationship and how the characteristics of the mother also influence this health behavior. We wanted to know if hospital interactions would be associated with an increase in initiation rates with mothers no matter the mother's characteristics. We also analyzed what characteristics of the mother were associated with initiation.

We evaluated the association of the hospital staff practices and initiation and how this differed by race. According to the literature, African-American mothers initiate at a lower rate than other races (Centers for Disease Control and Prevention (CDC), 2010). We evaluated whether this held true in this population.

The research was conducted in accord with prevailing ethical principles and was reviewed by the University of South Carolina Institutional Review Board prior to requesting the data from the South Carolina Department of Health and Environmental Control.

Study Design

In this study, the population of interest were all mothers who delivered infants in South Carolina from 2013-2015, delivered in the hospital a singleton birth with a child alive and living with the mother. We used univariate analysis to describe the sample population. We analyzed the sample using bivariate analysis to evaluate associations between covariates as well as associations between initiation and the independent variables. When using bivariate analysis, the significance level used was p value $\alpha=0.05$. Finally, we ran multiple logistic regression models to assess independent associations of the hospital staff practices on breastfeeding initiation.

We ran an unadjusted and an adjusted model. The unadjusted model analyzed the eight Steps and how they were associated with breastfeeding initiation rates. The adjusted model included the covariates that were primary the mother's covariates.

Conceptual Model

We adapted the Social Ecological Model (SEM) to explain the association between hospital staff practices and breastfeeding initiation. SEM states that there are multiple spheres of influence that are associated with an individual's health behaviors as well as the decision making process that leads up to these behaviors. The spheres are Individual, Interpersonal, Community, Organizational, and Policy.

The Individual sphere consists of the individual's characteristics that influence behavior and decision making. The Interpersonal sphere (Relationships) examines formal and informal social networks and social support systems that can influence decision making and health behavior of the individual. The Community (Environment) sphere examines relationships between organizations/institutions and environmental settings. Social relationships form in these settings and their characteristics that influence breastfeeding decisions which lead to observed health behaviors (Dunn et al., 2014). The Organizational sphere consists of established institutions with formal or informal policy, procedures, and regulations regarding how they operate (McLeroy et al., 1988). The Policy sphere explores governmental policy at the global, federal, state, and local levels (McLeroy et al., 1988). It examines allocation of government resources and the programs and policies that these allocations support or fund (Dunn et al., 2014).

SEMs theory-based framework helps to explain the spheres of influence that may be associated with an individual's health behaviors through external characteristics.

SEM's complex framework accounts for and helps explain the different levels of influence and how these influences are associated with individual behaviors (Johnston & Esposito, 2007; McLeroy, Bibeau, Steckler, & Glanz, 1988). Understanding these relationships helps us better implement policies, procedures, and programs to maximize positive health behaviors and therefore better health outcomes.

For the purpose of this study, we focused on the "Organizational" sphere which we argue the hospital is located. However, we are acknowledging all of the spheres because the influences of the hospital may have an effect on many, if not all, of the other spheres of influence. The hospital staff behaviors that the mother experiences, can be taken and utilized through other situations and relationships and therefore other spheres.

Variables

Dependent Variable- Initiation

The dependent variable of interest was the initiation rates of mothers who delivered in the hospital. We included all non-missing responses to the question, "Did you ever breastfeed (or pump breast milk to feed your new baby), even for a short period of time? (Yes, No)".

Independent Variables

The main independent variables of interest are the hospital practices defined by eight of the ten steps of *Ten Steps to Successful Breastfeeding* guidelines. The questions associated with these steps are as follows:

- Step 3 - Hospital staff gave me information about breastfeeding.
(Best Practice-Yes)
- Step 4 - Mother breastfed in the first hour after baby was born.
(Best Practice-Yes)
- Step 5 - Hospital staff helped me learn how to breastfeed.
(Best Practice-Yes)

- Step 6 - Baby was fed only breastmilk in the hospital.
(Best Practice-Yes)
- Step 7 - My baby stayed in the same room with me at the hospital.
(Best Practice-Yes)
- Step 8 - Hospital staff told me to breastfeed whenever my baby wanted
(Best Practice-Yes)
- Step 9 - Hospital staff gave baby a pacifier.
(Best Practice-No)
- Step 10 - The hospital gave me a telephone number to call for help with breast feeding. (Best Practice-Yes)

The covariates of interest were mother's race, mothers' age group, mother's years of education, marital status, mother's poverty level, urban vs. rural, insurance coverage, WIC recipient, mother's BMI, and mother's mental health status.

RESULTS

Descriptive Analysis

Our descriptive analysis included the outcome of interest which was breastfeeding initiation rates for the population. It also included the hospitals', moms', and babies' demographics. As for the hospitals, 92.14 % were located in an urban area. Of those hospitals included in the study, 14.52% were certified as Baby-Friendly and 23.01% of all hospitals practiced all eight steps. As for the hospital practices of interest, which were steps 3-10 of the *Ten Steps to Successful Breastfeeding*, they are as follows:

STEP 3 - Staff gave information about breastfeeding. – 96%

STEP 4 - Mom breastfed baby in the first hour after birth. – 74%

STEP 5 - Staff helped mom learn how to breastfeed. – 82%

STEP 6 - The baby was fed only breast milk. – 62%

STEP 7 - Baby stayed in the same room as mom. – 87%

STEP 8 - The staff told mom to breastfeed the baby on demand. – 83%

STEP 9 - Hospital staff did NOT give baby a pacifier. – 51%

STEP 10 - Mom given a number to call for help with breastfeeding. – 86%

The average # of steps met by hospitals, categorized as Baby Friendliness Score, were 6.01. (Table 4.1)

Outcome of Interest - Initiation

The final study sample size was n=1888. There were 92.63% of mother's who stated that they delivered in the hospital and that they initiated breastfeeding. (Table 4.2)

Descriptive Analysis - Mother's Characteristics

The majority of mothers delivered their infants vaginally (65.37%). The majority of mothers, 84.71%, lived in rural areas (Table 4.3). The mothers' race/ethnicity was 59.47% White, 25.57% Black, 10.92% Hispanic, and 4.03% Other. Of the mothers' age groups, 52.56% were 20-29 years of age, followed by 40.02% that were 30+ years of age, and 7.42% that were <20 years of age. Over half of the women were married 59.77%, 23.68% were unmarried but had paternity acknowledgement and 16.55% were unmarried mothers that did not have paternity acknowledgement. The mothers' education levels categories were a college degree (41.12%), some college/no degree (24.05%), high school diploma/GED (19.29%), and less than a high school diploma (14.55%). The majority of respondents were at or below 100% of the Poverty Line (64.24%).

There were fewer mothers who were WIC recipients during pregnancy (47.08%) than were not WIC recipients. Only 12.28% had a health care worker talk to them about breastfeeding during a prenatal visit. The majority had non-Medicaid insurance before pregnancy (58.86%), Medicaid for prenatal care (48.58%), and non-Medicaid insurance (52.19%) at time of the PRAMS survey. The mothers who had a normal pre-pregnancy BMI was (44.02%). The proportion of moms' with a BMI that was overweight was 25.54% and the proportion of moms' with a BMI that was obese was 23.45%. The moms

that “never felt depressed since they delivered” (39.11%) and 33.12% “rarely felt depressed”. The moms who had “no interest since birth” (44.36%) and 29.27% “rarely” had interest since birth.

We analyzed mom’s drinking and smoking habits (Table 4.3). The proportion of moms that drank alcohol in the last 2 years was 69.66%; the proportion of mothers that had a drink in the 3 months prior to pregnancy was 58.89%; and the proportion of mothers that drank in the last 3 months of pregnancy was 8.41%. The proportion of moms that smoked at least 1 cigarette in the last 2 years was 24.75%; the proportion of mothers that smoked in the 3 months prior to pregnancy was 22.43%; the proportion of mothers that smoked in the last 3 months of pregnancy was 8.73%; and the proportion of mothers that currently smoke was 14.12%. (Table 4.3) The proportion of moms who had infants living with them was 99.67%; 99.98% of infants were alive, 11.59% were admitted in the NICU at birth, and the majority stayed in the hospital for 1-5 days (90.59%). (Table 4.4)

Bivariate Analysis

Maternal Characteristics

There were multiple maternal demographics that were significantly associated with initiation of breastfeeding. Mothers’ race/ethnicity was significantly associated with breastfeeding initiation ($p=.0159$). Other non-Hispanics initiated breastfeeding at the highest rate (95.16%), followed by non-Hispanic White (91.60%), Hispanics (91.01%), and non-Hispanic Blacks (83.37%). Mother’s county of residence, defined as rural or urban was significantly associated at ($p=0.037$). Mothers who lived in an urban county

initiated breastfeeding at 93.36% in comparison to those located in rural counties (86.93%). (Table 4.5)

There was a significant association between mothers' marital status and breastfeeding initiation ($p=0.0001$). Mothers who were married, initiated breastfeeding at the highest rate (95.81%), followed by mothers who were unmarried with paternity acknowledgement (90.24%). There was a significant relationship between whether a mother was a WIC recipient during pregnancy and initiation ($p=0.0001$). WIC recipients initiated at 96.10% and non-WIC recipient initiated at (88.62%). Mother's poverty level was significantly associated with initiation ($p=0.0023$). The mothers' mode of delivery ($p=0.0098$), and mental health status including depressed since birth ($p=0.0479$) and no interest since birth ($p=0.004$), were also significantly associated with initiation. Pre-pregnancy ($p=0.008$), prenatal ($p=0.0092$), and current insurance coverage ($p=0.0134$) were also significantly associated with breastfeeding initiation. (Table 4.5)

A mother's smoking and drinking status also had an association with breastfeeding initiation rates, including mothers who had any alcoholic drinks in past 2 years and/or in the 3 months before pregnancy ($p <.0001$), and mothers who were currently smoking ($p=0.0353$). Mothers' characteristics that were not significantly associated with initiation were maternal education ($p= 0.053$) and mother's pre-pregnancy BMI ($p= 0.0653$). (Table 4.5)

Hospital Characteristics

Baby Friendly designation ($p= 0.4804$) was not significantly associated with breastfeeding initiation. Hospital designation however, was significantly associated with initiation ($p= 0.0007$). If the hospital was located in an urban county, mothers initiated

breastfeeding at a rate of 93.68%, compared to mothers delivering in hospitals located in rural counties who initiated at a rate of 80.33%. Hospitals that practiced all eight steps had mothers initiating breastfeeding at a rate of 100%. Those hospitals that did not practice all eight steps had mothers initiating breastfeeding at a rate of 90.37% (Table 4.6).

Hospital Practices/STEPS and Initiation

After analyzing the eight steps that defined the hospital steps, all of the eight steps showed to be significantly associated with breastfeeding initiation. All of which had a ($p = <.0001$) except for Step 10, Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic ($p = .0004$). Providing information regarding breastfeeding benefits and management (Step 3) 93.74% compared to not providing information 68.44%. Mothers who breastfeed within an hour of birth (Step 4), initiated at a rate of 99.02% in comparison to those who did not breastfeed within an hour of birth 74.04%. Hospitals that routinely helped mothers learn how to breastfeed, and how to maintain lactation even if they should be separated from their infants (Step 5), had mothers initiate breastfeeding at a rate of 95.26% compared to hospitals that did not 80.86%. Those facilities that did not give newborn infants food or drinks other than breast milk unless medically indicated (Step 6), those mothers initiated at a rate of 98.14% compared to those that did provide food or drink other than medically necessary 84.11%. (Table 4.6)

Hospitals that practiced rooming in, which allowed mothers and infants to remain together - 24 hours a day (Step 7), experienced mothers initiating breastfeeding 94.95% of the time, compared to 77.71% for mothers who delivered in hospitals that did not have

this practice. Mothers encouraged to breastfeed on demand (Step 8), initiated at 97.09% compared to those who were not 73.70%. When pacifiers were not given to breastfeeding infants (Step 9), mothers initiated at a rate of 96.23%. When pacifiers were given, the initiation rate was 88.89%. When hospital staff fostered the establishment of breastfeeding support groups through giving them a number to call for help with breastfeeding once discharged from the hospital or clinic (Step 10), they initiated breastfeeding at 93.89% compared to when they did not foster the establishment of support 84.87%. (Table 4.6)

*Multivariate Analysis Unweighted Model
Hospital Practices– Model 1 Initiation and All Eight Steps*

Model 1 analyses the association of hospital practices and initiations. We included in Model 1, all eight of the hospital Steps and the outcome of interest, initiation. The hospital designation rural vs urban (OR 0.37, $p=0.0407$) was found to be significant. Six of the eight Steps were significantly associated with the mothers' initiation of breastfeeding. These include: STEP 3 - Provide information regarding breastfeeding benefits and management (OR 4.66, $p=0.0062$); STEP 4 - Breastfeed within the first hour of birth, skin-to-skin contact (OR 18.85, $p<.0001$); STEP 5 - Hospital staff show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants (OR 3.26, $p=0.0019$); STEP 6 - Staff did not give infants food or drink other than breast milk unless medically indicated (OR 4.41, $p=0.0002$); STEP 7 - Hospital practiced rooming in which allows mothers and infants to remain together – 24 hours a day (OR 2.30, $p=0.0387$); and STEP 8 - Hospital staff encouraged breastfeeding on demand (OR 5.25, $p<.0001$). (Table 4.7)

Two of the steps that did not show a significant association with initiation were STEP 9 - Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants (OR 0.76, $p=0.5344$) and STEP 10 - Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic (OR 0.47, $p=0.1167$). (Table 4.7)

*Multivariate Analysis Hospital Practices
Model 2 Initiation and All Independent Variables and Covariates*

Model 2 was adjusted by adding in the covariates to Model 1. Model 2 includes initiation, the independent variables of interest, (the eight steps describing the hospital's practices), and all of the relevant covariates. When mother's demographics were added to Model 1, they did not change the associations that were evident between hospital interactions and breastfeeding initiation.

