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Voices of low SES women overcoming breastfeeding barriers: A qualitative analysis and model development

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To the Graduate Council:

I am submitting herewith a thesis written by Lacey Mc Donough Raburn entitled "Voices of low SES women overcoming breastfeeding barriers: A qualitative analysis and model development." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

Katherine F. Kavanagh, Major Professor

We have read this thesis and recommend its acceptance:

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(Original signatures are on file with official student records.)

Voices of low SES women overcoming breastfeeding barriers: A qualitative analysis and model development

A Thesis Presented for the

Master of Science

Degree

The University of Tennessee, Knoxville

Lacey McDonough Raburn

December 2011

Abstract

Background: Breast milk provides optimal nutrition for most infants for a specific amount of time. In spite of well-accepted benefits associated with breastfeeding, both for infants and mothers, rates among low-income women remain consistently low.

Objective: The objective of this study was to identify what motivates women, who are at a high risk of not initiating breastfeeding or early weaning, to establish a successful breastfeeding relationship.

Methods: Mothers meeting the eligibility criteria of having no more than a high school degree, being low-income, and having breastfed for ≥ 3 weeks, completed an in-depth telephone interview. Using grounded-theory methodology, researchers developed a theoretical model describing the experience of this population.

Results: Though recruitment was ongoing for over a year, with 212 mothers screened for eligibility, only seven mothers were eligible and completed study activities. Based on analysis of interview transcripts, a theoretical model was developed.

Conclusions: Mothers who breastfeed despite being high-risk for not breastfeeding may be motivated by the perception that breastfeeding is easier than formula feeding and comforting. In addition, the breastfeeding relationship may be protected by the services offered by WIC, which may be amplified by the mother's own determination. A lack of experienced barriers and the act of bed-sharing may also assist with breastfeeding duration. The researchers hypothesize that, as barriers are experienced that are beyond the perceived control of WIC services, the mother's level of stress may increase, increasing the likelihood of weaning. Future research

should test the proposed model and determine specific messages targeting this at-risk population.

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PART I – Introduction Literature

Review

Breast milk is the best nutrition for most infants, especially in the first 6 months of life, and then when combined with other foods for up to and beyond 2 years of age.¹ It confers a variety of benefits to both mothers and infants.² Because the magnitude and duration of breastfeeding influences the extent of many of these benefits, it is important to define terminology prior to discussion of the benefits of breastfeeding.

Breastfeeding Terms

Initiation of breastfeeding occurs when a mother breastfeeds an infant, either from the breast or with expressed breastmilk.³ This can be the beginning of a lasting breastfeeding relationship, but also describes the mother who breastfeeds one or two times before weaning the infant.

Duration of breastfeeding indicates the length of time that a mother maintains the breastfeeding relationship; this can be for only a few days or as long as a few years. *Exclusive breastfeeding* is defined as the infant receiving no other liquids or solids, whereas *full breastfeeding* refers to the infant receiving mostly breastmilk in addition to infrequent supplements such as water, traditional teas, herbs, or formula. *Partial or token breastfeeding* defines a mother who provides a significant amount of formula to the infant daily and only breastfeeds occasionally.⁴ However, these definitions are not officially recognized by health agencies and are not consistently used among researchers or health care professionals.³ The differing definitions causes some confusion when evaluating studies.³ In addition, in order to increase sample size, and thus be able to conduct inferential statistics, and because exclusive

breastfeeding is relatively uncommon, often researchers will pool *exclusive* and *full breastfeeding* groups into one and present the results as “*any breastfeeding*”. This is important to note as, depending on the health outcome of interest, this classification may directly impact the ability to draw clear conclusions in many studies. It is for this reason that, for many health outcomes, there are relatively few studies available to review.

Breastfeeding and Health Outcomes

To have a clear understanding of how specific health outcomes are related to the magnitude and duration of breastfeeding, the literature reviewed here will be organized in close alignment with the definitions listed previously. Short and long-term health outcomes will be explored by *exclusive breastfeeding*, *combination feeding* (including partial and token breastfeeding), and *exclusive formula-feeding*.

Impact during First Year of Life

Risk of Mortality - In the first year of life, breastfeeding of any magnitude or duration can affect some health outcomes for infants. In a review by Ip et al, breastfeeding’s ability to decrease mortality is discussed at length.² To highlight one such finding, according to Chen and Rogan, initiation of breastfeeding has been shown to be protective against neonatal mortality.⁵ Chen and Rogan concluded that breastfeeding an infant in any amount for three months had a protective effect against postneonatal death compared to infants who were never breastfed (Adjusted OR 0.62). This conclusion was based on a nationally representative sample of 7,740 children surviving to one year of age and 1204 children who died before one year of age. These data represent children in the United States in 1988. To reduce the possibility of confounders,

the authors controlled for the mother's age, education level, Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) status and whether or not she smoked during her pregnancy. The authors also controlled for the infant's gender, race, birth weight, and whether there were any congenital malformations. The authors concluded that, assuming breastfeeding is causing the decrease in post-neonatal death, approximately 720 infants could be saved or delayed from death annually. They further hypothesize that the majority of these infants would be from at risk populations, such as infants born to mothers who are young, less educated or are eligible for WIC participation. This is an important note because this population has very low breastfeeding rates.⁶ The reduction in postneonatal death may be attributed to the protective effects of breastmilk against various infections and illnesses common to young infants. This would include respiratory, gastrointestinal and ear infections along with some research that supports a protective effect against Sudden Infant Death Syndrome (SIDS).⁷ However, a limitation of this study was the impossibility of proving causality in the relationship. Because this was a cross-sectional, observational study design, these data cannot determine whether or not breastfeeding is the protective mechanism or if those who died were less likely to have been breastfed.

Similarly, a study conducted in Ghana followed 10,947 infants to determine whether early initiation of breastfeeding affected neonatal mortality.⁸ "Early initiation" was defined as the infant breastfeeding within one day of birth; "late initiation" was defined as the infant first breastfeeding one day after birth. Mothers with a live singleton birth were contacted and responded to questionnaires assessing infant feeding practices and infant health. Infants who died within 48 hours of birth were excluded to control for the possibility that a serious illness,

premature birth, or congenital abnormality may affect the infant's ability to breastfeed. The results showed that infants who were not breastfed within 24 hours of birth had a significantly higher risk of neonatal mortality compared to those who were breastfed within 24 hours ($P < .0001$). Breastfeeding magnitude was also related to infant mortality. Infants who were exclusively breastfed had a lower risk of mortality compared to those who were partially breastfed ($P < .0001$). To demonstrate the impact of these results, the authors calculated the percentage of infants who could be saved from death by the early initiation of breastfeeding; they propose that 22.3% of all neonatal deaths could be prevented by initiating breastfeeding within one hour of birth and that 16.3% could be saved by initiating breastfeeding within 24 hours.⁸

Rate of Hospitalization due to Infant Morbidity – In addition to decreasing the risk of neonatal mortality, breastfeeding has been linked to decreases in infant morbidity and specifically with decreases in hospitalization.⁹⁻¹⁰ One prospective cohort study, conducted in Spain, followed 1,385 infants for their first year of life to determine if breastfeeding would reduce the rate of hospitalization.⁹ Their results showed that for the first four months of the infant's life, full breastfeeding would prevent up to 56% of the hospitalization cases. For each additional month thereafter, 30% of the admissions could be avoided by continuation of full breastfeeding until the infant was six months of age, at which time it is recommended that the diet be supplemented with appropriate infant foods. Similar conclusions were found in a study, conducted in Israel, among mothers and infants who had undergone a caesarean section.¹¹ Studying a population of caesarean section births is of value because caesarean-delivered infants are at an increased risk for postneonatal morbidity.¹² The population consisted of a total

of 468 infants; of those, 352 were Jewish and 116 were Muslim. Due to substantial cultural differences in this population, the authors analyzed the outcomes of the two ethnic groups separately. The authors concluded that breastfeeding significantly reduced the risk of post-neonatal hospitalization in both the Jewish ($P=.003$) and Muslim ($P=.005$) groups. A reduction in hospitalization is important for many reasons; including decreased medical costs for families whose infants avoid being admitted to a hospital, overall decreased infant morbidity, and a decreased economic cost to society.¹³⁻¹⁶

Respiratory Infection – A common respiratory infection is the Respiratory Syncytial Virus (RSV). RSV is an infection occurring in the airways and lungs that affects many infants in the United States and worldwide.¹⁷ The Centers for Disease Control and Prevention (CDC) notes that most infants will have acquired RSV by age two.¹⁷ The subsequent infection may become severe in some infants and lead to further complications such as bronchitis, pneumonia and hospitalization. In a study of 203 infants who were less than 100 days old, those who were fully breastfed had a lower duration of hospitalization with RSV than those who were only breastfed occasionally or partially.¹⁸ Infants who were fully breastfed had an average hospital stay of 4.83 days compared to 6.27 and 7.80 days in the partial and token breastfed groups, respectively. The difference was significant between the occasionally breastfed ($n=43$) and fully breastfed ($n=88$) groups ($P= 0.020$), and tended toward significance in the partial ($n=71$) and fully breastfed groups ($P=0.052$). Also, when compared to infants who were only occasionally breastfed, fully breastfed infants had a significantly lower risk of needing oxygen therapy ($P=0.044$).

A meta-analysis, conducted by Bachrach et al, supports the conclusion that breastfeeding offers a protective effect against respiratory diseases in infancy.¹⁹ The authors identified 33 studies that reported on the risk of hospitalizations associated with lower respiratory tract diseases. All 33 studies reported a reduction of risk associated with breastfeeding. As the authors state, this is a “remarkable” finding for a meta-analysis.¹⁹ Of the 33 studies, seven were selected to be further analyzed due to consistent selection criteria, sample sizes, and study design. In the seven pooled cohort studies, infants who were not breastfed were three times more likely to be hospitalized due to a lower respiratory tract infection, compared to those who were breastfed exclusively for four months.

Gastrointestinal Infection – Breastfeeding also appears to be protective against gastrointestinal infection.² Though the “Bavarian Breastfeeding Study”, conducted in Germany in the year 2005, was primarily concerned with determining breastfeeding rates among mothers in Bavaria, the authors also report outcomes regarding gastrointestinal infection.²⁰ Nearly 2,000 mother/infant pairs (n=1,901) participated in the study. Subjects were divided into three groups based on the magnitude of breastfeeding. These groups were “exclusively breastfed for 6 months”, “partially breastfed for 6 months”, and “never breastfed”. The researchers found that infants in the exclusively breastfed group had a decreased risk of developing more than one gastrointestinal infection (Adjusted ORs 0.6) compared to infants in the other two groups who were partially breastfed for 6 months (Adjusted ORs 0.94) or did not receive breastmilk at all (reference group).²⁰

Sudden Infant Death Syndrome - In the years 1998 through 2001, a large, case-controlled, matched-pairs study was conducted in Germany to determine the effect of breastfeeding on cases of Sudden Infant Death Syndrome (SIDS)²¹. The researchers, Vennemann et al, analyzed 333 cases of SIDS and used 998 age-matched healthy infant controls to compare infant-feeding practices before the infant death or the time of the interview. The data indicated that “less than 50% of the SIDS cases were breastfed at age two weeks” compared to 83% of the control cases. At one month, 40% of the SIDS cases were exclusively breastfed compared to 72% of the control cases. During the month before the infant death, 10.2% and greater than 40% of infants were exclusively breastfed in the SIDS and control cases, respectively (aOR: 0.27). After controlling for potential confounders such as maternal age, family status, etc, the authors concluded that the risk reduction associated with breastfeeding was about 50% (OR: 0.42 and aOR: 0.69). The protective effect of breastfeeding appears to be for the duration of the breastfeeding relationship. This led the authors to conclude that breastfeeding should, at the very least, be continued through the first six months of life, at which point in time the risk of developing SIDS is reduced.²²

Risks Associated with Formula Feeding

Recently, researchers have also begun to change how data are presented in an attempt to shift away from the social “norm” of formula-feeding. Instead of touting the benefits of breastfeeding, some researchers are outlining the risks of formula-feeding.²³ This change in data presentation is of great historical significance due to the fact that research results often report risk reductions, or protective effects, of breastfeeding, but tend to imply that formula-

feeding is the norm and therefore carries no risks.²⁴ This frame of mind has led to the conclusion that formula feeding is inherently safe for infants, and breastfeeding is simply better, or something to strive for.²⁴ Yet, as new manuscripts emerge that re-frame previously analyzed data in such a way that breastfeeding is held as the norm, the results clearly show that exposure to varying amounts of formula can increase the risk of various negative health outcomes in infants.²³ For example, McNiel et al conducted a re-analysis, examining the effect of any formula use in infants and health outcomes from previously published studies identified through PubMed and the U.S. Agency for Healthcare Research and Quality (AHRQ).²³ Four studies were identified that examined the relationship between formula use and otitis media. The pooled OR indicated that infants who received any formula in the first three to six months were at double the risk of developing otitis media compared to those who were breastfed exclusively from three to six months.²³ Future research that investigates breastfeeding and infant health outcomes should continue to reframe conclusions that emphasize the risks associated with formula in order to change cultural perceptions that formula-feeding is safe and considered the “norm”.

Impact of Breastfeeding on Health Outcomes in Early Childhood

Using a nationally representative sample of 7,900 US infants, Hetzner et al studied the impact of different infant feeding patterns on common childhood illnesses including asthma, respiratory infection, gastrointestinal infection, and ear infection.²⁵ They assessed infant feeding patterns in the first six months of the infant’s life then determined the influence these patterns had on child illness up to two years of age. The results indicated a significant increase

in risk of developing a respiratory or ear infection for infants who were fed formula only ($P < .01$ for ear infection and $P < .05$ for respiratory infection), formula plus solid foods ($P < .01$), breastmilk plus solid foods ($P < .05$) and formula with solid foods and breastmilk ($P < .01$) with the reference group being those infants who were exclusively breastfed. This analysis included controls for child characteristics such as race, birth weight, gender, and family demographics such as income and education levels, child health, home environment, and the mother-child relationship.²⁵

Data collected by Oken et al showed a positive relationship between longer durations of breastfeeding and child development at 18 months.²⁶ The study was conducted in Denmark, from 1997 through 2002, and obtained data from over 25,000 women who gave birth during that time period. Mothers were interviewed at six and eighteen months postpartum to determine breastfeeding status. At that time, the mothers answered questions concerning the infant's developmental progress that focused on typical developmental milestones expected to occur at the ages of six and eighteen months. The researchers found that, compared to infants who were breastfed for less than one month, infants who were receiving any breast milk for greater than ten months achieved more developmental milestones by the interview at eighteen months (OR 1.28). This included controlling for confounders such as parent and child characteristics.²⁶

These studies indicate a positive impact on infant health, immunity, and development as a result of exposure to breast milk.

Long-term Benefits of Breastfeeding

Benefits conferred from breast milk to infants do not appear to be limited to the time before, or immediately after, weaning.²⁷ The World Health Organization (WHO) published a comprehensive review in 2007 examining published data on long term benefits of breastfeeding.²⁷ They studied the literature involving breastfeeding and long term outcomes such as blood pressure, serum cholesterol, overweight and obesity, type 2 diabetes, and intelligence and schooling.

Blood pressure - Long term evidence concerning blood pressure and breastfeeding is controversial. The WHO concluded from its analysis that there is a small, but significant negative relationship between breastfeeding and both systolic and diastolic blood pressure.²⁷ While the differences were small, the authors concluded that even a modest reduction in blood pressure could lower the prevalence of heart disease, hypertension and stroke for 6%, 17%, and 15% of the population respectively.²⁷ In 2004 Martin et al reached a similar conclusion when they conducted a meta-analysis using existing literature to evaluate the relationship between breastfeeding and blood pressure later in life.²⁸ Studies were identified using an online database and by the manual searching of reference lists; the search yielded 15 studies that qualified. The studies ranged in sample sizes, breastfeeding definitions, and the age of the child at follow-up. The mean systolic blood pressure among infants who were breastfed was 1.4mm Hg lower than those who were formula fed. The mean diastolic blood pressure was 0.5mm Hg less among breastfed infants compared to formula fed infants. There was no heterogeneity found between small and large sample size studies for diastolic blood pressure. A limitation of

this meta-analysis is that it is impossible to determine if the relationship is causal. However, the authors concluded that, should the relationship be causal, breastfeeding promotion may help lower blood pressure among a large population. Martin also emphasized that future studies should focus on identifying mechanisms responsible for the protective effect. In contrast, Owen et al found conflicting evidence in their review and concluded that the reported difference was more a product of publication bias rather than a true effect.²⁹ Future studies of sound design, long term follow-up, and large sample sizes are needed in this area of research.

Cholesterol – Similar results were found by Owen et al in a 2008 quantitative review of existing literature.³⁰ Seventeen studies were identified and data were collected from the original authors in thirteen of the studies. The authors were asked to provide information on exclusivity of breastfeeding, duration of breastfeeding, year of birth of the participants along with the data that were reported in their original publications. Once the data were collected, the researchers re-analyzed the data and controlled for potential confounders including age, socioeconomic status, BMI, and smoking status. Of the seventeen studies, seven reported on exclusive breastfeeding compared to formula-fed infants. Young adults who were exclusively breastfed for four to nine months during infancy had total cholesterol levels that were 8.1 mg/dL lower than those who were formula fed as infants. This decreased to a 3.8 mg/dl reduction in adults over the age of 50.³⁰ Normal total cholesterol levels for adults are less than 200 mg/dL, with greater than 240 mg/dL considered “High”.³¹ These findings were not influenced by confounders, publication bias, or sample size.³⁰ The authors note that, even though the reduction was modest, when applied to a population a small decrease in mean cholesterol levels could help avoid up to 5% of heart disease cases.

Overweight/Obesity – The meta-analysis conducted on breastfeeding and the risk of overweight and obesity also showed a small but significant risk reduction of breastfeeding.²⁷ Breastfeeding appeared to be protective of reducing risk of obesity, not overweight. Duration of breastfeeding did not affect the risk reduction.²⁷ However, a meta-analysis conducted by Harder et al reached the opposite conclusion.³² Seventeen studies were identified for the review after a search of databases and a manual search of reference lists. The authors found an inverse relationship between exclusive breastfeeding duration and the risk of overweight throughout childhood and, in two studies, early adulthood. This relationship was dose dependent, based upon the number of months the infant was exclusively breastfed. For infants who were exclusively breastfed for one month, the risk was 4% lower. At nine months, this risk was 30% lower among breastfed infants. While the authors concede that the mechanism behind this relationship is currently unclear, they do conclude that this evidence strongly supports breastfeeding promotion to decrease the risk of being overweight later in life.³²

Type 2 diabetes – While the WHO meta-analysis determined that data supporting the effect of breastfeeding and the development of type 2 diabetes later in life were sparse, and was unable to make a firm conclusion, a separate analysis conducted by Owen in 2006 found that breastfeeding was associated with lower risk of developing type 2 diabetes.^{27,33} His research team hypothesized that this could be a result of decreased blood insulin concentrations in breastfed populations which may affect glucose metabolism as infants age. However Owen cautions that confounders may play a large role in this difference and this field warrants further investigation before any conclusions can be derived.

Intelligence - The evidence concerning academic performance and intelligence due to breastfeeding is limited and inconclusive.^{27, 34} While the meta-analysis conducted by the WHO supported a positive association, they also conclude that teasing out confounders, such as parental education and other lifestyle factors, is very difficult if not impossible.²⁷ However, the meta-analysis conducted by Jain concluded that the evidence was unconvincing due to the poor quality of the studies.³⁴ Future studies should be conducted to confirm any existing relationship.

Though more studies are needed to validate some of the potential benefits of breastfeeding, the evidence overwhelmingly indicates that breastfeeding offers a variety of positive health benefits to infants that may continue throughout adulthood.

Impact on Maternal Health

Postpartum hemorrhage – Along with promoting infant health, breastfeeding also has a variety of protective effects for mothers.² Maternal postpartum hemorrhage is a growing health concern in the United States.³⁵ Callaghan et al reported an increase in incidence of postpartum hemorrhage from 2.3% to 2.9% from the years 1994 to 2006.³⁵ In 2001, Mattheison et al conducted a study that analyzed the effects of newborn hand movements and suckling while breastfeeding on maternal oxytocin production.³⁶ They concluded that during breastfeeding the infant can successfully stimulate oxytocin production which may decrease the likelihood of maternal postpartum hemorrhaging.³⁶ However, research in this field of study is sparse and future studies should be conducted to confirm this potential relationship.

Weight loss – The research conducted on weight loss during breastfeeding is conflicting and, at present, unclear.² In an evidence report compiled by Ip et al, the three studies identified that evaluated the effect of breastfeeding on postpartum weight loss arrived at different conclusions.² The first study³⁷ found a 1 kg weight increase among exclusively breastfeeding mothers while the two other studies³⁸⁻³⁹ showed a 1 kg weight loss from preconception weight and quicker return to preconception weight compared to women who did not breastfeed. Ip concludes that confounders such as socioeconomic status, BMI, diet, and ethnicity may contribute to postpartum weight loss or retention more so than breastfeeding; however, more research should be conducted before a conclusion can be reached.²

Type 2 Diabetes – Another protective effect is the inverse association between breastfeeding and the development of maternal type 2 diabetes. A retrospective, population-based study conducted by Schwartz et al found that among women who had given birth, those who have never exclusively breastfed their infant were at a higher risk of developing type 2 diabetes compared to those who had exclusively breastfed for greater than one month (OR 1.52).⁴⁰ This association remained even when the researchers controlled for BMI and physical activity, known contributors to the development of type 2 diabetes.