Again as with Model 1, the same six of the eight Steps were significantly associated with the mothers' initiation of breastfeeding. However, the hospital designation was no longer significantly associated to initiation (OR 0.38, $p=0.1034$). Regarding hospital interaction, the adjusted odd-ratios are the following: STEP 3 - the odds of initiating breastfeeding among mothers who received information regarding breastfeeding were 6.43 times higher than those of mothers who did not (OR 6.43, $p=0.0011$); STEP 4 - the odds of initiating breastfeeding among mothers who were advised to breastfeed in the first hour of birth were 28.12 times higher than those who did not (OR 28.12, $p<.0001$); STEP 5 - the odds of initiating breastfeeding mothers who were shown how to breastfeed, were 4.31 times higher than those who were not (OR 4.31, $p=0.0006$). STEP 6 - the odds of initiating breastfeeding among mothers who were directed to only give their baby breastmilk were 4.91 times higher than those who were

not. (OR 4.91, $p < .0001$). STEP 7 - the odds of initiating breastfeeding among mothers who practiced rooming in were 3.14 times higher than those who did not (OR 3.14, $p = 0.0057$). STEP 8 - the odds of initiating breastfeeding among mothers who were encouraged to breastfeed on demand were 6.56 times higher than those who were not (OR 6.56, $p < .0001$) (Table 4.7).

As in Model 1, STEPs 9 (OR 0.601 $p = 0.3199$) and 10 (OR 0.43, $p = 0.0676$) did not show a significant association between hospital steps/practices and initiation. (Table 4.9) When adding mother's demographic variables into Model 2, there are some significant associations. Mother's race/ethnicity was found to be significantly associated with initiation with Black mothers having lower odds of initiating breastfeeding than their White counterparts (OR 0.37, $p = 0.0272$) (Table 4.8). Mother's marital status showed to be significantly associated with initiation with unmarried mothers without paternity acknowledgement having lower odds to initiate breastfeeding than married mothers (OR 0.23, $p = 0.0100$). Mother's pre-pregnancy BMI normal weight showed to be significantly associated to breastfeeding initiation. The odds of mothers others with a normal pre-pregnancy BMI were 5.53 higher than mothers who did not have normal pre-pregnancy BMI (OR 5.53, $p = 0.0244$). These are the only mother demographics that were significantly associated with breastfeeding initiation when all were included in the full weighted model. (Table 4.8)

DISCUSSION

In this study, there were significant associations between mother's breastfeeding initiation and hospital practices. Hospital practices, defined by using the *Ten Steps to Successful Breastfeeding*, were found to have a significant association with breastfeeding

initiation in both the unadjusted and adjusted models. There were some of the mother's demographics that were associated with initiation. However, those demographics did not change the significance of the association of hospital staff practices with initiation.

Strengths and Limitations

A major limitation of this study was that the PRAMS data were from a secondary data source. The survey questions were not specifically asked for this study. The mothers self-reported the responses that were included in the survey except for the portions of the survey that were extracted from the birth certificate.

We used only non-missing responses for the question related to breastfeeding initiation. Thus we may have failed to capture hospital experiences of those women who did not respond to the question.

Although there are limitations, there are strengths to this study as well. The SC PRAMS survey is linked to birth certificate data, is comprehensive and elicits responses for multiple health behaviors, characteristics, demographics, relationships, and life experiences. The SC PRAMS is a data source unique to South Carolina and is population based. The data are generalizable to South Carolina mothers who delivered in a hospital.

CONCLUSION

Hospitals should make every attempt to incorporate in their policies breastfeeding practices, more specifically, the *Ten Steps to Breastfeeding* to facilitate higher breastfeeding rates. In our analysis, there were six of the eight that we examined that were significantly associated to initiation regardless of mothers' demographics.

Our finding suggests that if hospitals focus on policy and systems changes that support the increase of hospital staff practices that are positively associated with mother's

breastfeeding initiation while she is in the hospital, breastfeeding rates in those hospitals should increase. Hospitals that are not designated as Baby-Friendly but implement or continue practices that support/facilitate breastfeeding could potentially experience breastfeeding initiation rates similar to those of facilities deemed Baby-Friendly.

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DISCLAIMER

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TABLES

TABLE 4.1 DESCRIPTIVE HOSPITAL VARIABLES					
HOSPITAL CHARACTERISTICS	n	%	SE	95% Confidence Limits for Percent	
HOSPITAL IN RURAL OR URBAN AREA	1712				
URBAN		92.14	1.11	89.96	94.32
RURAL		7.86	1.11	5.68	10.04
HOSPITAL LABELLED BABY-FRIENDLY	1712				
NO		85.48	1.33	82.87	88.09
YES		14.52	1.33	11.91	17.13
STAFF GAVE INFO ABOUT BREASTFEEDING	1712				
NO		4.40	0.84	2.76	6.05
YES		95.60	0.84	93.95	97.24
BABY STAYED IN SAME ROOM	1709				
NO		13.52	1.22	11.13	15.91
YES		86.48	1.22	84.09	88.87
STAFF HELPED LEARN HOW TO BREASTFEED	1708				
NO		18.26	1.55	15.21	21.31
YES		81.74	1.55	78.69	84.79
BREASTFED BABY IN THE 1ST HOUR	1708				
NO		25.70	1.70	22.37	29.03
YES		74.30	1.70	70.97	77.63
BABY FED ONLY BREAST MILK	1707				
NO		38.00	1.94	34.21	41.80
YES		62.00	1.94	58.20	64.79
STAFF TOLD ME TO BF BABY ON DEMAND	1693				
NO		18.32	1.53	15.30	21.32
YES		81.69	1.53	78.67	84.69
STAFF GAVE PHONE # TO CALL FOR HELP WITH BF	1703				
NO		14.10	1.41	11.33	16.88
YES		85.90	1.41	83.12	88.68
HOSP STAFF DID NOT GIVE BABY A PACIFIER	1705				

NO		49.00	1.97	45.12	52.87
YES		51.00	1.97	47.13	54.88
HOSPITAL MEETS ALL 8 STEPS	1705				
NO		76.99	1.63	73.79	80.19
YES		23.01	1.63	19.81	12.22

TABLE 4.2
DESCRIPTIVE OUTCOME VARIABLES - INITIATION

OUTCOME	n	%	SE	95% Confidence Limits for Percent	
INITIATED BREASTFEEDING	1712				
NO		7.37	1.00	5.40	9.34
YES		92.63	1.00	90.66	94.59

**TABLE 4.3
DESCRIPTIVE MOTHER CHARACTERISTICS**

MATERNAL CHARACTERISTICS	n	%	SE	95% Confidence Limits for Percent	
MATERNAL COUNTY DESIGNATION	1712				
MATERNAL URBAN		88.59	1.30	86.05	91.13
MATERNAL RURAL		11.40	1.30	8.87	13.95
MATERNAL RACE/ETHNICITY	1709				
WHITE, NH		59.47	1.99	55.57	63.38
BLACK, NH		25.57	1.87	21.91	29.23
OTHER, NH		4.03	0.74	2.58	5.49
HISPANIC		10.92	1.25	8.47	13.38
MATERNAL AGE GROUP	1712				
<20 YEARS		7.42	1.14	5.19	9.65
20-29 YEARS		52.56	1.97	48.69	56.42
30+ YEARS		40.02	1.90	36.29	43.76
MARITAL STATUS	1709				
MARRIED		59.77	1.98	55.89	63.66
UNMARRIED WITH PATERN ACK		23.68	1.73	20.28	27.07
UNMARRIED WITHOUT PATERN ACK		16.55	1.59	13.42	19.67
MATERNAL EDUCATION/HIGHEST DEGREE	1705				
LESS THAN HIGH SCHOOL		14.55	1.50	11.60	17.50
HIGH SCHOOL DIPLOMA/GED		19.29	1.64	16.07	22.50
SOME COLLEGE/NO DEGREE		24.05	1.71	21.70	28.40
COLLEGE DEGREE		41.12	1.90	37.39	44.84
AT OR BELOW 100% OF POVERTY	1712				
NO		28.48	1.85	24.86	32.10
YES		64.24	1.92	60.46	68.03
MISSING	120	7.27	1.04	5.24	9.31
WIC RECIPIENT DURING PREGNANCY	1697				
NO		52.92	1.98	49.04	56.80
YES		47.08	1.98	43.19	50.96
DELIVERY METHOD	1699				
VAGINAL		66.41	1.85	62.78	70.03
CAESAREAN SECTION (C-SECTION)		33.59	1.85	29.97	37.22
MOTHER'S PREPREGNANCY BMI CATEGORY	1712				
UNDERWEIGHT		6.99	1.02	4.99	8.99
NORMAL WEIGHT		44.02	1.95	40.19	47.84
OVERWEIGHT		25.54	1.75	22.11	28.97
OBESE		23.45	1.70	20.12	26.78

MOTHER'S BMI AT DELIVERY	1712				
UNDERWEIGHT		3.26	0.73	1.84	4.69
NORMAL WEIGHT		11.05	1.20	8.71	13.40
OVERWEIGHT		28.18	1.75	24.75	31.61
OBESE		57.50	1.94	53.70	61.30
MENTAL HEALTH -- DEPRESSED SINCE BIRTH	1697				
NEVER		39.11	1.95	35.28	42.94
RARELY		33.12	1.85	29.48	36.75
SOMETIMES		19.92	1.54	16.89	22.95
OFTEN/ALMOST ALWAYS		5.93	0.92	4.12	1.74
ALWAYS		1.92	0.58	0.78	3.07
MENTAL HEALTH -- NO INTEREST SINCE BIRTH	1694				
NEVER		44.36	1.97	40.49	48.23
RARELY		29.27	1.78	25.77	32.74
SOMETIMES		16.60	1.48	13.69	19.50
OFTEN/ALMOST ALWAYS		6.75	0.98	4.83	8.67
ALWAYS		3.03	1.74	1.59	4.48
HCW TALKED ABOUT BF DURING PRENATAL VISIT	1676				
YES		12.28	1.24	9.85	14.72
NO		87.72	1.24	85.29	90.15
PREPREGNANCY HEALTH INSURANCE COVERAGE	1600				
NO INSURANCE		22.62	1.74	19.21	26.03
MEDICAID		18.52	1.71	15.16	21.88
NON-MEDICAID INSURANCE		58.86	2.04	54.87	62.86
PRENATAL HEALTH INSURANCE COVERAGE	1658				
NO INSURANCE		5.07	0.93	3.24	6.90
MEDICAID		46.35	2.01	42.41	50.30
NON-MEDICAID INSURANCE		48.58	2.00	44.66	52.49
CURRENT HEALTH INSURANCE COVERAGE	1664				
NO INSURANCE		16.33	1.52	13.32	19.28
MEDICAID		31.51	1.92	27.74	35.29
NON-MEDICAID INSURANCE		52.19	2.00	48.27	56.10
HAD ANY ALCOHOLIC DRINKS, PAST 2 YEARS	1704				
NO		30.34	1.86	26.68	33.99
YES		69.66	1.86	66.00	73.32
ALCOHOLIC DRINK 3 MONTHS BEFORE PREGNANCY	1696				
NO		41.11	1.97	37.25	44.97
YES		58.89	1.97	55.03	62.75