Cancer Risk - Longer duration of breastfeeding has been associated with a lower risk of mothers developing breast and ovarian cancer.^{2, 40} A case-control study conducted in Tunisia examined the relationship between breastfeeding and breast cancer.⁴⁰ The results indicated a significantly lower in risk of developing breast cancer among women who breastfed each child longer than 24 months (OR 0.46), had a cumulative duration of breastfeeding 73-108 months over their

lifetime (OR 0.65), or had a cumulative duration of breastfeeding greater than 109 months over their lifetime (OR 0.42).⁴⁰ In the evidence report for the AHRQ, six retrospective studies were identified that examined the relationship between breastfeeding for greater than 12 months and ovarian cancer.² The authors concluded that twelve months of cumulative duration of breastfeeding over a lifetime was associated with a decreased risk in the development of ovarian cancer (OR 0.72).² However, there is a need for prospective research in this field of study to clarify any potential relationships.

Impact on fiscal fitness of nation

In addition to tangible health outcomes, breastfeeding influences economic factors for both individual families and the nation as a whole.¹⁴⁻¹⁵ Wiemer submits that there are two types of factors that primarily contribute to the higher costs attributable to formula-feeding compared to breastfeeding.¹⁵ First, direct costs are those accrued from the cost of formula and fees associated with visits to a hospital or doctor's office as a result of the higher risk of infant morbidity. Second, indirect costs are those associated with lost wages that may occur if a parent must miss work to care for a sick infant. The USDA estimates that at least \$3.6 billion may be saved annually if exclusive breastfeeding rates increased to that of the Surgeon General's recommendations from 2001, which set the objective of initiation of breastfeeding at 75% and 50% of any breastfeeding at six months. These savings were calculated by combining estimates of these direct and indirect costs.¹⁵ Ball conducted an additional analysis focusing on the impact of never breastfeeding and health insurance costs.¹⁴ He concluded that not breastfeeding costs between \$331 and \$475 dollars per infant for health care systems in the

year 1999. His study only focused on health care costs associated with three common childhood illnesses: otitis media, lower respiratory illness, and gastrointestinal illnesses.¹⁴ Both authors conclude that breastfeeding promotion that increases breastfeeding rates could save substantial amounts of money for individuals, insurance agencies, and government-funded health care systems.¹⁴⁻¹⁵

Breastfeeding Recommendations

Due to the plethora of published data demonstrating the many benefits of breastfeeding, it is the position of the American Dietetic Association (ADA) that breastfeeding is a key factor in reducing infant morbidity and mortality along with maternal morbidity.⁴¹ The American Academy of Pediatrics (AAP) also summarizes the many benefits of breastfeeding and calls for pediatricians to “promote, support and protect breastfeeding enthusiastically”.⁴² It is for these reasons that the ADA, APA and the World Health Organization recommend exclusive breastfeeding until six months of age for infants.⁴¹⁻⁴³ At six months, appropriate foods should be added to the infant’s diet, and breastfeeding should continue to at least twelve months of age and ideally to two years old and possibly beyond.⁴¹⁻⁴³

Due to the critical importance of breastfeeding in the realm of public health, Healthy People 2020 identified objectives to “increase the proportion of infants who are breastfed.”⁴⁴ The specific objectives target increasing the percentage of mothers who had ever breastfed in the United States to 81.9%, those who continued to breastfeed at six months to 60.6% and until 12 months to 34.1%. Additional objectives target rates of exclusive breastfeeding at three months (46.2% of mothers) and at six months (25.5% of mothers). Some of these programs include

breastfeeding peer counselors provided by the WIC program, breastfeeding education by lactation consultants both pre- and postnatal, the Breastfeeding Promotion Act of 2011 that supports breastfeeding mothers in the workplace, and community-based interventions occurring in the hospital and at home.⁴⁵⁻⁴⁸ However, even with the aid of public health programs and initiatives, as of 2011 the breastfeeding goals of Healthy People 2020 were not being met.⁴⁹ Understanding populations that have chronically low breastfeeding rates along with high infant and maternal morbidity and mortality is an important key for developing programs that will improve breastfeeding rates and potentially assist with reaching the national goals for breastfeeding.

At-risk Populations

Large, population-based and culturally diverse studies have demonstrated that certain populations are at a higher risk for not initiating breastfeeding, for early weaning, and for formula supplementation.⁵⁰ In particular, low income mothers are less likely to breastfeed, for any duration, compared to mothers with higher incomes.⁵⁰ Mothers who have a lower education level or are not married are also less likely to breastfeed their infants, compared to mothers who are married or are college graduates.⁵⁰⁻⁵¹ Data from an additional study also suggest that mothers who participate in the WIC program are less likely to breastfeed as compared to women who are eligible but do not participate in WIC.^{50, 52} Zoil-Guest et al hypothesize that mothers participating in WIC may be “induced by the free infant formula provided”.⁵²

As mentioned, some populations of mothers are more or less likely to breastfeed their infants when compared to other populations. Data collected from the NHANES questionnaire and additional research supports this statement.^{6, 50, 52-54} One study conducted by Ryan et al examined the effect of regional location and likelihood of breastfeeding.⁵⁴ This was conducted using a nationally representative sample of 4.3 million expectant and new mothers responding to questions about infant feeding behaviors. The researchers divided the United States into four regions based on location. The results indicated that women in the Southern region including the South Atlantic, East South Central, and West South Central geographical regions were least likely to breastfeed compared to women in the other three regions comprised of the New England, North, and West regions. The Southern region had a breastfeeding initiation rate of 65.1% and the Western region had a statistically significant higher initiation rate of 81.3%. Among Southern mothers, those who were non-Hispanic black, younger than 20 years of age, and had only a grade school education were the least likely to initiate breastfeeding. In all but one of the regions, participating in the WIC program was associated with a lower likelihood of initiating breastfeeding. When examining the Southern states again, at six months the indicators for early cessation of breastfeeding included being of non-Hispanic black ethnicity, being less than thirty years old, having obtained only a high school education, working full time outside of the home and participating in WIC. These findings are consistent with data collected from the 2006 NHANES survey.⁶ While in 2006, 77% of mothers initiated breastfeeding in the hospital, this percentage drops to about 40% receiving any breastmilk at six months. The NHANES data also associated certain characteristics of mothers with not breastfeeding. Mothers who had a lower income and were younger were less likely to breastfeed compared to

mothers who had higher incomes and were older than 20 years of age. Therefore, it is critical to determine what barriers exist in these specific populations that deter them from breastfeeding more than other populations.

Barriers to Breastfeeding

Barriers to establishing a successful breastfeeding relationship are commonly divided into two phases: those associated with initiation and those associated with duration/exclusivity. A qualitative study conducted by Earle in the United Kingdom identified three potential areas that may affect initiation.⁵⁵ These included that infant feeding decisions are often made without consulting a healthcare professional, women are aware of the benefits associated with breastfeeding but this may not change their feeding decisions, and women may fear the loss of a certain degree of independence while breastfeeding and may want the father to play a greater role in infant feeding.⁵⁵

Another study examined the effect of pre-natal information on breastfeeding initiation and duration.⁵⁶ A prospective cohort study design was used to determine if women who felt like they needed more breastfeeding information before giving birth would breastfeed longer compared to women who did not feel like they needed more information before birth. The study was conducted in a New Zealand hospital and the study population consisted of 490 mothers who intended to fully breastfeed when they were asked at 20 to 24 weeks gestation. Each participant received four mailed questionnaires, the first at 20 to 24 weeks gestation to determine eligibility for further inclusion and to collect demographic information, one at 36 weeks gestation, one at 6 to 10 weeks postpartum, and another at 4 months postpartum.

Results from the questionnaire indicated that women who had higher education, were not low income, did not smoke, and had planned the pregnancy were significantly more likely to report intending to breastfeed. However, only women with a higher education were significantly more likely to be breastfeeding at six to ten weeks postpartum. Data collected at 36 weeks gestation concluded that mothers who had not had recent contact with small children and those who reported needing more breastfeeding information prenatally were significantly less likely to still be breastfeeding at six to ten weeks postpartum. At six to ten weeks postpartum, women who smoked, experienced breastfeeding problems, and delivered the infant via cesarean section were significantly less likely to be fully breastfeeding. The survey also assessed each mother's psychological state (via the General Health Questionnaire -12 (GHQ-12)) to determine the level of psychological symptoms the mother may be experiencing, such as stress. The results indicated that mothers with a higher GHQ-12 score were more likely to have stopped breastfeeding at the six to ten weeks time point. However, this cannot determine causality because it is impossible to say whether high levels of psychological symptoms caused the cessation of breastfeeding or whether cessation of breastfeeding induced a higher level of psychological symptoms. The results from the paper emphasize the importance of prenatal education to the success of the breastfeeding relationship. If mothers feel like they are ill-equipped and unprepared for breastfeeding, they are less likely to establish and to continue a breastfeeding relationship for the duration that they had intended. Also, these results indicate that a potential relationship may exist between psychological symptoms such as stress and depression and breastfeeding success.⁵⁶

In an article titled “Why do women stop breastfeeding? Findings from the Pregnancy Risk Assessment and Monitoring System”, Ahluwalia et al attempted to identify specific reasons women stopped breastfeeding.⁵⁷ The sample was taken from ten states and the method of data collection was a survey mailed between two and six months postpartum. The survey included questions on breastfeeding intentions, duration, and reasons for early cessation. There was also an open ended question that assessed why women did not initiate breastfeeding or why they stopped early. Of the mothers who did not initiate breastfeeding, the reasons cited included personal reasons, managing household responsibilities, multiple births, or mother was taking medication that was contraindicated with breastfeeding. Women who did initiate breastfeeding were divided into three sections: those who stopped breastfeeding at less than one week, those who stopped between one and four weeks, and those who stopped after four weeks. Within all three groups the two main reasons mothers reported for early cessation of breastfeeding were 1) perceived insufficient milk supply and 2) the perception that the infant was not being satisfied with the breast milk. The other results varied between the first two groups of mothers who stopped before four weeks and the last group of mothers who stopped after four weeks. In the first two groups, two common reasons for early weaning included that 1) the infant experienced difficulty with breastfeeding, and 2) the mother experienced issues such as sore, cracked, or bleeding nipples. For women who stopped breastfeeding after four weeks, 35% said they had to return to work or school and 21% said that it was the right time to stop. Using the data collected on breastfeeding intention and subsequent breastfeeding duration, the researchers concluded that mothers who planned, during pregnancy, that they

were going to breastfeed were more likely to be doing so at four weeks compared to those who said they might breastfeed or that their intentions were uncertain.⁵⁷