ALCOHOLIC DRINK LAST 3 MONTHS OF PREGNANCY	1699				
NO		91.59	1.10	89.42	93.76
YES		8.41	1.10	6.24	10.58
SMOKE AT LEAST 1 CIG IN LAST 2 YRS	1697				
NO		75.25	1.72	71.88	79.63
YES		24.75	1.72	21.37	27.12
SMOKE 3 MONTHS BEFORE PREGNANCY	1692				
NO		77.56	1.68	74.27	80.85
YES		22.43	1.68	19.16	25.73
SMOKE LAST 3 MONTHS OF PREGNANCY	1694				
NO		91.27	1.14	89.03	93.51
YES		8.73	1.14	6.49	10.97
SMOKE NOW	1693				
NO		85.88	1.14	89.09	88.67
YES		14.12	1.14	11.33	16.91

TABLE 4.4 DESCRIPTIVE BABY					
BABY CHARACTERISTICS					
	n	%	SE	95% Confidence Limits for Percent	
LENGTH OF BABY'S HOSPITAL STAY	1251				
<1 DAYS		1.79	0.53	0.74	2.83
1-5 DAYS		90.59	1.07	88.50	92.69
6-14 DAYS		4.06	0.74	2.60	5.52
>14 DAYS		3.56	0.61	2.37	4.75
INFANT ADMITTED IN THE NICU AT BIRTH	1249				
NO		88.41	1.23	86.00	90.81
YES		11.59	1.23	9.19	14.00
INFANT ALIVE NOW	1210				
NO		0.01	0.01	0.00	0.03
YES		99.98	0.01	99.97	100.00
INFANT LIVING WITH MOM	1209				
NO		0.34	0.23	0.00	0.79
YES		99.67	0.23	99.21	100.00

TABLE 4.5 BIVARIATE ANALYSIS - MATERNAL CHARACTERISTICS				
	BREASTFEEDING INITIATION			
MATERNAL CHARACTERISTICS	n	%	SE	p value α= 0.05
MATERNAL COUNTY DESIGNATION	1712			0.0369
MATERNAL URBAN		93.36	1.03	
MATERNAL RURAL		86.93	3.69	
MATERNAL RACE/ETHNICITY	1709			0.0151
WHITE, NH		94.23	1.07	
BLACK, NH		88.59	2.63	
OTHER, NH		98.89	0.43	
HISPANIC		91.43	3.43	
MATERNAL AGE GROUP	1712			0.1899
<20 YEARS		88.90	4.93	
20-29 YEARS		91.51	1.50	
30+ YEARS		94.79	1.25	
MARITAL STATUS	1709			0.0001
MARRIED		95.81	0.89	
UNMARRIED WITH PATERN ACK		90.24	2.27	
UNMARRIED WITHOUT PATERN ACK		84.54	3.87	
MATERNAL EDUCATION/HIGHEST DEGREE	1705			0.053
LESS THAN HIGH SCHOOL		89.22	3.45	
HIGH SCHOOL DIPLOMA/GED		88.90	2.84	
SOME COLLEGE/NO DEGREE		92.67	1.78	
COLLEGE DEGREE		95.56	1.23	
AT OR BELOW 100% OF POVERTY	1712			0.0023
NO		87.66	2.46	
YES		95.33	0.94	
MISSING	120	88.22	5.00	
WIC RECIPIENT DURING PREGNANCY	1697			0.0001
NO		96.10	0.94	
YES		88.62	1.85	
DELIVERY METHOD	1699			0.0098
VAGINAL		94.49	1.16	
CAESAREAN SECTION (C-SECTION)		88.92	1.94	
MOTHER'S PREPREGNANCY BMI CATEGORY	1712			0.0653
UNDERWEIGHT		88.59	4.76	
NORMAL WEIGHT		94.18	1.31	
OVERWEIGHT		94.79	1.62	
OBESE		88.56	2.64	
MENTAL HEALTH -- DEPRESSED SINCE BIRTH	1697			0.0479

NEVER		93.09	1.58	
RARELY		92.92	1.70	
SOMETIMES		94.05	1.80	
OFTEN/ALMOST ALWAYS		89.22	5.28	
ALWAYS		70.77	14.36	
MENTAL HEALTH -- NO INTEREST SINCE BIRTH	1694			0.004
NEVER		93.45	1.45	
RARELY		95.61	1.35	
SOMETIMES		91.15	2.74	
OFTEN/ALMOST ALWAYS		79.99	6.36	
ALWAYS		87.14	6.47	
HCW TALKED ABOUT BF DURING PRENATAL VISIT	1676			0.832
YES		92.06	2.90	
NO		92.70	1.09	
PREPREGNANCY HEALTH INSURANCE COVERAGE	1600			0.008
NO INSURANCE		88.09	2.86	
MEDICAID		88.95	3.04	
NON-MEDICAID INSURANCE		95.23	1.04	
PRENATAL HEALTH INSURANCE COVERAGE	1658			0.0092
NO INSURANCE		90.29	5.48	
MEDICAID		89.58	1.81	
NON-MEDICAID INSURANCE		95.97	1.03	
CURRENT HEALTH INSURANCE COVERAGE	1664			0.0134
NO INSURANCE		89.04	3.18	
MEDICAID		89.48	2.15	
NON-MEDICAID INSURANCE		95.46	1.10	
HAD ANY ALCOHOLIC DRINKS, PAST 2 YEARS	1704			<.0001
NO		86.42	2.56	
YES		95.28	0.89	
ALCOHOLIC DRINK 3 MONTHS BEFORE PREGNANCY	1696			<.0001
NO		87.93	2.09	
YES		95.85	0.86	
ALCOHOLIC DRINK LAST 3 MONTHS OF PREGNANCY	1699			0.3502
NO		92.25	1.07	
YES		96.24	2.99	
SMOKE AT LEAST 1 CIG IN LAST 2 YRS	1697			0.6983
NO		92.80	1.17	
YES		91.92	2.02	
SMOKE 3 MONTHS BEFORE PREGNANCY	1692			0.5441

NO		92.67	1.16	
YES		93.99	1.73	
SMOKE LAST 3 MONTHS OF PREGNANCY	1694			0.0353
NO		93.22	1.02	
YES		85.75	4.49	
SMOKE NOW	1693			0.4254
NO		93.26	1.05	
YES		91.12	2.71	



TABLE 4.6 BIVARIATE ANALYSIS - HOSPITAL STEPS/ CHARACTERISTICS				
HOSPITAL	n	%	SE	p value $\alpha= 0.05$
HOSPITAL LOCATION	1712			0.0007
URBAN		93.68	0.96	
RURAL		80.33	5.80	
HOSPITAL LABELLED BABY-FRIENDLY	1712			0.4804
NO		92.91	1.08	
YES		90.97	2.76	
STAFF GAVE INFO ABOUT BREASTFEEDING	1712			<.0001
NO		68.44	9.46	
YES		93.74	0.92	
BABY STAYED IN SAME ROOM AS MOM	1709			<.0001
NO		77.71	3.77	
YES		94.95	0.99	
STAFF HELPED MOM LEARN HOW TO BREASTFEED	1708			<.0001
NO		80.86	3.74	
YES		95.26	0.85	
BREASTFED BABY IN THE 1ST HOUR OF BIRTH	1708			<.0001
NO		74.04	3.34	
YES		99.02	0.42	
BABY FED ONLY BREAST MILK	1707			<.0001
NO		84.11	2.38	
YES		98.14	0.43	
STAFF TOLD MOM TO BREASTFEED BABY ON DEMAND	1693			<.0001
NO		73.70	4.00	
YES		97.09	0.71	
STAFF GAVE PHONE # TO CALL FOR HELP WITH BREASTFEEDING	1705			0.0004
NO		88.89	1.71	
YES		96.23	1.07	
HOSP STAFF DID NOT GIVE BABY A PACIFIER	1703			0.0035
NO		84.87	4.08	
YES		93.89	0.95	
HOSPITAL MEETS ALL 8 STEPS	1705			--
NO		90.37	1.30	
YES		100.00	0.00	

TABLE 4.7 MULTIVARIATE ANALYSIS				
HOSPITAL	BREASTFEEDING INITIATION			
MODEL 1 HAS INITIATION AND HOSPITAL VARIABLE	MODEL 1		MODEL 2	
MODEL 2 INCLUDES INITIATION, HOSPITAL, AND MOTHER DEMOGRAPHIC VARIABLES.	OR	p value $\alpha=0.05$	OR	p value $\alpha=0.05$
MODEL 1: N=1712 USED 1668 NO=445 YES=1223				
MODEL 2: N=1712 USED 1628 NO=435 YES=1193				
HOSPITAL DESIGNATION	0.37	0.0407	0.38	0.1034
STEP 3: PROVIDE INFORMATION REGARDING BREASTFEEDING BENEFITS/MANAGEMENT	4.66	0.0062	6.43	0.0011
STEP 4: BREASTFEED WITHIN HOUR OF BIRTH.	18.85	<.0001	28.12	<.0001
STEP 5: SHOW MOTHERS HOW TO BREASTFEED, AND HOW TO MAINTAIN LACTATION EVEN IF THEY SHOULD BE SEPARATED FROM THEIR INFANTS.	3.26	0.0019	4.31	0.0006
STEP 6: GIVE NEWBORN INFANTS NO FOOD OR DRINK OTHER THAN BREAST MILK UNLESS MEDICALLY INDICATED.	4.41	0.0002	4.91	<.0001
STEP 7: PRACTICE ROOMING IN - ALLOW MOTHERS AND INFANTS TO REMAIN TOGETHER - 24 HOURS A DAY.	2.30	0.0387	3.14	0.0057
STEP 8: ENCOURAGE BREASTFEEDING ON DEMAND.	5.25	<.0001	6.56	<.0001
STEP 9: GIVE NO ARTIFICIAL TEATS OR PACIFIERS	0.76	0.5344	0.61	0.3199
STEP 10: FOSTER THE ESTABLISHMENT OF BREASTFEEDING SUPPORT GROUPS AND REFER MOTHERS TO THEM ON DISCHARGE FROM THE HOSPITAL OR CLINIC.	0.47	0.1167	0.43	0.0676

TABLE 4.8 MULTIVARIATE ANALYSIS				
MOTHER DEMOGRAPHICS	BREASTFEEDING INITIATION			
MODEL 1: INCLUDES INITIATION AND MOTHER'S VARIABLES	MODEL 1		MODEL 2	
MODEL 2 INCLUDES INITIATION, HOSPITAL, AND MOTHER DEMOGRAPHIC VARIABLES.	OR	p value $\alpha=$ 0.05	OR	p value $\alpha=$ 0.05
MODEL 1: N=1712 USED 1668 NO=445 YES=1223				
MODEL 2: N=1712 USED 1628 NO=435 YES=1193				
MATERNAL COUNTY DESIGNATION	0.62	0.2458	1.13	0.8585
MATERNAL RACE/ETHNICITY				
MATERNAL RACE/ETHNICITY WHITE VS BLACK	0.90	0.8290	0.37	0.0272
MATERNAL RACE/ETHNICITY HISPANIC VS BLACK	7.01	0.8582	0.35	0.0731
MATERNAL RACE/ETHNICITY OTHER VS BLACK	1.09	0.0011	3.30	0.1552
MATERNAL AGE GROUP				
MATERNAL AGE GROUP <20 YEARS VS 30+ YEARS	0.87	0.9697	2.92	0.2849
MATERNAL AGE GROUP 20-29 YEARS VS 30+ YEARS	0.98	0.6971	0.60	0.2509
MARITAL STATUS				
UNMARRIED WITH PATERN ACK VS MARRIED	0.70	0.4568	0.70	0.4651
UNMARRIED WITHOUT PATERN ACK VS MARRIED	0.48	0.1233	0.23	0.0100
MATERNAL EDUCATION/HIGHEST DEGREE				
LESS THAN HIGH SCHOOL VS COLLEGE DEGREE	1.02	0.5324	3.11	0.1387
HIGH SCHOOL DIPLOMA/GED VS COLLEGE DEGREE	1.47	0.9603	1.33	0.6208
SOME COLLEGE/NO DEGREE VS COLLEGE DEGREE	1.33	0.5380	1.41	0.5292
AT OR BELOW 100% OF POVERTY				
100% OF POVERTY MISSING VS NO	0.53	0.3285	0.23	0.1192
100% OF POVERTY YES VS NO	0.64	0.2234	0.91	0.8216
WIC RECIPIENT DURING PREGNANCY				
WIC RECIPIENT DURING PREGNANCY NO VS YES	1.98	0.2370	2.48	0.1287
MOTHER'S PREPREGNANCY BMI CATEGORY				
UNDERWEIGHT VS NORMAL WEIGHT	0.78	0.7771	5.53	0.0244
OVERWEIGHT VS NORMAL WEIGHT	1.28	0.5750	3.10	0.0183
OBESE VS NORMAL WEIGHT	0.84	0.5422	2.12	0.1504
MENTAL HEALTH -- DEPRESSED SINCE BIRTH				
RARELY/SOMETIMES VS NEVER	0.79	0.8459	1.19	0.6955
ALMOST ALWAYS/ALWAYS VS NEVER	0.93	0.6747	1.26	0.7140
MENTAL HEALTH -- NO INTEREST SINCE BIRTH				
RARELY/SOMETIMES VS NEVER	0.55	0.4032	0.41	0.6916
ALMOST ALWAYS/ALWAYS VS NEVER	1.32	0.2578	0.85	0.1238

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CHAPTER 5

“HOSPITAL STAFF PRACTICES AND BREASTFEEDING DURATION”²

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ABSTRACT

Objective: To examine the association between hospital staff practices and breastfeeding duration.

Methods: 2013-2015 South Carolina Pregnancy Risk Assessment Monitoring System data were analyzed. Chi-square and logistic regression analyses were used to examine association between hospital staff interactions and breast feeding duration of ≥ 10 weeks among women who delivered a live infant and initiated breastfeeding, adjusting for mother's socio-demographics.

Results: Three Steps were significantly associated with breastfeeding duration of ≥ 10 weeks, including STEP 5 - Hospital staff show mothers how to breastfeed (OR 0.41, $p=0.0031$), STEP 6 - Staff did not give infants food or drink other than breast milk unless medically indicated (OR 4.55, $p<0.0001$), and STEP 8 - Staff encouraged mother to breastfeed on demand (OR 2.06, $p=0.051$). Additionally, the mother's county of residence, was significantly associated with breast feeding duration of ≥ 10 weeks (OR 0.348, $p=0.0305$).

Conclusions: Hospital practices were found to be strongly associated with breastfeeding duration regardless of mother's race, marital status, education, poverty level, BMI, or mental health status. Our finding suggests that hospitals should focus on policy and systems changes that support the increase of key staff interactions with mothers since they are associated with sustained breastfeeding.

SIGNIFICANCE

The knowledge of the benefits of breastfeeding is one of the primary reasons a mother initiates breastfeeding (Alexander et al., 2010; Murimi, Dodge, Pope, & Erickson, 2010; Robinson & VandeVusse, 2009). Breastfeeding initiation increased with the level of a mother's confidence in breastfeeding (Avery et al., 2009). The fear of pain that is perceived to be associated with breastfeeding influences a woman's decision to initiate breastfeeding. Breastfeeding difficulties may cause a woman to cease breastfeeding (Alexander et al., 2009; Hurley et al., 2008; Robinson & VandeVusse, 2009). Support from health care providers increases initiation and duration rates. The Merewood et al., (2007) study found that the Baby Friendly Hospital Initiative was associated with an increase in breastfeeding initiation rates. Public embarrassment and their comfort level with formula are associated with shorter breastfeeding duration (Kaufman et al., 2010). Pain and difficulty of breastfeeding was associated with shorter duration of breastfeeding. (McCann et al., 2007). New mothers need additional knowledge about the actual act of breastfeeding (Reeves & Woods-Giscombe, 2015).

This study examines associations between hospital practices and breastfeeding behaviors in South Carolina. It is essential that women's breastfeeding efforts are supported by hospital practices, the community, and government policies at all levels. Hospital practices play a vital role in supporting women to breastfeed. It is important to examine women's experiences with hospital staff so that the appropriate policies, practices, and programs can be implemented to promote breastfeeding.

INTRODUCTION

Breastfeeding is an optimal feeding practice which results in better health outcomes for mother and infant. Breastfeeding is associated with better health that can span throughout their entire childhood years (“Breastfeeding: Healthy People 2020 | DNPAO | CDC,” n.d.). Breastfeeding initiation is important but the length of time a mother breastfeeds is very important as well. The health outcomes for baby and mother get better the longer the mother breastfeeds.

The United States breastfeeding duration rates are well below the Healthy People 2020 goals (“Breastfeeding: Healthy People 2020 | DNPAO | CDC,” n.d.). Healthy People 2020 goal for breastfeeding duration is 60.6% for six months and women in the U.S are meeting this duration at 61.60%, however only 45.3% were meeting this rate in 2006 (“Breastfeeding: Healthy People 2020 | DNPAO | CDC,” n.d.).

The goal of the Baby Friendly Health Initiative (BFHI), which was sponsored by The World Health Organization (WHO) and the United Nations Children’s Fund, was to utilize hospital practices to increase initiation and duration rates of exclusive breastfeeding (“WHO | Implementation of the Baby-friendly Hospital Initiative,” n.d.) . The BFHI helps provide the standard to hospitals with procedures that supports their efforts to increase breastfeeding initiation and duration rates.

For a hospital to be designated as Baby Friendly they must incorporate in their practices the *Ten Steps to Successful Breastfeeding*, mothers must breastfeed exclusively at a rate of 75% at discharge, and follow the International Code of Marketing Breast-milk Substitutes (“WHO | Implementation of the Baby-friendly Hospital Initiative,” n.d.).

For the purpose of this study, we focused on breastfeeding duration rates and examined whether hospital practices, defined by the *Ten Steps to Successful Breastfeeding* guidelines, are associated with these rates. We examined whether different races experience hospital staff practices at different rates. We further examined whether the rate of these hospital staff practices for these racial groups were also associated with the breastfeeding duration rates for these groups.

As previously mentioned, the *Ten Steps to Successful Breastfeeding* will be used to define hospital practices. Hospital practices and STEPS will be used interchangeably throughout this study. In analyzing the association to breastfeeding duration, we analyzed eight of the ten steps of the *Ten Steps to Successful Breastfeeding* and breastfeeding duration. We used it as our standard when analyzing hospital practices and mother's breastfeeding duration rates. The *Ten Steps to Successful Breastfeeding* practices are the following:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within one hour of birth. (Interpreted as: Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour. Encourage mothers to recognize when their babies are ready to breastfeed and offer help if needed).
5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk unless medically indicated.
7. Practice rooming in - allow mothers and infants to remain together - 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

We have evaluated if any of the eight steps are associated with increased duration rates and if those rates differ by race. The steps we evaluated were STEPS 3-10 since they demonstrate direct contact with mother and/or infant.

METHODS

We analyzed the South Carolina Pregnancy Risk Assessment Monitoring System (PRAMS) data from 2013-2015. The SC PRAMS randomly surveys new mothers who recently delivered babies in South Carolina. The survey asks mothers about their health behaviors and experiences before, during, and after delivery (“DHEC,” n.d., 2016). The birth certificate data are also included in the SC PRAMS data which provide demographic information about mother, father, and baby.

For the purpose of our study, we analyzed health behaviors and experiences related to breastfeeding duration. Our main interest was the association between hospital staff’s practices, we will use Steps interchangeably, breastfeeding duration, and mother’s demographics. The goal of our analysis was to determine what procedures hospitals can incorporate to support or facilitate longer breastfeeding duration. Our interest is whether hospital practices are associated with an increase in duration rates and if this varies by mother’s demographics. We also wanted to determine whether our results would show a difference by race. The literature states that African-American mothers breastfeed for shorter periods in comparison to other races (Centers for Disease Control and Prevention (CDC), 2010). Our analysis was to determine if we would see the same results in our population. This research was conducted in accordance with prevailing ethical principles. It was reviewed by the University of South Carolina Institutional Review Board and the South Carolina Department of Health and Environmental Control.

Study Design

We analyzed hospital staff practices and their association with mother's breastfeeding duration and other covariates. We used the 2013-2015 SC PRAMS data to examine hospital staff practices and how their behaviors are experienced by mother and infant. We analyzed the restricted sample of mother's who delivered in the hospital; had a single birth; the child was alive; the child lived with the mom; and they initiated breastfeeding while in the hospital.

We used univariate analysis to describe the restricted sample population. We analyzed the sample using bivariate analysis to evaluate associations between covariates as well as associations between duration and the independent variables of interest. Finally, multiple logistic regression models were run to analyze independent associations of the staff practices on breastfeeding duration.

We ran an unweighted multivariate logistic regression model to analyze the association of the hospital staff practices and duration rates. We ran a weighted full multivariate logistic regression model by including the co-variables associated with mother's characteristics.

The population of interest are all mothers who delivered infants in South Carolina from 2013-2015 and who initiated breastfeeding while in the hospital. The eligibility requirements for mothers to be included in this study were 1) A singleton birth delivered in a hospital, 2) a live infant, 3) infant lives with mother, and 4) they initiated breastfeeding in the hospital. The sample was restricted to include only mothers who met the eligibility criteria.

Conceptual Model

Our conceptual model was developed using an adapted Social Ecological Model (SEM) to explain the association between hospital staff practices and breastfeeding duration. SEM helps to explain the multiple spheres of influence that are associated with an individual's health decision process that leads up to those actual health behaviors (Johnston & Esposito, 2007; McLeroy et al., 1988). SEM helps policy-makers understand the sphere that would provide the greatest influence if interventions are utilized. The spheres of influence are categorized as Individual, Interpersonal, Community, Organizational, and Policy.

The Individual sphere is defined by the individual's own characteristics such as age, education level, income, health behaviors, and beliefs. The Interpersonal sphere (Relationships) examines formal and informal social networks and social support systems. The Community (Environment) sphere examines relationships between organizations/institutions and environmental settings in which social relationships form and these settings that influence health behavior (Dunn et al., 2014). The Organizational sphere consists of established institutions with formal or informal policy, procedures, and regulations regarding how they operate (McLeroy et al., 1988). The Policy sphere explores governmental policy at the global, federal, state, and local levels (McLeroy et al., 1988). It examines the allocation of government resources and the programs and policies that they fund (Dunn et al., 2014).

SEM's theory-based framework helps to explain how external influences are associated with an individual's decisions regarding their health behaviors. There are different levels of influence that SEM's complex framework accounts for and helps

explain. SEM also explains how these relationships are associated with individual behaviors (Johnston & Esposito, 2007; McLeroy, Bibeau, Steckler, & Glanz, 1988). This helps us plan and implement better policies, procedures, and programs to move the individual and community towards better health outcomes.

We focused on the Organizational sphere where the hospital facility is located. We have included all of the spheres because they all are relevant and the hospitals' influences may reach into other spheres due to mothers' other relationships.

Variables

Dependent Variable- Duration

The dependent variable of interest was the duration rates of mothers who delivered in the hospital and initiated breastfeeding. The variable to determine if the mother would be included in the sample was in response to the question, We included all non-missing responses to the question, "Did you ever breastfeed (or pump breast milk to feed your new baby), even for a short period of time? (Yes, No)". If the mother answered yes to this question, we analyzed duration. The duration of interest was whether mother breastfed for ≥ 10 weeks. These independent variables are the hospital staff's practices defined by eight of the ten steps of *Ten Steps to Successful Breastfeeding* guidelines. The questions associated with these steps are as follows:

- Step 3 - Hospital staff gave me information about breastfeeding.
(Best Practice-Yes)
- Step 4 - Mother breastfed in the first hour after baby was born.
(Best Practice-Yes)
- Step 5 - Hospital staff helped me learn how to breastfeed.
(Best Practice-Yes)
- Step 6 - Baby was fed only breastmilk in the hospital.
(Best Practice-Yes)
- Step 7 - My baby stayed in the same room with me at the hospital.
(Best Practice-Yes)

- Step 8 - Hospital staff told me to breastfeed whenever my baby wanted
(Best Practice-Yes)
- Step 9 - Hospital staff gave baby a pacifier.
(Best Practice-No)
- Step 10 - The hospital gave me a telephone number to call for help with breast feeding. (Best Practice-Yes)

Covariates of interest were mother's race, mothers' age group, mother's years of education, marital status, mother's poverty level, urban/rural, insurance coverage status, WIC recipient, mother's BMI, and mother's mental health status.