Yet another barrier may arise when the mother returns to work or school.⁵⁸ In a study conducted by Taveras et al, 58% of mothers attributed going back to school or work as the main reason they stopped breastfeeding at ten to 12 weeks.⁵⁸ This conclusion was also supported by the researchers Mandal, Fein and Roe.⁵⁹ They conducted a nationwide survey that followed mother-infant pairs through the first year of the infant's life. Ten questionnaires were mailed to a nationally representative sample of 2615 women. Of these 2,615 mailed questionnaires, 1488 were filled out correctly and contained complete data to be used in the evaluation. The researchers concluded that mothers who while pregnant were expecting to work full time after the infant was born were less likely to initiate breastfeeding or continue breastfeeding to three months postpartum ($p=.01$) than those were not expecting to work or were only expecting to work part time. Women who were working full time at three months postpartum weaned the infants, on average, 8.6 weeks earlier than women who were working less than 35 hours per week ($p<0.05$). From these data, Fein and Roe suggested that allowing women to work less than 35 hours per week may be an effective strategy for maintaining the breastfeeding relationship while working.⁵⁹

Low-income mothers and breastfeeding

While all populations experience barriers related to breastfeeding initiation, duration, and exclusivity, it appears as if low-income populations may be affected by these barriers more so than other populations. Mothers who are considered low-income and mothers who participate

in the WIC program are less likely to initiate breastfeeding and are at a higher risk for early weaning.⁵² Breastfeeding rates among WIC populations consistently remain lower, at 57% initiation, compared to 74% in populations who have a higher income.⁶ Several studies have been conducted to determine the beliefs of this particular population and what barriers may exist in this population that would cause them to have lower rates of breastfeeding.⁶⁰⁻⁶³

In a series of focus groups conducted by Heinig et al, women with 4- to 12- month old infants were asked about their beliefs concerning infant feeding.⁶¹ While the women acknowledged that breastfeeding was the healthiest form of nutrition for infants, 60% offered formula to their infants within the first few weeks of life. The most common reason for this supplementation was attributed to the infant's hunger cues, crying, and sleeping patterns. Infant weight gain, perceived infant hunger, and insufficient milk supply are common reasons women report supplementing young infants with formula.^{56-57, 60} While the study conducted by Heinig did not specifically identify barriers these women experienced with breastfeeding, it did suggest that women are aware that breast milk is better for infants, even though breast milk is not often offered exclusively.⁶¹

To help identify attitudes associated with infant feeding among the WIC population, McCann et al conducted a year-long survey with 874 WIC mothers, beginning in 1994.⁶⁰ Each mother was interviewed 9-10 times, using a structured questionnaire, either over the phone or in person if necessary. Questions were developed for the survey by completing a literature review of current breastfeeding attitudes and mothers were asked whether they "agreed", "disagreed", or were "not sure" with each question. The results indicated the mothers who breastfed their

infants were significantly more likely ($p < .05$) to agree with statements concerning the benefits of breastfeeding. Conversely, women who did not breastfeed were more likely ($p < .05$) to agree with statements about the perceived barriers of breastfeeding. Some of these perceived barriers included not wanting to breastfeed in public, being the only one able to feed the infant, breastfeeding taking too much time and that it would “tie you down”, breastfeeding being painful, issues with breast milk leaking onto clothing, interfering with sexual relationships and breastfeeding causing the woman’s breasts to sag. When interviewed at one month, women who had reported initiating breastfeeding also reported experiencing at least one specific problem with breastfeeding. At the second month interview, half of the women who had initiated breastfeeding had weaned. The most common problem cited with breastfeeding was perception of insufficient milk supply. This issue relates to the qualitative study conducted by Heinig et al in which the women reported concerns associated with the infant not receiving enough breast milk and therefore supplementing with formula, allowing the mother “to see” what the infant was consuming⁶¹.

Qualitative research

The current body of literature concerning breastfeeding is derived mainly from a quantitative point of view.^{52, 56-60, 63-69} Most data are collected via surveys that fail to identify, or fully explore, personal reasons that women who are at a high risk of not breastfeeding **actually do** establish a successful breastfeeding relationship. When individual interviews are performed, this is likely to be completed in a population with little or no barrier to breastfeeding or among women who traditionally have higher breastfeeding rates. Oftentimes these women are white,

have higher socioeconomic status, and/or have completed higher levels of education.⁶ This history has contributed to a general lack of knowledge concerning factors influencing motivation and commitment to breastfeeding among at-risk populations. Conducting an in-depth, qualitative study among an at-risk population of women will give a voice to the many women who overcome various barriers to establish a successful and rewarding breastfeeding relationship. Because research investigating this idea is relatively new, qualitative research is necessary to determine basic themes and ideas.

John Cresswell, a leader in qualitative research methodology, identifies several situations in which a qualitative research design provides superior data compared to what can be derived from a quantitative design.⁷⁰ The first situation is when there are limited data available in the current literature and the topic needs to be further explored. The second reason to use a qualitative design is to provide a more detailed view of the factors and themes associated with breastfeeding among specific populations of women. The first two reasons to utilize a qualitative design will ultimately aid in answering the research questions by providing detailed, in-depth data where none currently exist.

Because very little literature exists reporting how at-risk (low-income and low-education) women are able to overcome significant and unique barriers to breastfeeding duration, the following research question will be explored via qualitative grounded-theory methodology:

Research Question

1. What motivates women of low socio-economic status to breastfeed for a significant period of time?

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Part 2: Voices of low SES women overcoming breastfeeding barriers: A qualitative analysis and model development

Abstract

Background: Breast milk provides optimal nutrition for most infants for a specific amount of time. In spite of well-accepted benefits associated with breastfeeding, both for infants and mothers, rates among low-income women remain consistently low.

Objective: The objective of this study was to identify what motivates women, who are at a high risk of not initiating breastfeeding or early weaning, to establish a successful breastfeeding relationship.

Methods: Mothers meeting the eligibility criteria of having no more than a high school degree, being low-income, and having breastfed for ≥ 3 weeks, completed an in-depth telephone interview. Using grounded-theory methodology, researchers developed a theoretical model describing the experience of this population.

Results: Though recruitment was ongoing for over a year, with 212 mothers screened for eligibility, only seven mothers were eligible and completed study activities. Based on analysis of interview transcripts, a theoretical model was developed.

Conclusions: Mothers who breastfeed despite being high-risk for not breastfeeding may be motivated by the perception that breastfeeding is easier than formula feeding and comforting. In addition, the breastfeeding relationship may be protected by the services offered by WIC, which may be amplified by the mother's own determination. A lack of experienced barriers and the act of bed-sharing may also assist with breastfeeding duration. The researchers hypothesize that, as barriers are experienced that are beyond the perceived control of WIC services, the mother's level of stress may increase, increasing the likelihood of weaning. Future research

should test the proposed model and determine specific messages targeting this at-risk population.

Introduction

Breast milk is the best nutrition for most infants, especially in the first six months of life, and then when combined with other foods for up to and beyond two years of age,¹ conferring a variety of benefits to both mothers and infants.² In addition to tangible health outcomes, breastfeeding influences economic factors for both individuals and society.³⁻⁴ Recently, the USDA estimated at least \$3.6 billion could be saved annually if exclusive breastfeeding rates increased to that of the Surgeon General's 2001 recommendations.⁴ Promotional breastfeeding programs include peer counselors in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), pre- and postnatal breastfeeding education, and community-based interventions.⁵⁻⁷ However, even with the aid of multiple initiatives, as of 2010⁸ the breastfeeding goals of Healthy People 2020⁹ were not being met.

Epidemiologic studies have demonstrated that certain populations are at increased risk of never breastfeeding, for early weaning, and for formula supplementation.¹⁰ Understanding more about populations that have chronically low breastfeeding rates is an important step in developing programs designed to improve breastfeeding rates and assist with reaching national breastfeeding objectives. For example, mothers who have a lower education level or are unmarried are less likely to breastfeed, compared to mothers who are married or are college graduates.¹⁰⁻¹¹ In addition, low-income mothers are less likely to breastfeed, for any duration, compared to higher-income mothers.¹⁰ Data also suggest mothers participating in WIC are less likely to breastfeed, compared to women who are eligible but do not participate in WIC.^{10, 12}

While all populations experience barriers to breastfeeding initiation, duration, and exclusivity, it does appear that low-income populations may be more susceptible to these

barriers. Several studies have been conducted to determine the beliefs of this particular population and what barriers may exist that would help to explain these lower rates.¹³⁻¹⁶ However, this literature represents mainly quantitative data.^{12-13, 16-26} Though there has been a good deal of qualitative work, most data are collected via survey, and are unable to fully explore why some women from disadvantaged populations **are** able to successfully breastfeed. When individual interviews are performed, these are likely to be completed in populations with few breastfeeding barriers or among those with traditionally higher breastfeeding rates. Oftentimes the data are reflective of women who are white, have higher socioeconomic status, and/or have completed higher levels of education.²⁷ This research history has contributed to a general lack of knowledge concerning factors influencing motivation and commitment to breastfeeding among at-risk populations. Because in-depth study of these factors in low-income and low-SES populations is relatively young, research using qualitative methodology is necessary to determine basic themes and ideas.

Methods

Prior to study implementation, permission for all procedures was obtained from the Institutional Review Board at the University of Tennessee, at Knoxville.

Study Design

This was a qualitative study, using grounded theory methodology²⁸ to investigate maternal motivation to breastfeed, specifically among women of low-socioeconomic status. Grounded theory was chosen due to the minimal amount of existing literature concerning breastfeeding in this population.

Script Development and Modification

Initial questions were derived from a previous study which was based on a review of the infant-feeding literature and expert panel review. This script was used as a guide, with additional questions added as new topics arose. Questions were open-ended, to allow participant responses to be as unconstrained as possible. Topics included when breastfeeding was first considered, who or what influenced the decision to breastfeed, what expectations about breastfeeding were (including duration), what barriers may have been experienced and overcome, and what role the WIC program may have played in the breastfeeding relationship.

Eligibility/Recruitment

Eligibility was limited to low-income mothers, as measured by WIC eligibility²⁹, with no more than a high school education. Mothers were also to have exclusively breastfed their infants for at least 3 months and the breastfeeding experience must have occurred within the past year. However, this final criterion was liberalized during recruitment, as discussed in the Results section. These criteria allowed for the capture of the unique barriers and experiences of this population.

Participants were recruited via flyers distributed to a local WIC clinic. In addition, recruitment occurred at a heavily-attended, bi-annual, consignment sale, focusing on young families³⁰. Flyers encouraged potential participants to contact the research lab for determination of eligibility. Upon contacting the research lab, potential participants were screened by trained graduate research assistants. Those eligible were invited to participate in

an in-depth, recorded phone call, and were compensated with a small gift upon completion of this activity.

Data-Collection Methodology

All telephone interviews, including verbal consent, were audio-recorded. A copy of the consent form was mailed to each participant upon completion of the interview. Recordings were downloaded to a password-protected computer and transcribed, verbatim, by trained research assistants.

Coding Schemes

Transcripts were coded by the primary researcher and an additional graduate student, trained in the protocol for qualitative coding. QDA Miner³¹ software was used as the coding platform. Initial codes were developed by the two researchers, based on an independent review of the first transcript, and a subsequent meeting and negotiation of codebook development. After developing the initial codes and defining the unit of analysis, the researchers coded the next three transcripts, adding codes as new concepts were encountered. The researchers then re-convened and discussed the utility of initial codes and consolidated any new concepts into additional standard codes. When agreement could not be reached, a third researcher was consulted and the codes discussed as a team. Inter-coder reliability was assessed before and after each meeting. Initially, inter-coder reliability was 77.7%, but inter-coder reliability increased to 96.9% by the final transcription³².

Data Interpretation/Model Development

Upon completion of coding, the research team met to discuss emerging themes. Several themes were identified and multiple models proposed, as a result of several meetings and revisions. These discussions and alterations continued until all members of the research team agreed on components of the proposed theoretical model (**Figure 1**).

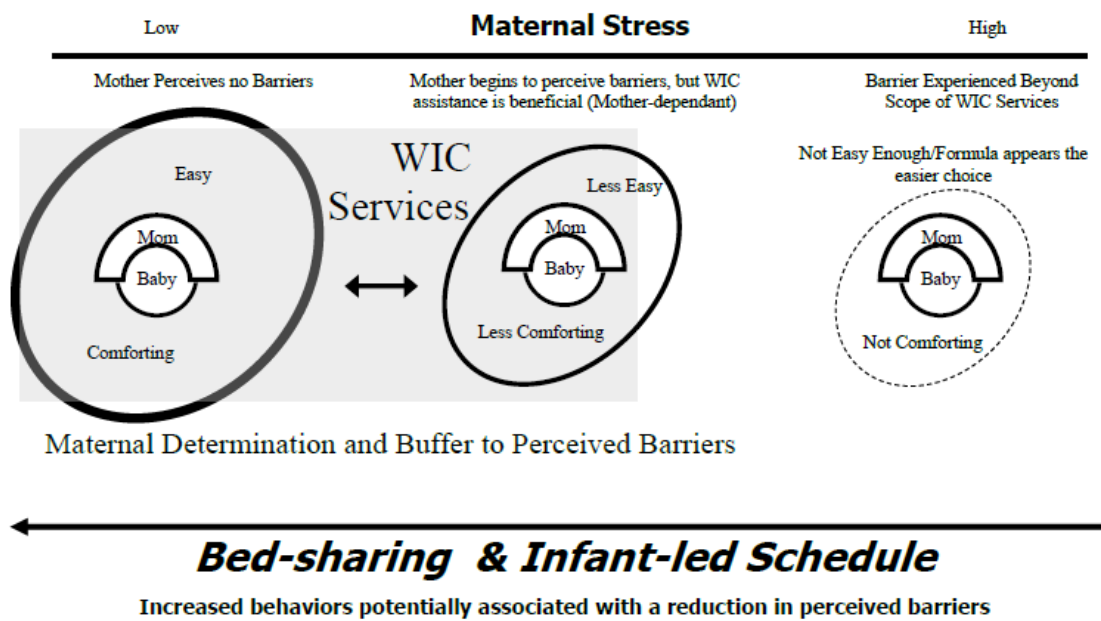


Figure 1: Model of the Factors Affecting the Breastfeeding Relationship

Results

Because mothers reported bed-sharing with their infants, a disclaimer was added to the script, reflecting the American Academy of Pediatrics position concerning bed-sharing and the increased risk of Sudden Infant Death Syndrome³³.

Recruitment was ongoing between February 2010 and May 2011. Despite aggressive recruitment, of the 212 mothers screened only ten were eligible and seven of these completed

interviews. The three mothers who were eligible, but did not participate, were considered lost-to-follow-up when the primary researcher could not reach them after the initial screening call. To increase the ability to recruit, the breastfeeding-experience criterion was liberalized from three months to three weeks. The most common reasons for ineligibility were education beyond high school and the offering of formula. Of those completing the study activities, four self-identified as White, two as Black, and one as White Hispanic. Mean maternal age was 25.8 years (range: 24.08 to 27.25), and mean infant age was 28.4 weeks (range: 6.3 to 50.3). Two of the mothers had one infant, two had two children, two had three children, and one had four children.

Theoretical Model

The proposed theoretical model includes three concepts: *Maternal and Infant Buffer*, *Behaviors Promoting Breastfeeding*, and *Absence of Significant Barriers*. Each concept is discussed in detail, with the overall movement through the model summarized below.

Concept 1 – Maternal and Infant Buffer

Barriers to breastfeeding are likely to be differentially challenging, depending on the individual experiencing the barrier(s). In this study, there appeared to be a protective attitude or “buffer”, or the fostering of such a buffer, which may have functioned as a filter through which mothers interpreted their breastfeeding experience. This theorized buffer around the mother and infant may have protected them against situations that normally would have been interpreted as unsupportive of breastfeeding. Those with an intrinsic motivation may have had a heartier buffer, and needed less fostering. This buffer was created by the mother’s own

determination and often the support offered by WIC services, and helped to create a breastfeeding relationship that was both easy and comforting. It protected the mother-infant bond that breastfeeding often creates and established an environment that helped make breastfeeding successful.

When the buffer is strong, it may create an environment for the mother in which breastfeeding is considered the easiest way to feed the infant. One important example of a manifestation of this buffer is the concept that breastfeeding was considered as being *easier than formula-feeding*. Many of the mothers reported feeling that breastfeeding was easier than formula feeding for a variety of reasons, ranging from decreased trips to the doctor, to cost, to formula preparation being considered a hassle. This concept is demonstrated by the following quotes from study participants:

- *“No because I formula fed with my first child because she wouldn't take the breast and cost wasn't a consideration... It was just more easier, you know, than the whole hassle with the formula and making up the bottles and measuring and all that stuff.” “And it makes it easier for you and I mean it really does. It beats having to go make a bottle every hour.”*
- *“Because I felt it was more easier and natural than getting up in the middle of the night and making a bottle and having the baby to wait and she's crying while you fix the bottle and check the temperature and then you know start to feed her.”*
- *“Um with number two the experience was after I had her I was so tired and they asked me you know did I want to feed her and they came with a bottle and I was just like I*

don't want to sit there and feed her the bottle then have to look at the thing and then write how many ounces, I'm too tired and I was just like you know if I put her on the breast that would just, you know. Just tired from having her I just wanted to put her on the breast and just, you know, that was it. Instead of doing the hassle of counting and seeing how many ounces and writing how many ounces it was and how much she took and it was just easier."

- *"I feel like this like if I'm hungry, I think about it like if I'm hungry, if I'm at my hungriest to the point and I have to cry do I want my mother to cook me a whole meal before I get to eat or do I want something that's instant. That's good and instant you know. So I figured like that I would want to give it to them right then and now than making them wait like ten minutes you know to measure it out, then put the water in, and then boil it and make sure it's the right temperature, and then if it's too hot you have to wait until it cools off and then they're still screaming and screaming I think that's kinda, I don't know to me that's kinda cruel."*
- *"I was going to be at home with them so, to me it seemed easier than, you know, packing bottles and buying formula and, um, waking up in the middle of night and rolling over is a lot easier than getting up and boiling bottles and all that stuff, so, but mostly for them."*
- *"I'd say at night is definitely, probably the easiest or when it pays off the most because uh, it makes them sleepier I think, you don't have to get up, especially when they are really little because I just kind of lay her next to me and feed them and put them right back and I don't have to get up and do 10 different things just to make the bottle up."*

- *“I didn't know if it would work or not. But, I wanted to breastfeed just because I have worked in the childcare environment and I have seen the, you know, projectile exorcist style vomiting that other babies have done on formula, not to mention, you know, just how bad it stinks”*

Additionally, many mothers noted the valuable services offered by the WIC clinic; specifically prenatal breastfeeding promotion and postnatal breastfeeding support. One mother reflected on how WIC influenced her decision, prenatally, to breastfeed: *“They were just saying the things about (how) breastfeeding is the best decision and... they don't really like the formula and stuff. I mean they give it to the people who need it but they rather that the mother was nursing. They really support the nursing mothers.”* Two mothers mentioned being encouraged by the additional WIC vouchers breastfeeding mothers receive. When asked if WIC helped her make the decision to breastfeed, one mother responded: *“Oh, yes! When I realized they changed the vouchers... you get fruits and vegetables and stuff, so I was real excited about that, so that encouraged me to definitely want to continue.”*

Once mothers were breastfeeding, they reported that one of the ways WIC supported breastfeeding was the availability of the peer counselors. The idea that the peer counselors were available at all times was especially important. One mother speaks about the comfort of having this available, even though she had never called the peer counselor: *“They give you their phone numbers and everything in there. So they can be supportive if you need to ask them questions and stuff. I don't call them but they give you their numbers though.”* Another mother felt similarly supported: *“They actually call and make sure that everything's ok. They offer to, if*

needed, to send a lactation specialist to my house, they gave the class right before I had my son...(and) they have a person that actually texts me once a week or twice a month and, just make(s) sure that everything is ok and that I have everything that I need... If I need something then... they say, you know, day or night, call me, text me, whatever.”

Concept 2- Behaviors Promoting Breastfeeding

It appeared that mothers in this sample participated in behaviors that simultaneously promoted breastfeeding and decreased barriers. Importantly, these behaviors appeared to arise organically, and often persisted against the recommendation of others. There were two overarching examples of this: bed-sharing and allowing the infant to dictate the schedule. These behaviors functioned within the buffer, and appeared to strengthen it and further protect the mother-infant feeding relationship. All mothers reported bed-sharing as an important behavior that assisted them with being more comfortable with breastfeeding, making breastfeeding easier, or allowing them to reduce concern for the well-being of their infant. In addition, all the infants were fed on demand and several mothers reported being used as a “pacifier”. Though this was not always considered to be optimal, the behaviors continued. By fostering the close relationship, even at the detriment of maternal comfort, and often with outright disregard for recommendations, it appeared that maternal stress was reduced and breastfeeding continued. The following quotes support this second concept:

- *“But at nighttime, it’s definitely harder for me because she will fall asleep, and then I’ll try to remove her from, you know, the breast, and she wakes up, and “no!” She just*

wants it like a pacifier. She stopped sucking her paccie and using me as a pacifier instead.”