RESULTS

Descriptive Analysis

Our descriptive analysis of the sample includes the hospitals', moms', and babies' characteristics as well as rates of duration. As for the hospitals, 92.14 % were located in an urban area. Of those hospitals included in the study, 14.52% were certified as Baby-Friendly and 23.01% of all hospitals practiced all eight steps. As for the hospital practices of interest which were steps 3-10 of the *Ten Steps to Successful Breastfeeding*, they are as follows:

- 96% - Staff gave information about breastfeeding.
- 87% - Baby stayed in the same room as mom.
- 82% - Staff helped mom learn how to breastfeed.
- 74% - Mom breastfed baby in the first hour after birth.
- 62% - The baby was fed only breast milk.
- 82% - The staff told mom to breastfeed the baby on demand.
- 86% - Mom given a number to call for help with breastfeeding after discharge.
- 51% - Hospital staff did NOT give baby a pacifier.

The average # of steps met by hospitals, categorized as Baby Friendliness Score, were 6.01. (Table 5.1)

Outcome of interest – Breastfed for ≥ 10 Weeks

The final study sample size was n=1888. There were 92.63% of mother's who stated that they delivered in the hospital and that they initiated breastfeeding in the hospital. (Table 5.2)

Mother's Characteristics

The majority of mothers delivered their infants vaginally (65.37%). The majority of mothers, 84.71%, lived in rural areas (Table 5.3). Their race/ethnicity was 59.47% White, 25.57% Black, 10.92% Hispanic, and 4.03% Other. Of the mothers' age groups, 52.56% of the mothers were 20-29 years of age, followed by 40.02% that were 30+ years of age, and 7.42% were <20 years of age. Over half of the women were married 59.77%; 23.68% of the women were unmarried with paternity acknowledgement, 16.55% were unmarried without such acknowledgement. The mothers' education levels were a college degree (41.12%), some college/no degree (24.05%), high school diploma/GED (19.29%), and less than a high school diploma (14.55%). The majority of respondents stated that they were at or below 100% of the Poverty Line (64.24%).

There were fewer mothers who were WIC recipients during pregnancy (47.08%) than were not WIC recipients. Only 12.28% had a health care worker talk to them about breastfeeding during a prenatal visit. The majority had non-Medicaid insurance before pregnancy (58.86%), Medicaid for prenatal care (48.58%), and non-Medicaid insurance (52.19%) at time of the PRAMS survey. The proportion of moms' with an overweight pre-pregnancy BMI was 25.54% and the proportion of moms with a BMI that was obese was 23.45%. The moms that "never felt depressed since they delivered" were (39.11%)

and 33.12% “rarely felt depressed”. The moms who had “no interest since birth” (44.36%) and 29.27% stated they “rarely” did (Table 5.3).

We examined mom’s drinking and smoking habits (Table 5.3). The proportion of moms who drank alcohol in the last 2 years 69.66%, the proportion of mothers that had a drink in the 3 months prior to pregnancy 58.89%, and The proportion of mothers that drank in the last 3 months of pregnancy 8.41%. The proportion of moms who smoked at least 1 cigarette in the last 2 years 24.75%, the proportion of mothers who smoked in the 3 months prior to pregnancy 22.43%, the proportion of mothers who smoked in the last 3 months of pregnancy 8.73%, and the proportion of mothers who currently smoke 14.12% (Table 5.3). Mom’s with infants living with them 99.67%, 99.98% of infants were alive, 11.59% of the infants were admitted to NICU at birth, and 90.59% of the infants stayed in the hospital for 1-5 days (Table 5.4).

Bivariate Analysis

Maternal Characteristics

There were multiple maternal demographics that were significantly associated with mother’s breastfeeding duration. Mothers’ race/ethnicity was significantly associated with breastfeeding duration ($p = .0267$). Hispanics breastfed for ≥ 10 weeks at the highest percentage rate (67.55%), followed by Other (65.50%), White (61.85%), and Blacks (61.85%). Mother’s county of residence, defined as rural or urban was significantly associated ($p < .0001$). Mothers who lived in an urban county breastfed for ≥ 10 weeks at 51.43% in comparison to those located in rural counties 20.72%. (Table 5.5)

Breastfeeding ≥ 10 weeks significantly associated with mothers' marital status ($p < .0001$). Mothers who were married breastfed for ≥ 10 weeks, at the highest rate (69.67%), followed by mothers who were unmarried with paternity acknowledgement (46.91%). There was a significant relationship with whether a mother was a Women Infant and Children nutritional program (WIC) recipient during pregnancy ($p < .0001$) and duration. The WIC recipients breastfed for ≥ 10 weeks at 68.99% and a non-WIC recipients breastfed ≥ 10 weeks at (47.31%). A mother who was at or above 100% of poverty level breastfed at (66.31%) in comparison to those who were below 100% of the poverty level. The 100% of poverty level ($p < .0001$) was significant. Maternal Education ($p < .0001$) was significantly associated to breastfeeding duration. Mothers who had a college degree breastfed for ≥ 10 weeks (71.82%), those with some college (55.41%), and those who had less than a high school diploma or GED met the ≥ 10 week mark the least at (42.19%). (Table 5.5)

Pre-pregnancy ($p = 0.0005$), prenatal ($p < .0001$), and current insurance coverage ($p < .0001$) were significant regarding breastfeeding to ≥ 10 weeks. Those mother's with non-Medicaid insurance coverage pre-pregnancy (66.02%), prenatal (71.77%), and currently were covered by non-Medicaid (71.11%) continued to breastfeed through ≥ 10 weeks than mothers with Medicaid (pre-pregnancy 45.03%, prenatal 45.09%, and current 42.82%) and no insurance coverage (pre-pregnancy 56.47%, prenatal 63.28%, and current 53.21%). Women with no insurance coverage continued to breastfeed through ≥ 10 weeks at a higher rate than those mothers covered by Medicaid. Pre-pregnancy BMI ($p = 0.0147$) was significantly associated with breastfeeding duration of ≥ 10 weeks. (Table 5.5)

A mother's smoking status was significantly associated with breastfeeding duration rates. Mothers who smoked at least 1 cigarette in the last 2 years ($p=0.0056$) breastfed ≥ 10 weeks at a rate of 45.82% compared to mothers who had not 66.89%. Mothers who smoked in the last three months or pregnancy ($p=0.0078$, 48.47%) compared to mothers who did not 62.62%. Among mothers who were smoking at the time of the survey ($p=0.0004$), 39.35% breastfed ≥ 10 weeks compared to mothers who were not currently smoking 62.68%. (Table 5.5)

Alcohol consumption did not show to have an association with breastfeeding duration rates. Mode of delivery ($p=0.3771$), mental health status, depressed since birth ($p=0.0937$) and no interest since birth ($p=0.0698$) showed no association to breastfeeding duration of ≥ 10 weeks. (Table 5.5)

Hospital Characteristics

The Baby Friendly hospital designation ($p= 0.6400$) was found to not be significantly associated to breastfeeding duration. The location of the hospital however, was found to be significant ($p= 0.0134$). Hospitals located in urban counties had mothers who breastfeed ≥ 10 weeks at 60.92% compared to hospitals located in rural counties 40.62%. Practicing all eight steps ($<.0001$) was significantly associated with mothers' breastfeeding for ≥ 10 weeks. Hospitals that routinely practiced all 8 steps had 74.80% of their mothers who breastfed for ≥ 10 weeks compared to those who did not (54.24%). (Table 5.6)

Hospital Practices/STEPS and Duration

In analyzing the hospital staff practices with mother and baby, of the eight steps that were included in our analysis, six were shown to be significantly associated with breastfeeding duration for ≥ 10 weeks.

Hospitals that practiced having mother breastfeed within an hour of birth (skin-to-skin) (Step 4) ($p=0.0028$) had 63.15% mothers meet the duration rate of ≥ 10 weeks in comparison to those who did not 48.49%. Facilities that regularly practiced not giving newborn infants food or drinks other than breastmilk unless medically indicated (Step 6) $p<.0001$, their mothers met the duration of ≥ 10 weeks at a rate of 73.21% compared to those that did provide food or drink other than medically necessary 37.33%. (Table 5.6)

Hospitals that practiced rooming in, which again, allowed mothers and infants to remain together - 24 hours a day (Step 7) $p=0.0201$, experienced 61.07% of their mothers breastfeeding for ≥ 10 weeks, compared to 47.47% for mothers who delivered in hospitals that did not have this practice. Facilities that maintained a practice that encouraged mothers to breastfeed on demand (Step 8) $p<.0001$, rates were 63.11% compared to those who did not 39.89%. When pacifiers or artificial teats were NOT given to breastfeeding infants (Step 9) $p=0.0007$, mothers' duration rate was 66.29% compared to facilities that did provide pacifiers 51.60%. When hospital staff fostered the establishment of breastfeeding support groups and referred mothers to them on discharge from the hospital or clinic (Step 10) $p=.0072$, they met the breastfeeding duration at 61.66% compared to 44.89%, when they did not give the mother a number for breastfeeding support. (Table 5.6)

Our analysis determined that hospitals that routinely provided information regarding breastfeeding benefits and management (Step 3) ($p=0.3899$) had no association with duration. The interaction of helping mothers learn how to breastfeed, and how to maintain lactation (Step 5) ($p=0.1203$), was not significant either. (Table 5.6)

*Multivariate Analysis Unadjusted Model
Hospital Practices - Model 1 Duration ≥ 10 and All Eight Steps*

The unadjusted Model 1 analyzed the association of hospital staff practices and duration of ≥ 10 weeks. We included in the Model 1, all of the hospital steps and the outcome of interest, duration. Our analysis determined that three of the eight Steps were significantly associated with the mothers' duration rate. Once all of the Steps were added into the model, the hospital designation was no longer significant but it was close enough to mention (OR 0.48, $p = 0.0570$). The three Steps that were found to have a significant association with breastfeeding duration of ≥ 10 weeks were; STEP 5 - Hospital staff show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants (OR 0.38, $p=0.0006$); STEP 6 - Staff did not give infants food or drink other than breast milk unless medically indicated (OR 4.19, $p < 0.0001$); Hospitals that did not give infant anything but mothers' breastmilk had mothers who were 4.19 times more likely to breastfeed ≥ 10 weeks then facilities that did not have this practice; and STEP 8 - emphasis was on encouraging mothers to breastfeed on demand (OR 2.06, $p=0.0051$). When mothers were encouraged to breastfeed on demand the mothers were 2.06 times more like to breastfeed ≥ 10 weeks then facilities that did not have this practice. (Table 5.7)

*Multivariate Analysis Hospital Practices Adjusted Model
Model 2 Duration and All Independent Variables and Covariates*

Model 2 is an adjusted model that includes duration of ≥ 10 and all independent variables, which are the eight steps describing the hospitals practices and all of the relevant covariates. There were three Steps significantly associated with breastfeeding duration of ≥ 10 weeks. However, the hospital designation was no longer significantly associated with duration for ≥ 10 weeks (OR 0.35, $p=0.8129$). (Table 5.7)

Regarding breastfeeding duration for ≥ 10 weeks, the first one, STEP 5 - The odds of breastfeeding for ≥ 10 weeks among mothers who were shown how to breastfeed were lower than those who were not shown how to breastfeed (OR 0.41, $p=0.0031$). The second, STEP 6 - the odds of breastfeeding for ≥ 10 weeks among mothers in facilities that only gave their infants' mothers' breastmilk, the mothers were 4.55 times higher than those in facilities that supplemented mother's breast milk (OR 4.55, $p<0.0001$). The third, STEP 8 - the odds of breastfeeding for ≥ 10 weeks among mothers who were encouraged to breastfeed whenever baby wanted were 2.06 times higher than those whose babies were put on a schedule (OR 2.06, $p=0.051$). (Table 5.7)

The mother's county of residence, was significantly associated with breastfeeding duration of ≥ 10 weeks. The odds of breastfeeding for ≥ 10 weeks among mothers who were located in rural counties were lower than those who lived in rural counties (OR 0.348, $p=0.0305$). (Table 5.8)

Mother's race/ethnicity with Black being the reference group was significantly associated with breastfeeding duration of ≥ 10 weeks. The odds of breastfeeding for ≥ 10 weeks among Black women was lower than White women (OR 0.37, $p=0.0272$). Marital status was determined to be significantly associated with duration of ≥ 10 weeks. The

odds of breastfeeding for ≥ 10 weeks among unmarried women without paternity acknowledgement was lower than married women (OR 0.23, $p=0.0100$). Mothers' age group was found to be significant with breastfeeding duration of ≥ 10 weeks. The odds of breastfeeding for ≥ 10 weeks among mothers who were < 20 years old were lower than mothers who were 30+ years (OR 0.18, $p=0.0014$). (Table 5.8)

DISCUSSION

In this study, there were significant associations between mother's breastfeeding duration and hospital practices. Hospital practices, defined using the *Ten Steps to Successful Breastfeeding*, were found to be significantly associated with increased duration rates in both the unadjusted and adjusted models.