- “Um, well, all of my kids slept with me from the time they was born 'til a year old, so...she sleeps with me now... I feel safer knowin' that I can hear them breathin' close to me...at night.”
- “I just always had my children sleep with me.”
- “In the night he sleeps... in the bed with us... so whenever he still wakes up two times in the night to eat... I just put him on the other side of me and I lay onto my side and he just latches on and eats instead of having to get up and make a bottle and stuff.”
- “She sleeps in the bed with me. For awhile, she slept in her own bed, but it was just so much easier just to keep her next to me.”
- “With my daughter, with having the C-section, it was not easy for me to get in and out of the bed. So I actually slept in the recliner for the first six months of her life. And she would sleep on my chest. Um, and I got so used to sleeping with her that I couldn't sleep without her right there. So that's why she slept in the bed. My son actually has breathing issues and we're currently trying to figure out what's going on and why he stays so congested and stuff like that and I find that I can't sleep unless I can feel him breathing on me.”

Concept 3- Absence of Significant Barriers

The final overarching concept was that mothers did not appear to perceive significant barriers during the breastfeeding relationship. Though they may have experienced something

generally considered a barrier, if the mother did not perceive it as such, it did not threaten the breastfeeding relationship. For example, some mothers reported having little support from family members or their significant other. For some, this would be a significant barrier to breastfeeding; however, for the women in this study, this did not seem to impact the success of the breastfeeding relationship. One mother spoke about how her husband was not supportive of her decision to breastfeed: *“Well yea I talked to my husband as well, he kinda didn't want me to breastfeed because he said ... when I'm not there they're kinda, you know, crying and stuff. But that's just cause he didn't have breasts to feed them so that was his problem”*. It is likely that the buffer assisted with this interpretation.

As the buffer thins, for whatever reason, these assaults may become more powerful. Had these mothers experienced a barrier that they would have found too difficult, it is likely they may have weaned. This may be due to increased stress perceived by the mother. The researchers hypothesized that as the mothers experience more barriers, maternal stress may increase. Higher stress could thin the buffer and create a situation in which breastfeeding is no longer easy or comforting. Many mothers reported common potential future barriers that they expected would influence them to wean. These potential barriers included going back to work or having a teething infant. When asked how long she would like to continue breastfeeding, one mother responded: *“really with my daughter I planned on breastfeeding until you know, she didn't want to breastfeed anymore. However, she got teeth and developed this weird little personality where she liked to bite me and I just didn't like that, so I stopped breastfeeding. So really whenever he gets top and bottom teeth it will stop, or until he's a year old, whichever*

comes first.” Therefore, it was a preconceived barrier that would be acted upon at first experience.

Moving through the model

Based on the results, the theoretical model was developed to reflect the factors the mothers reported contributing to successful breastfeeding. The scenario illustrated on the far left of the model depicts a situation in which the breastfeeding relationship is protected by a strong buffer and maternal stress is low. This buffer is facilitated by the services offered by WIC and the mother’s own determination to breastfeed. When functioning properly, the buffer can protect a breastfeeding environment that is both easy and comforting to the mother and infant. Few barriers are experienced, due to an increase in behaviors that promote and support breastfeeding such as bed-sharing and infant-led schedules. However, as the mother begins to experience barriers she may move into the middle of the model. These barriers may be solved with the assistance of a WIC lactation counselor or by the mother actively seeking help from another lactation expert due to her desire to continue breastfeeding. Should the barrier be resolved, the mother may continue to breastfeeding and once again return to the more protected situation, illustrated on the far left of the model. However, should this barrier be beyond the scope of the WIC lactation counselor or too great for the mother to overcome, the mother may wean. This scenario is depicted on the far right of the model. At this point, maternal stress is high and formula-feeding appears to be the easier choice compared to breastfeeding.

Discussion

In spite of intensive recruitment for over a year, the total number of eligible participants identified was only ten, and then only seven interviews were completed. Though this was lower than desired, these mothers shared specific, unique characteristics and several overarching and intriguing themes emerged from the data. The 2011 Breastfeeding Report Card issued by the CDC reports that 65.6% of mothers initiate breastfeeding when their infants are born. However, only 27.9% are exclusively breastfeeding at three months.³⁴ This is much higher than the 4.7% of mothers who were screened that met the eligibility criteria. Importantly, the low number of eligible participants highlights the need to use information provided by these interviews to develop more effective methods of breastfeeding promotion and support, specifically targeting low-income mothers who have no education beyond high school.

Bed-sharing and Reduction of Barriers

Researchers are at odds concerning the safety of bed-sharing with infants and the potential relationship with breastfeeding³⁵, as some studies have found a relationship between bed-sharing and an increased risk of SIDS or infant suffocation³⁶⁻⁴¹. The American Academy of Pediatrics advises against bed-sharing due to the risk of SIDS and infant suffocation that may be associated with this practice³³. However, all mothers reported participating in bed-sharing despite verbalizing an understanding of these risks. This finding is supported by a study conducted by Ateah and Hamelin, using questionnaires mailed to 1,122 mothers of three to four month old infants born in Manitoba, Canada. Researchers found that 72.4% of respondents reported bed-sharing and 88% were aware of the risks.³⁸ However, most of the

controversy surrounding bed-sharing stems from studies not differentiating between exclusive breastfeeding and formula feeding, and the concept that bed-sharing may be protective of breastfeeding and subsequently protective against SIDS⁴²⁻⁴⁴ have been somewhat lost in the argument. In addition, one study found that infants who bed-shared were less likely to sleep in the prone position, a known risk factor associated with SIDS⁴⁵. For example, clinical sleep studies, conducted by McKenna et al, demonstrated that breastfeeding mothers who routinely bed-shared with their infants were more responsive during the night and spent less time in deeper sleep than breastfeeding mothers who did not bed-share. Also, mothers who routinely bed-shared had infants who spent more time breastfeeding during the night compared to those infants who slept by themselves in a room apart from the mother, which may help to establish a good milk supply and promote infant weight gain⁴³.

Interestingly, a common factor leading to lack of initiation or early weaning is maternal fear of insufficient milk supply¹⁷, a concern expressed by this sample. While mothers participating in this study reported having these milk-supply doubts prenatally, none remained concerned when interviewed. The high prevalence of bed-sharing may support the hypothesis that bed-sharing promotes breastfeeding. Though what motivated the mothers to bed-share varied, it is a truly significant finding to see that all of the mothers were continuing to breastfeed despite being in a population traditionally at very high risk of weaning¹¹. These results warrant further investigation of the bed-sharing/breastfeeding relationship, especially among women who are at a higher risk of early weaning. However, before incorporating bed-sharing into interventions, much remains to be evaluated such as the protective role of breastfeeding while bedsharing and to what extent bedsharing promotes breastfeeding.

Breastfeeding Easier than Formula Feeding

Another interesting finding was that mothers perceived breastfeeding to be the easier choice, compared to formula feeding. Many referred to formula feeding as a hassle and did not want to have to clean bottles, or mix and warm formula. A survey conducted by Ertem et al also found that 58% of mothers agreed that breastfeeding was easier than formula feeding⁴⁶.

Another study conducted by Shaker et al reported the attitudes of both formula feeding and breastfeeding mothers in regards to convenience⁴⁷. The results indicated that both groups felt like their feeding choice was easier and more convenient. While this topic is of interest and can contribute valuable knowledge to the field of breastfeeding promotion, little research has been conducted on the attitudes of formula feeding mothers. One national survey examined the general public's opinion concerning breastfeeding and infant formula. The most remarkable finding from this study was that, from the year 1999 to the year 2003, there was a 11.4% increase in respondents who agreed that "infant formula is as good as breastmilk"⁴⁸. This could possibly be attributed to the increase in and effectiveness of infant formula marketing.

Understanding the attitudes concerning formula feeding is a very important component to understanding breastfeeding continuation or weaning. Future research should focus on this concept, especially among populations at risk for early formula supplementation or weaning.

WIC Services Supporting Breastfeeding

These mothers reported that WIC supported their breastfeeding endeavors, both prenatally and while breastfeeding. A good deal of literature highlights the importance of WIC services for pregnant and breastfeeding women^{6, 24-25, 49-54}. For example, a qualitative study

conducted by Raisler used focus groups for low-income women to describe their breastfeeding experiences⁵³. Mothers echoed voices in the current study, specifically noting appreciation for the availability of the WIC peer counselor. The mothers in the Raisler study also felt like the peer counselors were more likely to care and take time to answer their questions than other health care providers. In another qualitative study with breastfeeding WIC participants peer counselors were considered to be a significant provider of support while breastfeeding⁵⁰, likened to a close family member. Having a peer counselor support breastfeeding may serve as a protective function for women who have family members or partners who are not supportive of breastfeeding or do not have these people in their lives at all. In fact, some studies have suggested that the absence of a supportive partner may increase the risk of early weaning^{17, 55-56}. Future research should be conducted to examine the role of the WIC counselor in replacing or buffering this type of support that may be absent in the home environment. These findings combined with findings from similar studies highlight the benefits of the unique services offered by the WIC program.

Maternal Stress

The results presented here suggest that, as the mother's level of stress increases due to barriers experienced, she is more likely to wean. When maternal stress is high, the breastfeeding relationship is no longer comforting and formula appears to be the easier choice. Physiologically, stress may affect lactation because it can decrease the amount of oxytocin released by the mother when breastfeeding.⁵⁷ Oxytocin is a hormone that reduces stress, facilitates the mother and infant bond, and may be a factor that contributes to protecting the

breastfeeding relationship. It is also responsible for stimulating muscle cells in the breasts to contract and move the stored milk in the alveolar cells to the milk ducts to be emptied. If this letdown fails to occur, the milk could stay in the alveolar cells for extended periods of time. Over time, the mother would produce less milk, which could contribute to additional stress.

Beyond a physiological understanding of how stress impacts breastfeeding, few studies have been published on breastfeeding mothers and stress⁵⁸⁻⁶⁴. Of those published, most focus on prenatal stressors and the impact on breastfeeding outcomes,^{58, 60} mothers who are breastfeeding preterm infants,⁶¹ or the protective effect of breastfeeding against stress^{59, 63-64}. One study, conducted in Iceland, sought to determine the relationship between stress and exclusive breastfeeding at two to three months postpartum⁶². The results indicated that mothers who were exclusively breastfeeding scored lower on the both the parental stress and depressive symptoms scales compared to mothers who were not exclusively breastfeeding. While the information gleaned from this study is valuable, it does not answer the question whether or not breastfeeding was protective against stress or if those who experienced stressful events were more likely to supplement with formula or wean. A qualitative study conducted by O'Brien et al used focus groups to determine what factors could influence breastfeeding duration⁶⁵. The researchers identified five psychological characteristics of mothers intending to breastfeed that affected breastfeeding duration. One such characteristic was maternal stress. Mothers who were breastfeeding reported that stress could be a threat to the breastfeeding relationship. This concept is reflected in the model developed from this research. As the model indicates, it is hypothesized that as maternal stress increases, the

mother may be more likely to wean. Future research concerning maternal stress and breastfeeding should be conducted, especially among specific populations of mothers.

Maternal Self-efficacy

Many of these mothers reported wanting to *try* breastfeeding. However, some were unsure of their ability to successfully breastfeed. It is hypothesized that the mothers had a low self-efficacy in regards to solving breastfeeding problems when barriers arose. In addition, these mothers appeared to have a low self-efficacy in regard to preparing formula. Nommsen-Rivers et al examined the relationship between breastfeeding self-efficacy, breastfeeding comfort, and formula feeding comfort. Formula-feeding comfort was measured by asking mothers “how comfortable are you with the idea of formula feeding your baby?” Results indicated that “the odds of stronger breastfeeding intention increased by approximately 300% with each one level decrease in formula feeding comfort.”⁶⁶ Future work in this population should likely adopt use of these tools to examine maternal attitudes surrounding formula-feeding comfort. Additionally, breastfeeding self-efficacy was identified by O’Brien as one of the 5 factors influencing duration⁶⁵. Those mothers who were offering formula reported questioning their self-efficacy in their abilities to breastfeed and provide adequate nourishment for their infants. This was in contrast to the mothers who were breastfeeding who reported high levels of self-efficacy and trust in their breastfeeding abilities.

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Part 3: Conclusion

Conclusion

Though breastfeeding is universally regarded as the optimal nourishment for infants¹, breastfeeding rates among some populations remain consistently low¹⁰. Few studies have utilized qualitative methodology to describe how some women in these populations establish successful breastfeeding relationships, with most of the current literature being derived from quantitative studies^{13, 16-26}. These results, involving women of low-socioeconomic status who successfully breastfed, indicate there may be some factors that contribute to a protective buffer and continued success. Those factors include the mother's own determination, support offered by WIC services, and behaviors that promote breastfeeding. In addition, many mothers spoke about the hassles associated with formula-feeding compared to the ease of breastfeeding. The continued success of the breastfeeding relationship facilitated an environment in which breastfeeding was both easy and comforting to the mother. However, if the mothers experienced a barrier, while breastfeeding, this may have contributed to increased maternal stress and, potentially, weaning. Future research should focus on what factors influence the perception of breastfeeding as 'easy' and attitudes concerning the 'difficulty' of formula feeding. In addition, a better understanding of factors protecting the breastfeeding relationship is greatly needed, especially the relationship between bed-sharing and breastfeeding. Listening to the success stories of mothers who breastfeed despite the barriers associated with low-socioeconomic status is crucial to designing effective breastfeeding interventions.

Limitations

These results may not be applicable to mothers in all regions as all mothers who participated were residents of East Tennessee. Parity among participants varied between one and four children. Those mothers with more than one child may have had different experiences or motivators compared to mothers who only had one child. In addition, despite aggressive recruiting, only seven mothers were eligible for the project. Future research conducted in other regions with greater numbers of low-income, low-education, breastfeeding mothers is necessary to fully understand the factors influencing the breastfeeding relationship among this population.

Appendix A: Expanded Methodology

Script Development and Modification

Initial questions forming the interview script were derived from a previous study conducted by Joyce et al in 2008⁶⁷, which was based on a review of the infant-feeding literature and expert panel review. This script was used as a guide, with additional questions asked as needed. Throughout the data collection process, the primary researcher met with the faculty advisor and developed additional questions that targeted new concepts that arose during the phone interviews. These questions were designed to be open-ended, in order to encourage participants to share any experiences they felt were relevant. This allowed for important concepts to arise based on the responses of the participants rather than pre-conceived influence from the researchers. The primary researcher was trained by the faculty advisor in interview techniques, focusing on avoidance of “leading” questions and remaining non-judgmental in response. Questions remaining from the script developed by Joyce in 2008 covered topics such as when participants began thinking about breastfeeding, who or what might have influenced this decision, what were the expectations about breastfeeding (including duration), what barriers were experienced and how they were overcome, what motivated participants to overcome various barriers, and what were their feelings about the Supplemental Nutrition Program for Women, Infants, and Children (WIC) in relation to breastfeeding. Additional concepts that arose included what times of the day were easier or more difficult, while breastfeeding, and what advice participants would give new mothers. Because many mothers reported that they were bed sharing with their infants, a disclaimer was added to the script, reflecting the American Academy of Pediatrics position concerning bed sharing and the

increased risk of Sudden Infant Death Syndrome³³. The final interview script, with additional questions highlighted, is attached (Appendix A-1).

Participants

In order to be eligible for the study, potential participants must have been low income, as measured by WIC eligibility²⁹, and could have obtained no more than a high school education. Combining the attainment of a high school diploma or less, with the WIC income-eligibility criteria, the term “low socioeconomic status” was used to describe these participants. This allowed for the capture of the voices of this specific population and the ability to assess any unique barriers faced and overcome. In addition, participants must have exclusively breastfed their infant for at least 3 months and the breastfeeding experience must have occurred within the past year. Participants who had weaned more than one year prior were considered ineligible, as the desire was to discuss recent breastfeeding experiences.

Participants were recruited via flyers distributed to the Knox County Health Department (KCHD) and the Knox Area Rescue Ministries (KARM) (See Appendix A-2 for a copy of the flyer). Potential participants were recruited from WIC using flyers distributed to the local WIC clinic, which is housed within the KCHD. WIC staff encouraged potential participants to contact the Infant, Child, and Adolescent Nutrition Lab (ICAN Lab), to be screened for eligibility. In addition, participants were recruited during a popular local consignment sale which is heavily attended³⁰. Upon contacting the Infant, Child and Adolescent Research Lab located at the University of Tennessee (ICAN Lab), potential participants were screened by trained graduate research assistants to determine eligibility criteria. The screening form can be found in Appendix A-3.

Data-Collection Methodology

Phone Interview

Upon determination of eligibility, a brief explanation of study activities was provided and, with permission from the potential participants, graduate research assistants provided participant contact information to the primary researcher. Participants were referred to the primary researcher and the study purpose and activities were explained. If interested, a phone interview date was scheduled at the convenience of the participant. All interviews were conducted over the phone and were audio-recorded. At the start of the phone interview, the consent form was reviewed and verbal consent received and audio recorded from the participant prior to the beginning of the interview. A copy of the consent form was mailed to each participant upon completion of the interview. (See Appendix A-4 for a copy of the consent form). Permission for all study procedures was obtained through the Institutional Review Board at the University of Tennessee in Knoxville. For their time, participants were compensated with a \$20 gift card. Gift cards were mailed directly after the completion of the interview to the address provided by the participant.

Transcription

Recorded interviews were downloaded to a password-protected computer and transcribed, verbatim, by trained research assistants from the ICAN Lab. This training was conducted by a senior member of the ICAN Lab with extensive experience with qualitative data management and analysis. Special emphasis was placed on transcribing the participants' statements word for word, including slang words and incomplete thoughts.

Coding Schemes

Transcripts were coded by the primary researcher and an additional graduate student, trained in the protocol for qualitative coding. QDA Miner³¹ software was used as the coding platform. Initial codes were developed by the two researchers, based on an independent review of the first transcript, and a subsequent meeting and negotiation of codebook development. During this initial phase, the unit of analysis was defined as a “phrase”. After developing the initial codes and defining the unit of analysis, the researchers coded the next three transcripts, adding codes as new concepts were encountered. The researchers then re-convened and discussed the utility of initial codes and consolidated any new concepts into additional standard codes. When agreement could not be reached, the faculty advisor was consulted and the codes in question discussed as a team. Inter-coder reliability was assessed before and after each meeting. Initially, the inter-coder reliability was 77.7%, but after the researchers met and discussed all of the interviews, the inter-coder reliability increased to 96.9%¹.

Data Interpretation/Model Development

Once data were coded, the research team met to discuss codes and emerging themes. Several themes were identified and an initial logic model was developed. Based on a team discussion of the logic model, a visual model was proposed, and subsequently constructed by the primary researcher (see Model 1 in Appendix A-5). This model was circulated and the research team then re-convened to discuss the model’s strengths and weaknesses. A new

model was created, reflecting this feedback (see Model 2 in Appendix A-5). These discussions and alterations continued until all members of the research team agreed on components of the final visual model representing the major themes. The final model should most accurately reflect the factors the mothers reported contributing to their success in breastfeeding (Figure 2).

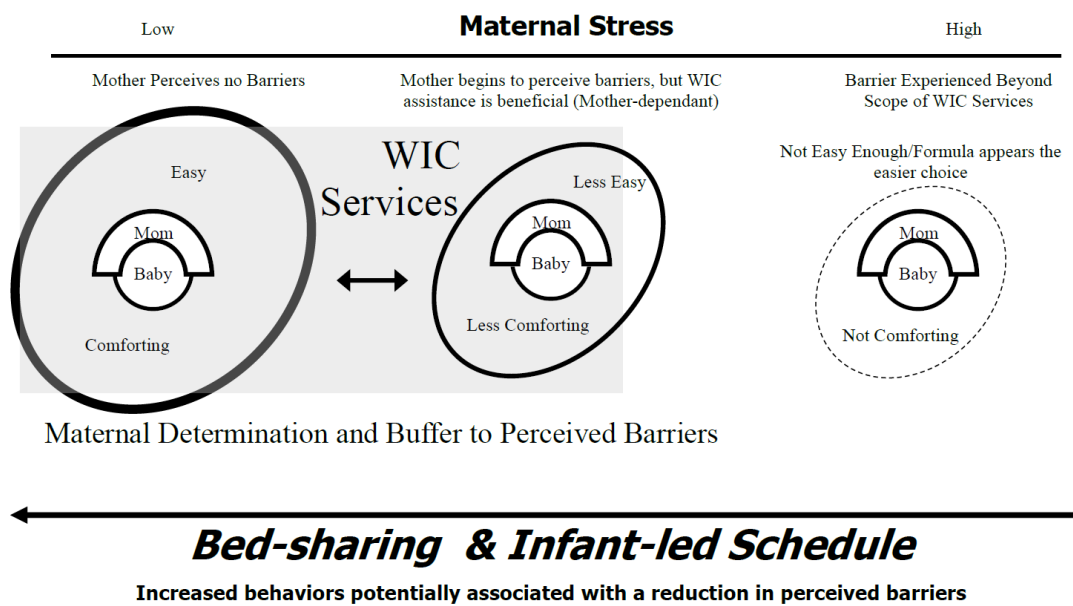


Figure 2: Model of the Factors Affecting the Breastfeeding Relationship

Research Question

While the initial research question proposed for this study was to identify motivators of breastfeeding among women of low-socioeconomic status, the focus shifted to factors influencing breastfeeding throughout the study. This shift occurred organically through the interviewing process as a result of open-ended questions. These results still contribute significantly to what is known about this population in regards to breastfeeding. In addition,

these results highlight areas in which future research should be conducted to gain a better understanding of the breastfeeding relationship.