Study Limitations

A limitation of this study is that the SC PRAMS data source was secondary. Due to the fact that these questions were not specifically asked for this study, some participant answers were not included in the analysis that may have provided additional information. Participants who stated that they didn't breastfeed in the hospital were not directed to respond to the section detailing their experiences with hospital staff practices. We did not include these data which may have provided valuable insights on this population and the dynamics of their experiences with hospital staff.

Another limitation was that responses were self-reported except for the portion linked to the birth certificate. The responses to the questions were answered based on the mother's level of comprehension. The level of comprehension would determine how well they understood the question and therefore whether they answered it correctly.

Surveys are sent to mothers fairly soon after she has delivered but there may still be a level of difficulty recalling hospital staff interaction accurately.

Potential Strengths of Study

Although there are limitations, there are also strengths to this study. The PRAMS data source is a population-based and unique to South Carolina. The random selection of the original sample and the weighting of the data, allow the data to be generalizable to South Carolina mothers who delivered in a hospital. PRAMS survey is comprehensive and elicits responses for multiple health behaviors, characteristics, demographics, relationships, and life experiences. It is also linked to birth certificate data that allow us to analyze data that were submitted with more accurate data provided by a third party.

CONCLUSION

Although other studies have shown that mother's demographics were significantly associated to the health behavior of breastfeeding duration, our study shows that mother's demographics do not have an effect on the associations of the hospital practices and mother's duration. Hospital practices with mother and baby were strongly associated with breastfeeding duration regardless of mother's race, marital status, education, poverty level, BMI, or mental health status. The hospital Steps are significantly associated with breastfeeding duration rates when mother covariates are not included in the model. The significance of these associations remains when mother's covariates are included in the full model.

If a hospital implements practices that are deemed significantly associated to supporting breastfeeding durations, the mother's demographics, although cultural

competency is important to understand, does not have to be a focus of the implementation of the policy. The practices must be practiced consistently for all mothers regardless of her demographics. The hospital's procedures must consistently be practiced towards all mothers who deliver in the hospital.

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DISCLAIMER

Opinions expressed in this paper are those of the authors.

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TABLES

TABLE 5.1 DESCRIPTIVE HOSPITAL VARIABLES					
HOSPITAL CHARACTERISTICS	n	%	SE	95% Confidence Limits for Percent	
Hospital in rural or urban area	1712				
Urban		92.14	1.11	89.96	94.32
Rural		7.86	1.11	5.68	10.04
Hospital labelled Baby-friendly	1712				
No		85.48	1.33	82.87	88.09
Yes		14.52	1.33	11.91	17.13
Staff gave info about breastfeeding	1712				
No		4.40	0.84	2.76	6.05
Yes		95.60	0.84	93.95	97.24
Baby stayed in same room	1709				
No		13.52	1.22	11.13	15.91
Yes		86.48	1.22	84.09	88.87
Staff helped learn how to breastfeed	1708				
No		18.26	1.55	15.21	21.31
Yes		81.74	1.55	78.69	84.79
Breastfed baby in the 1st hour	1708				
No		25.70	1.70	22.37	29.03
Yes		74.30	1.70	70.97	77.63
Baby fed only breast milk	1707				
No		38.00	1.94	34.21	41.80
Yes		62.00	1.94	58.20	64.79
Staff told me to bf baby on demand	1693				
No		18.32	1.53	15.30	21.32
Yes		81.69	1.53	78.67	84.69
Staff gave phone # to call for help with bf	1703				
No		14.10	1.41	11.33	16.88
Yes		85.90	1.41	93.12	88.68
Hospital staff did not give baby a pacifier	1705				
No		49.00	1.97	45.12	52.87
Yes		51.00	1.97	47.13	54.88
Hospital meets all 8 steps	1705				
No		76.99	1.63	73.79	80.19
Yes		23.01	1.63	19.81	26.21

TABLE 5.2 DESCRIPTIVE OUTCOME VARIABLES - DURATION ≥ 10 WEEKS					
OUTCOME	n	%	SE	95% Confidence Limits for Percent	
Breastfeeding for duration ≥ 10 weeks	1370				
No		40.78	2.18	36.51	45.04
Yes		59.22	2.18	54.96	63.49
Still breastfeeding at time of survey	1710				
No		48.92	1.98	45.05	52.80
Yes		51.08	1.98	47.20	55.95

TABLE 5.3 DESCRIPTIVE MOTHER CHARACTERISTICS					
Maternal characteristics	n	%	SE	95% Confidence Limits for Percent	
Maternal county designation	1712				
Maternal urban		88.59	1.30	86.05	91.13
Maternal rural		11.40	1.30	8.87	13.95
Maternal race/ethnicity	1709				
White		59.47	1.99	55.57	63.38
Black		25.57	1.87	21.91	29.23
Other		4.03	0.74	2.58	5.49
Hispanic		10.92	1.25	8.47	13.38
Maternal age group	1712				
<20 years		7.42	1.14	5.19	9.65
20-29 years		52.56	1.97	48.69	56.42
30+ years		40.02	1.90	36.29	43.76
Marital status	1709				
Married		59.77	1.98	55.89	63.66
Unmarried with paternity acknowledgement		23.68	1.73	20.28	27.07
Unmarried without paternity acknowledgement		16.55	1.59	13.42	19.67
Maternal education/highest degree	1705				
Less than high school		14.55	1.50	11.60	17.50
High school diploma/GED		19.29	1.64	16.07	22.50
Some college/no degree		24.05	1.71	21.70	28.40
College degree		41.12	1.90	37.39	44.84
At or below 100% of poverty	1712				
No		28.48	1.85	24.86	32.10
Yes		64.24	1.92	60.46	68.03
Missing	120	7.27	1.04	5.24	9.31
WIC recipient during pregnancy	1697				
No		52.92	1.98	49.04	56.80
Yes		47.08	1.98	43.19	50.96
Delivery method	1699				
Vaginal		66.41	1.85	62.78	70.03
Caesarean section (C-section)		33.59	1.85	29.97	37.22
Mother's pre-pregnancy BMI category	1712				
Underweight		6.99	1.02	4.99	8.99
Normal weight		44.02	1.95	40.19	47.84
Overweight		25.54	1.75	22.11	28.97
Obese		23.45	1.70	20.12	26.78
Mother's BMI at delivery	1712				

Underweight		3.26	0.73	1.84	4.69
Normal weight		11.05	1.20	8.71	13.40
Overweight		28.18	1.75	24.75	31.61
Obese		57.50	1.94	53.70	61.30
Mental health -- depressed since birth	1697				
Never		39.11	1.95	35.28	42.94
Rarely		33.12	1.85	29.48	36.75
Sometimes		19.92	1.54	16.89	22.95
Often/almost always		5.93	0.92	4.12	1.74
Always		1.92	0.58	0.78	3.07
Mental health -- no interest since birth	1694				
Never		44.36	1.97	40.49	48.23
Rarely		29.27	1.78	25.77	32.74
Sometimes		16.60	1.48	13.69	19.50
Often/almost always		6.75	0.98	4.83	8.67
Always		3.03	1.74	1.59	4.48
HCW talked about bf during prenatal visit	1676				
Yes		12.28	1.24	9.85	14.72
No		87.72	1.24	85.29	90.15
Pre-pregnancy health insurance coverage	1600				
No insurance		22.62	1.74	19.21	26.03
Medicaid		18.52	1.71	15.16	21.88
Non-Medicaid insurance		58.86	2.04	54.87	62.86
Prenatal health insurance coverage	1658				
No insurance		5.07	0.93	3.24	6.90
Medicaid		46.35	2.01	42.41	50.30
Non-Medicaid insurance		48.58	2.00	44.66	52.49
Current health insurance coverage	1664				
No insurance		16.33	1.52	13.32	19.28
Medicaid		31.51	1.92	27.74	35.29
Non-Medicaid insurance		52.19	2.00	48.27	56.10
Had any alcoholic drinks, past 2 years	1704				
No		30.34	1.86	26.68	33.99
Yes		69.66	1.86	66.00	73.32
Alcoholic drink 3 months before pregnancy	1696				
No		41.11	1.97	37.25	44.97
Yes		58.89	1.97	55.03	62.75
Alcoholic drink last 3 months of pregnancy	1699				
No		91.59	1.10	89.42	93.76
Yes		8.41	1.10	6.24	10.58
Smoke at least 1 cig in last 2 yrs	1697				
No		75.25	1.72	71.88	79.63
Yes		24.75	1.72	21.37	27.12

Smoke 3 months before pregnancy	1692				
No		77.56	1.68	74.27	80.85
Yes		22.43	1.68	19.16	25.73
Smoke last 3 months of pregnancy	1694				
No		91.27	1.14	89.03	93.51
Yes		8.73	1.14	6.49	10.97
Smoke now	1693				
No		85.88	1.14	89.09	88.67
Yes		14.12	1.14	11.33	16.91

TABLE 5.4 DESCRIPTIVE BABY					
BABY CHARACTERISTICS	n	%	SE	95% Confidence Limits for Percent	
Length of baby's hospital stay	1251				
<1 days		1.79	0.53	0.74	2.83
1-5 days		90.59	1.07	88.50	92.69
6-14 days		4.06	0.74	2.60	5.52
>14 days		3.56	0.61	2.37	4.75
Admitted in the NICU at birth	1249				
No		88.41	1.23	86.00	90.81
Yes		11.59	1.23	9.19	14.00
Infant alive now	1210				
No		0.01	0.01	0.00	0.03
Yes		99.98	0.01	99.97	100.00
Infant living with mom	1209				
No		0.34	0.23	0.00	0.79
Yes		99.67	0.23	99.21	100.00

TABLE 5.5 BIVARIATE ANALYSIS - MATERNAL CHARACTERISTICS				
	BREASTFEEDING DURATION ≥10 WEEKS			
MATERNAL CHARACTERISTICS	n	%	SE	p value α= 0.05
Maternal county designation	1370			<.0001
Maternal urban		62.68	2.26	
Maternal rural		33.42	6.28	
Maternal race/ethnicity	1367			0.0267
White		61.85	2.62	
Black		47.77	5.03	
Other		65.50	9.54	
Hispanic		67.55	6.28	
Maternal age group	1370			<.0001
<20 years		12.26	4.46	
20-29 years		45.19	2.73	
30+ years		57.12	3.01	
Marital status	1368			<.0001
Married		69.67	2.49	
Unmarried with paternity acknowledgement		46.91	4.86	
Unmarried without paternity acknowledgement		37.63	5.73	
Maternal education/highest degree	1364			<.0001
Less than high school		42.19	5.87	
High school diploma/GED		51.04	5.55	
Some college/no degree		55.41	4.32	
College degree		71.82	2.91	
At or below 100% of poverty	1273			<.0001
No		42.75	4.34	
Yes		66.31	2.54	
WIC recipient during pregnancy	1359			<.0001
No		68.99	2.64	
Yes		47.31	3.46	
Mother's pre-pregnancy BMI category	1370			0.0147
Underweight		67.26	7.53	
Normal weight		64.68	3.17	
Overweight		58.42	4.41	
Obese		47.81	4.54	
HCW talked about bf during prenatal visit	1340			0.0280
Yes		71.58	5.28	
No		57.93	2.39	
Pre-pregnancy health insurance coverage	1271			0.0005

No insurance		56.47	4.93	
Medicaid		42.03	5.76	
Non-Medicaid insurance		66.02	2.72	
Prenatal health insurance coverage	1325			<.0001
No insurance		63.28	9.76	
Medicaid		45.09	3.51	
Non-Medicaid insurance		71.77	2.72	
Current health insurance coverage	1327			<.0001
No insurance		53.21	5.67	
Medicaid		42.82	4.27	
Non-Medicaid insurance		71.11	2.68	
Smoke at least 1 cig in last 2 yrs	1359			0.0056
No		62.71	2.47	
Yes		48.51	4.52	
Smoke 3 months before pregnancy	457			0.0832
No		66.89	4.74	
Yes		45.82	5.68	
Smoke last 3 months of pregnancy	1356			0.0078
No		62.62	2.45	
Yes		48.47	4.76	
Smoke now	1355			0.0004
No		62.68	2.32	
Yes		39.35	6.1	

TABLE 5.6 BIVARIATE ANALYSIS - HOSPITAL STEPS/ CHARACTERISTICS				
HOSPITAL	BREASTFEEDING DURATION ≥10 WEEKS			
	n	%	SE	p value α= 0.05
Hospital location	1370			0.0134
Urban		60.92	2.25	
Rural		40.62	7.88	
Hospital labelled baby-friendly	1370			0.6400
No		58.81	2.36	
Yes		61.70	5.66	
Staff gave info about breastfeeding	1370			0.3899
No		50.67	10.39	
Yes		59.65	2.22	
Baby stayed in same room as mom	1367			0.0201
No		47.47	5.40	
Yes		61.07	2.37	
Staff helped mom learn how to breastfeed	1367			0.1203
No		66.71	5.13	
Yes		57.62	2.39	
Breastfed baby in the 1st hour of birth	1367			0.0028
No		48.49	4.26	
Yes		63.15	2.50	
Baby fed only breast milk	1365			<.0001
No		37.33	3.49	
Yes		73.21	2.45	
Staff told mom to breastfeed baby on demand	1353			<.0001
No		39.89	5.16	
Yes		63.11	2.34	
Staff gave phone # to call for help with breastfeeding	1363			0.0007
No		51.60	3.18	
Yes		66.29	2.91	
Hospital staff did not give baby a pacifier	1363			0.0072
No		44.89	5.89	
Yes		61.66	2.32	
Hospital meets all 8 steps	1364			<.0001
No		54.24	2.54	
Yes		74.80	3.88	

TABLE 5.7 MULTIVARIATE ANALYSIS HOSPITAL				
HOSPITAL	BREASTFEEDING DURATION ≥10 Weeks			
MODEL 1 HAS DURATION AND HOSPITAL VARIABLE	MODEL 1		MODEL 2	
MODEL 2 INCLUDES DURATION, HOSPITAL, AND MOTHER DEMOGRAPHIC VARIABLES.	OR	p value α= 0.05	OR	p value α= 0.05
MODEL 1: N=1712 USED=1332 NO=588 YES=744 MISSING= 380				
MODEL 2: N=1712 USED 1299 NO=570 YES=729 MISSING=413				
HOSPITAL DESIGNATION	0.48	0.0570	0.88	0.8129
Step 3: provide information regarding breastfeeding benefits/management	1.40	0.5657	1.49	0.5285
Step 4: breastfeed within hour of birth.	0.84	0.5261	0.77	0.3848
Step 5: show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.	0.38	0.0006	0.41	0.0031
Step 6: give newborn infants no food or drink other than breast milk unless medically indicated.	4.19	<.0001	4.56	<.0001
Step 7: practice rooming in - allow mothers and infants to remain together - 24 hours a day.	1.05	0.8868	1.38	0.3595
Step 8: encourage breastfeeding on demand.	2.06	0.0051	1.56	0.1223
Step 9: give no artificial teats or pacifiers	1.27	0.2633	1.18	0.4854
Step 10: foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.	1.57	0.1577	0.77	0.2350

TABLE 5.8 MULTIVARIATE ANALYSIS MATERNAL DEMOGRAPHICS				
MATERNAL DEMOGRAPHICS	BREASTFEEDING DURATION ≥10 Weeks			
MODEL 1: INCLUDES DURATION AND MOTHER'S VARIABLES	MODEL 1		MODEL 2	
MODEL 2 INCLUDES DURATION, HOSPITAL, AND MOTHER DEMOGRAPHIC VARIABLES.	OR	p value α= 0.05	OR	p value α= 0.05
MODEL 1: N=1712 USED=1332 NO=588 YES=744 MISSING= 380				
MODEL 2: N=1712 USED =1333 NO=584 YES=749 MISSING= 379				
Maternal county designation	0.36	0.0020	0.35	0.0305
Maternal race/ethnicity				
Maternal race/ethnicity White vs Black	0.98	0.9530	0.71	0.2441
Maternal race/ethnicity Hispanic vs Black	1.50	0.3500	1.34	0.5382
Maternal race/ethnicity Other vs Black	1.25	0.6680	1.91	0.2457
Maternal age group				
Maternal age group <20 years vs 30+ years	0.50	0.0060	0.18	0.0014
Maternal age group 20-29 years vs 30+ years	1.04	0.5040	1.15	0.5533
Marital status				
Unmarried with Paternity Acknowledgement vs married	0.53	0.1140	0.66	0.1553
Unmarried without Paternity Acknowledgement vs married	0.39	0.0250	0.48	0.0350
Maternal education/highest degree				
Less than high school vs college degree	0.42	0.1690	0.78	0.5521
High school diploma/GED vs college degree	0.54	0.1790	0.60	0.1456
Some college/no degree vs college degree	0.56	0.3850	0.96	0.8851
At or below 100% of poverty				
100% of poverty missing vs no	1.15	0.3400	1.71	0.2433
100% of poverty yes vs no	0.80	0.7490	0.92	0.7795
WIC recipient during pregnancy				
WWIC recipient during pregnancy no vs yes	1.10	0.3620	1.56	0.5941
Mother's pre-pregnancy BMI category				
Underweight vs normal weight	1.77	0.4630	1.34	0.5179
Overweight vs normal weight	0.84	0.1470	0.63	0.0883
Obese vs normal weight	0.56	0.0080	0.69	0.1873
Mental health -- depressed since birth				
Rarely/sometimes vs never	0.81	0.6490	0.98	0.9436
Almost always/always vs never	0.61	0.2060	0.65	0.3710
Mental health -- no interest since birth				
Rarely/sometimes vs never	1.24	0.4660	1.10	0.7289
Almost always/always vs never	0.80	0.5430	0.63	0.2364

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CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

Health care providers have a role to play in breastfeeding rates among women. The mother and infant's experiences with hospital staff before, during, and after delivery may be associated with the mother's decision to initiate breastfeeding in the hospital as well as how long she continues to breastfeed after discharge. It is important to understand this relationship and the associated results.

PURPOSE OF THE STUDY

The purpose of this study was to investigate whether hospital practices are associated with increased rates of breastfeeding initiation and duration. We investigated if these practices differ by race and therefore breastfeeding rates. We defined breastfeeding broadly. We defined it as "feeding infant breast milk, whether at the breast, or expressed and fed through a bottle."

Hospital practices were defined as hospital staff practices listed in the *Ten Steps to Successful Breastfeeding*. We used eight of the ten steps of the *Ten Steps to Successful Breastfeeding*. We used the STEPS as our standard to compare hospital practices and their breastfeeding initiation and duration rates. We investigated the initiation and duration rates of all hospitals in South Carolina who had a delivery from 2013-2015 whether they have a baby friendly designation.

The goal of our analysis was to investigate how hospital staff practices are experienced by mother and infant and how these practices are associated with increased

initiation rates and longer breastfeeding duration. We also investigated whether these practices varied based on mothers' demographics. Our analysis answered the question regarding if these results would vary by race.

We focused on breastfeeding duration rates and whether hospital practices, also known as hospital STEPS, are associated with these rates. We have examined if different races experience these practices at different rates which then is associated with the breastfeeding initiation and duration rates of those races.

SUMMARY OF FINDINGS

Analyzing data from the SC PRAMS from 2013-2015 found that an estimated 92.63% of the women initiated breastfeeding in the hospital. Of those that initiated breastfeeding they continued to breastfeed an average of 8.11 weeks. The majority of hospitals, 92.14%, were located in urban areas. Of the mothers, 59.47% were non-Hispanic White, 52.56% of the mothers were 20-29 years of age, 59.77% of the women were married, and 64.24% at or below 100% of the Poverty Line. The mothers who had a college degree 41.12% and 47.08% of mother were not WIC recipients.

Hospital Steps that were experienced by mothers were as follows:

- Step 3: Staff gave information about breastfeeding (95.60%).
- Step 4: Mom breastfed baby in the first hour after birth (74.30%).
- Step 5: Staff helped mom learn how to breastfeed (81.74%).
- Step 6: The baby was fed only breast milk (62%).
- Step 7: Baby stayed in the same room as mom (86.48%).
- Step 8: The staff told mom to breastfeed the baby on demand (81.69%).
- Step 9: Hospital staff did NOT give baby a pacifier (51%).
- Step 10: Mom given a number to call for help with breastfeeding after discharge (85.9%).

Hypothesis 1: Hospital STEPS/Practices and Breastfeeding Initiation

The hypothesis for Study 1 is that respondents who were exposed to the eight Steps relating to hospital staff practices; Step 3: Hospital staff helped mom learn how to breastfeed; Step 4: Mother breastfed in the first hour after baby was born; Step 5: Hospital staff gave mother information about breastfeeding; Step 6: Baby was fed only breastmilk in the hospital; Step 7: Baby stayed in same room as mom at hospital; Step 8: Hospital staff told me to breastfeed whenever my baby wanted; Step 9: Hospital staff did not give baby a pacifier; and Step 10: The hospital gave me a telephone number to call for help with breastfeeding; are more likely to have initiated breastfeeding than those who were not exposed to the eight Steps relating to hospital staff practices.

1a. African-American women are the least likely to have been exposed to the eight Steps relating to hospital staff. 1b. Of those who were exposed to the eight Steps, African-American women are the least likely to have initiated breastfeeding in comparison to other races.

*Multivariate Analysis Unadjusted Models 1
Hospital Practices/STEPS – Model 1a Initiation and All 8 Steps*

The unadjusted model only analyzed initiation and all eight STEPS of hospital staff practices and did not include mothers' demographics. The hospital county designation whether rural or urban was found to be significant (OR 0.37, $p=0.0407$). We found that breastfeeding initiation was significantly associated with six of the eight Steps defining hospital staff practices. These include: STEP 3 - Provide information regarding breastfeeding benefits and management (OR 4.66, $p=0.0062$); STEP 4 - Breastfeed within the first hour of birth, skin-to-skin contact (OR 18.85, $p<.0001$); STEP 5 - Hospital staff show mothers how to breastfeed, and how to maintain lactation even if they

should be separated from their infants (OR 3.26, $p=0.0019$); STEP 6 - Staff did not give infants food or drink other than breast milk unless medically indicated (OR 4.41, $p=0.0002$); STEP 7 - Hospital practiced rooming in which allows mothers and infants to remain together – 24 hours a day (OR 2.30, $p=0.0387$); and STEP 8 - Hospital staff encouraged breastfeeding on demand (OR 5.25, $p<.0001$).

*Multivariate Analysis Hospital Practices Adjusted Model
Model 2 Initiation and All Independent variables*

This multivariate analysis is the adjusted model that analyzed initiation and all eight Steps of hospital staff practices while including all covariates. The covariates included where mother's county designation/urban or rural; mother's race/ethnicity; mother's age group; mother's marital status; mother's education/highest degree level obtained; at or below 100% of poverty level, mother's WIC recipient during pregnancy; mother's pre-pregnancy BMI category; and mental health status – depressed, no interest since birth.

In the adjusted model, again six of the eight Steps were significantly associated with the mothers' initiation of breastfeeding. In the adjusted model, hospital county designation was no longer significantly associated to initiation (OR 0.38, $p=0.1034$) nor was mother's county designation (OR 1.13, $p=0.8585$).

Regarding hospital practices, the adjusted odd-ratios are the following: STEP 3 - the odds of initiating breastfeeding among mothers who received information regarding breastfeeding were 6.43 times higher than those of mothers who did not (OR 6.43, $p=0.0011$). The odds of initiating breastfeeding among mothers who breastfeed within the first hour of birth, (STEP 4) were 28.12 times higher than those who did not receive STEP 4 (OR 28.12, $p<.0001$). The odds of initiating breastfeeding among mothers who

had hospital staff show them how to breastfeed, and how to maintain lactation (STEP 5) were 4.31 times higher than those who were not shown how to breastfeed (OR 4.31, $p=0.0006$). The odds of initiating breastfeeding among mothers who the staff did not give their infants food or drink other than breast milk (STEP 6) were 4.91 times higher than those mothers who's infants were fed supplemental food (OR 4.91, $p<.0001$). The odds of initiating breastfeeding among mothers who were allowed to room with infant – 24 hours a day (STEP 7) were 3.14 times higher than those who did not room in (OR 3.14, $p=0.0057$). The odds of initiating breastfeeding among mothers that hospital staff encouraged breastfeeding on demand (STEP 8) were 6.56 times higher than those who did not receive STEP 8 (OR 6.56, $p<.0001$).

The mother's demographics that mother's race/ethnicity was found to be significant with breastfeeding initiation (OR 0.37, $p=0.0272$). The odds of initiating breastfeeding among Black mothers were lower in comparison to other races. Mothers' marital status was significantly associated with breastfeeding initiation (OR 0.23, $p=0.0100$). The odds of initiating breastfeeding among unmarried mothers without paternity acknowledgement were lower than married mothers. Mother's pre-pregnancy BMI was significantly associated with initiation. The odds of mothers others with a normal pre-pregnancy BMI were 5.53 higher than mothers who did not have normal pre-pregnancy BMI (OR 5.53, $p=0.0244$). These are the only mother demographics that were significantly associated with breastfeeding initiation when all were included in the full weighted model.

Hypothesis 2: Hospital STEPS/Practices and Breastfeeding Duration

The hypothesis for Study 2 was that respondents who were exposed to the eight Steps relating to hospital staff practices; Step 3: Hospital staff helped mom learn how to breastfeed; Step 4: Mother breastfed in the first hour after baby was born; Step 5: Hospital staff gave mother information about breastfeeding; Step 6: Baby was fed only breastmilk in the hospital; Step 7: Baby stayed in same room as mom at hospital; Step 8: Hospital staff told me to breastfeed whenever my baby wanted; Step 9: Hospital staff did not give baby a pacifier; and Step 10: The hospital gave me a telephone number to call for help with breastfeeding; are more likely to have initiated breastfeeding in the hospital and have longer breastfeeding duration than those who were not exposed to the eight Steps relating to hospital staff practices.

2a. Of those who were exposed to the eight Steps relating to hospital staff practices, African-American women are the least likely to breastfed ≥ 10 weeks in comparison to other races.

Multivariate Analysis Unadjusted Model 1: Hospital Practices– Model 1 Duration for ≥ 10 weeks and All 8 Steps

We included in model, all of the hospital steps and the outcome of interest, duration. These results were unweighted due to the fact that mother's demographics were not included. Our investigation determined there were three (3) of the eight STEPS were significantly associated with the mothers' duration rate of interest. Once all of the practices were added into the model, the hospital designation was no longer significant but it was very close (OR 0.48, $p = 0.0570$). The three practices that were found to have a significant association with breastfeeding duration of ≥ 10 weeks were; STEP 5 - Hospital staff show mothers how to breastfeed, and how to maintain lactation even if they should

be separated from their infants (OR 0.38, $p=0.0006$); STEP 6 - Staff did not give infants food or drink other than breast milk unless medically indicated (OR 4.19, $p<0.0001$); Hospitals that did not give infant anything but mothers' breastmilk had mothers who were 4.19 times more likely to breastfeed ≥ 10 weeks than facilities that did not have this practice; and STEP 8 - emphasis was on encouraging mothers to breastfeed on demand (OR 2.06, $p=0.0051$). When mothers were encouraged to breastfeed on demand the mothers were 2.06 times more like to breastfeed ≥ 10 weeks than facilities that did not have this practice.

*Multivariate Analysis Hospital Practices Adjusted Model 2
Duration and All Independent Variables and Covariates*

This full model includes breastfeeding duration, all eight hospital practices, and co-variates. When adding mothers' demographics to the model the hospital location is no longer significant, however mothers' county of residence was significantly associated with duration of ≥ 10 weeks. The mother's county of residence, was significantly associated with breastfeeding duration of ≥ 10 weeks (OR 0.348, $p=0.0305$). Mothers who were located in urban counties were more likely to meet the breastfeeding duration of ≥ 10 weeks than those who lived in rural counties.

When analyzing the data regarding whether mothers breastfed for ≥ 10 weeks, there were three (3) STEPS significantly associated with breastfeeding duration. Regarding breastfeeding duration for ≥ 10 weeks, the first one, STEP 5 - The odds of breastfeeding for ≥ 10 weeks among mothers who were shown how to breastfeed were lower than those who were not shown how to breastfeed (OR 0.41, $p=0.0031$). The second, STEP 6 - the odds of breastfeeding for ≥ 10 weeks among mothers in facilities that only gave their infants' mothers' breastmilk, the mothers were 4.55 times higher than

those in facilities that supplemented mother's breast milk (OR 4.55, $p < 0.0001$). The third, STEP 8 - the odds of breastfeeding for ≥ 10 weeks among mothers who were encouraged to breastfeed whenever baby wanted were 2.06 times higher than those whose babies were put on a schedule (OR 2.06, $p = 0.051$).

The mother's county of residence, was significantly associated with breastfeeding duration of ≥ 10 weeks. The odds of breastfeeding for ≥ 10 weeks among mothers who were located in rural counties were lower than those who lived in rural counties (OR 0.348, $p = 0.0305$).

Mother's race/ethnicity with Black being the reference group was significantly associated with breastfeeding duration of ≥ 10 weeks. The odds of breastfeeding for ≥ 10 weeks among Black women was lower than White women (OR 0.37, $p = 0.0272$). Marital status was determined to be significantly associated with duration of ≥ 10 weeks. The odds of breastfeeding for ≥ 10 weeks among unmarried women without paternity acknowledgement was lower than married women (OR 0.23, $p = 0.0100$). Mothers' age group was found to be significant with breastfeeding duration of ≥ 10 weeks. The odds of breastfeeding for ≥ 10 weeks among mothers who were < 20 years old were lower than mothers who were 30+ years (OR 0.18, $p = 0.0014$).

DISCUSSION

In this study, in the unweighted model, there were significant associations with mother's breastfeeding initiation and hospital practices. There were significant associations with mother's breastfeeding duration and hospital practices as well. Hospital practices, defined using the *Ten Steps to Successful Breastfeeding*, were found to have a significant association with breastfeeding initiation and duration in the hospital. When

covariates were added to the weighted model, the hospital practices remained significant.

Strengths of the Study

Some strengths of this study were that we utilized PRAMS data in running the study analysis. The PRAMS data source is population-based data unique to South Carolina. The data are generalizable to the entire state of South Carolina mothers who delivered in a hospital. Respondents were randomly selected and the data were then weighted. PRAMS survey is comprehensive and elicits responses for multiple health behaviors, characteristics, demographics, relationships, and life experiences. The PRAMS survey is also linked to the birth certificate data and provides information for mother and infant.

Additionally, we specifically analyzed hospital staff practices with mother and baby. This provided insight into the experiences of mothers and babies in hospital settings in South Carolina. These practices were then evaluated to see the association with initiation and duration rates. This type of analysis is very valuable in guiding hospital policies and procedures in an attempt to provide services that help facilitate initiation and longer duration rates of its patients.

Limitations of the Study

There are also limitations with this study. One limitation is that only mothers who stated that they initiated breastfeeding in the hospital were asked the questions regarding hospital practices. We did not have the data for those mothers who stated that they did not initiate breastfeeding in the hospital. This missing data would

help explain the hospital practices that these respondents experienced to help explain why they chose not to breastfeed in the hospital.

The limitation regarding mothers self-reported the responses to the survey. With this, there may be a level of recall bias. Although there is a risk for recall bias, the surveys are sent to mothers two months after delivery minimizing recall bias but it still may exist. From the responses women gave to whether they breastfed in the hospital, it was clear that some did not follow the instructions of the survey. Those who stated that they did not breastfeed in the hospital were directed to skip the question regarding hospital practices. However, there were still some mothers who answered those questions that then again state that they did not breastfeed in the hospital. Due to the fact that this question was asked again, these women were then captured and we were able to analyze their responses.

CONCLUSION

Studies have shown that mother's demographics were significantly associated with the health behavior of breastfeeding initiation as well as duration. Our study supports these findings however they do not show to have an association strong enough to change the significance of the association of hospital practices and mother's initiation and duration rates. The hospital practices that were significantly associated with breastfeeding initiation and duration continued to be significant regardless of mother's race, marital status, education, poverty level, BMI, or mental health status.

Hospitals that would like to increase their breastfeeding initiation and duration rates can implement policies that are significantly associated with both health behaviors. Although it is best to implement all STEPS of the *Ten Steps to Successful Breastfeeding*,

we have determined that there are three STEPS that are significantly associated with both breastfeeding initiation and duration. Those hospital STEPS are STEPS 5 Hospital staff show mothers how to breastfeed, STEPS 6 Staff did not give infants food or drink other than breast milk, and STEP 8 Staff encouraged breastfeeding on demand.

The first one, where hospital staff show mothers how to breastfeed STEP 5 initiation (OR 4.31, $p=0.0006$) and duration (OR 0.41, $p=0.0031$). The second one was that staff did not give infants food or drink other than breast milk STEP 6 initiation (OR 4.41, $p=0.0002$) and duration (OR 4.55, $p<0.0001$). The third was that staff encouraged breastfeeding on demand STEP 8 initiation (OR 5.25, $p<0.0001$) and duration (OR 1.82, $P=0.0130$). Hospitals can maximize their breastfeeding efforts by implementing at least three of the 10 STEPS.

Recommendations

Specific policies are needed at the global level, federal, state, local, and organizational levels that would reinforce utilizing the *Ten Steps to Successful Breastfeeding*. Our results support hospitals implementing specific policies aimed at incorporating Steps 3-8. All of the eight Steps have been shown to have a significant association with breastfeeding initiation. This is important because mothers have to first initiate breastfeeding for there to be any chance to address lengthening breastfeeding duration. If organizations systematically implement policies and procedures that support healthy breastfeeding behaviors, our study has shown that these efforts are associated with increased rates of breastfeeding.

We would also suggest that, as our research shows, there are hospital practices that are significantly associated with duration as well. Those activities that were

determined to be significantly associated with duration, were also significantly associated with initiation. For those hospitals or other health facilities that may be initiating programs to help facilitate breastfeeding health behaviors, we would suggest implementing systematic policies and procedures focusing on these behaviors. We argue that this will help increase both initiation and duration with minimal initial changes. Our recommendation would be to continue to implement the remainder of the steps that have been shown to increase initiation rates alone. Although the remaining Steps have not shown to be significantly associated with duration, they are still activities that could benefit those mothers that do initiate.

Directions for Future Research

Our findings suggest that there is future research needed to capture the hospital experiences of all mothers that deliver in the hospital. In the PRAMS dataset, due to the flow of the questions, the majority of mothers who did not initiate breastfeeding in the hospital, their data regarding hospital staff's behaviors with them and their infant are not captured. We are missing the data that defines the characteristics of those mothers.

More research is needed regarding African-American women and what they are experiencing which may continue to hinder both their initiation and duration breastfeeding practices. There has been research on African-American women and breastfeeding practices, but more needs to be done to explore how hospital staff can help facilitate these practices and how to address obstacles that hinder breastfeeding continuation.

Another interesting area that we were unable to explore in this study was the issue of exclusive breastfeeding. The data did not provide an answer to whether the infant was

only breastfed. Breastfed was defined as feeding at the breast or providing breastmilk through a bottle. This question was only asked regarding the time the mother was in the hospital. The data do not provide information regarding exclusive breastfeeding after the mother has returned home. The survey only addresses the length of time the mother breastfed. Additional research is needed to understand what the feeding practices were during the continuation once discharged.

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