Reference: Expanded Methodology

1. Kurasaki KS. Intercoder Reliability for Validating Conclusions Drawn from Open-Ended Interview Data. *Field Methods*. August 1, 2000 2000;12(3):179-194.

Appendix A

A-1: Final Interview Script

Interview Script:

Opening questions: Would you like to tell me your name, your baby's name, and how many other children you have?

Personal BF Experiences:

1. Why did you start breastfeeding?
Prompt: Were costs ever a consideration?
2. When did you start thinking about how you would feed your baby?
Prompt: Before pregnancy? During pregnancy? After pregnancy?
3. How did you come to this decision?
** For women who say "I was going to anyways", how did you get that way?
How was that developed?
**What developed that internal motivation? What makes it so strong?
4. Was there anyone in your life that you talked with when deciding how you would chose between formula or breastfeeding?
5. When did this discussion take place?
Prompt: Before pregnancy? During pregnancy? After pregnancy? Before meeting significant other?
6. Did this help prepare you?
Concept: What happened prior that was most helpful?
7. Do you know if you were breastfed?
Prompt: If yes, how did this influence your decision to BF? If no, do you know if you were BF or were you fed something other than breast milk?

8. When you decided to BF, who or what was important to you when making this decision?

Prompt: This doesn't have to be a positive experience; this could be someone/ something that didn't support BF.

9. Were there any specific incidences/ experiences that shaped your decision to BF? Was/ is there any one person who has helped you the most with BF?

Prompt: Continuation or duration?

10. Are there times during the day that are harder or more challenging? Are there times that are easier?

** Wanting to determine support factors and what motivated them to get through the "harder parts".

11. How long would you like to continue to BF?

12. Is there anyone or anything in your life that would or would not support you goal in BF length?

Prompt: Is there anything keeping you from reaching your goals?

13. Can you think of any (other) women in your life that have influenced your decision to BF?

Prompt: This could be supportive or non-supportive influence.

WIC

14. Were you enrolled in WIC during your pregnancy? Did they help you make the decision to BF?

Prompt: If no, why not? What have you heard of the WIC program? If no, were you ever a WIC participant? If no, do you have any friends that participate in WIC? (If yes, what have they told you?) If no, what do you know about WIC?

15. Did you find the support you needed while BF at the WIC program?
16. Other than food, are there any reasons you continue to receive WIC?
17. Do you know anyone that BF and is not enrolled in WIC?
Prompt: If so, why do you think they choose not to come?
18. Do you think you have influenced anyone's decision to BF? How so?
19. Where do you receive your support for BF? Who do you turn to when you have trouble?
20. What advice would you have for a new mother in regards to BF?

If co-sleeping: Earlier in our conversation, you mentioned that you and your baby sleep in the same bed. I feel compelled to tell you that this practice is not recommended by the American Academy of Pediatrics. I understand why you are sharing a bed with your infant, but I just want you to be aware that the AAP does consider sharing a bed with your infant as an increased risk for your baby to suffer from SIDS.

Do you breastfeed your baby?



If you do, the UT Department of Nutrition would like you to call us to see if you are eligible for a study about feeding babies!

If you are eligible and able to complete the study activities, we will give you a \$20 gift card to Wal-Mart.

If you are interested in finding out if you are eligible, please call us at **865-974-2109** or email us at **babystudies@utk.edu**

For more information about this study, contact:
Katie Kavanagh PhD, RD, Dept. of Nutrition,
University of Tennessee; 865-974-6250.



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A-3: Screening Form

Screening form

UTK

Mother's name: _____ Subject ID#: _____

Phone #: _____ Date: _____ Screener: _____

Hi, my name is _____ and I am from the Department of Nutrition at the University of Tennessee. I am returning your voicemail that you might be interested in participating in research through UT in a study involving you and your baby. I would like to ask you a few quick questions to see if you might be eligible. Is this a good time?

OR: If contacting a mother identified through Skype study:

Hi, my name is _____ and I am from the Department of Nutrition at the University of Tennessee. I am contacting you to see if you might be interested in participating in research through UT in a study involving you and your baby. Is this something you might be interested in?

I would like to ask you a few quick questions to see if you might be eligible. Is this a good time?

1. What is your date of birth? __/__/____ (double check if <1991)
 - a. (Is mother ≥ 18 ? ___ No ___ Yes)

2. What is your baby's date of birth? __/__/____
 - a. (Is baby ≤ 9 months old? ___ No ___ Yes)

3. Do you participate in the WIC program? ___ No ___ Yes
 - a. How many people are in your household? _____
 - b. (Based on the number given above, find the annual income on chart.)
 - c. Ask "Is your household income less than or equal to _____? ___ No ___ Yes"

4. What is your race/ ethnicity?
 - a. ___ Caucasian, white
 - b. ___ African American, black
 - c. ___ Other _____

5. What is the highest grade of school you have completed?
 - a. _____ Years

6. Is your baby a boy or a girl? ___ M ___ F

7. Are you currently breastfeeding your baby? ___No ___Yes
If no, ask did you ever breastfeed? ___No ___ Yes (if no, excluded)
If yes, How old was your baby when you weaned? _____ (discuss with me)

8. Do you offer any additional foods such as solid foods or formula to your baby?
If currently breastfeeding, ask what other foods or fluids, if any are being offered (not exclusionary, but informational). IF STILL BREASTFEEDING and AA and LOW INCOME, we want to talk to them regardless.

If ELIGIBLE

I really appreciate your time spent answering these questions. Based on your answers, you are eligible to participate in our project. Now I'd like to briefly explain what participating in the study means:

Your participation would help us to understand more about how babies are fed and allow us to help parents to better feed their young babies. If you agree to participate in the study, you will also be asked to complete a 30 minute phone conversation about breastfeeding your baby. This conversation will be recorded, but we will not identify you by name and the recording will be destroyed when the study is complete. Only myself and my research team will have access to this recording. There is no cost to you to participate, and you will receive a gift card worth \$20 for your participation. We can do this now, or schedule another time when it is more convenient for you. Would you be interested in talking to me about breastfeeding your baby? We can do the interview before we get the consent form back, but cannot use the recording or send the gift card until we get the signed consent form.

Address:

Best number to call: _____

If parent "refuses":

16. Could you please tell me why you don't wish to participate? (this helps us design our studies better in the future)

If refusal: Thank you so much for your time today. We appreciate your answering these questions and wish the best for you and your baby.

If INELIGIBLE:

Thank you so much for your time today. It looks like you are not eligible for this particular project. Your name and phone number will remain in the data base so that others can contact you if another study comes up that you may be eligible for. Would it be okay to keep this information on file and to call you in the future?

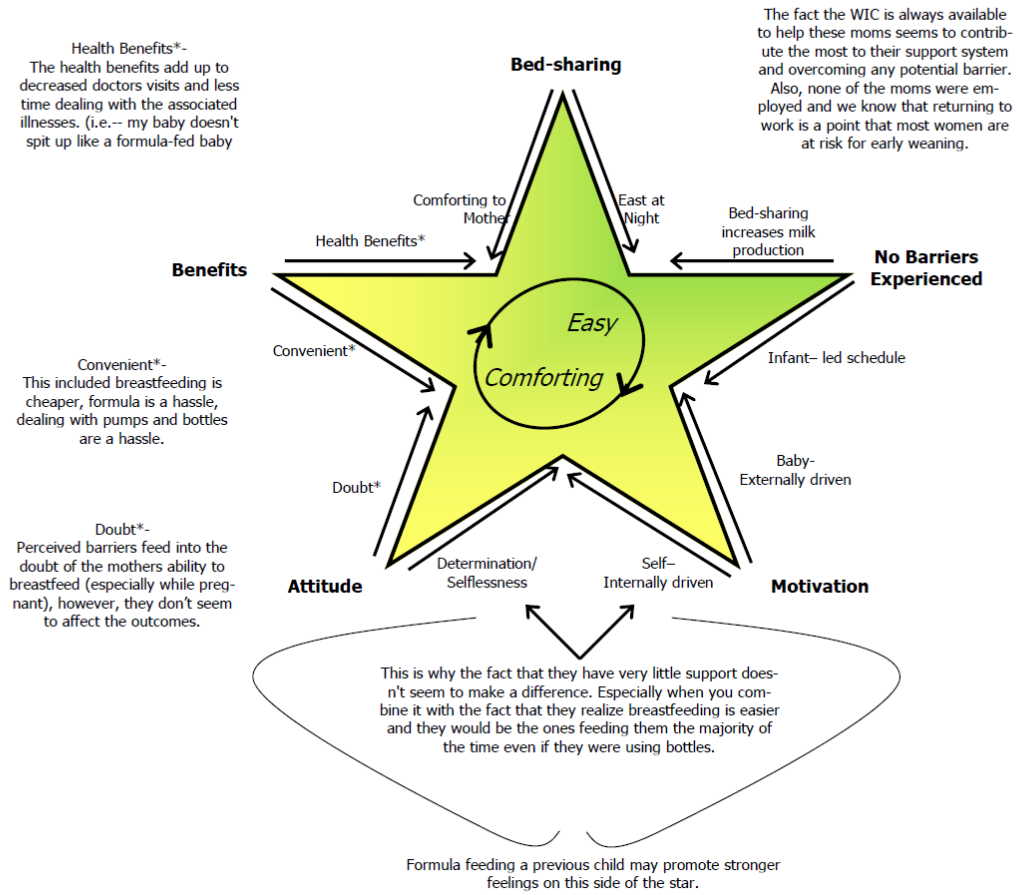
No (0)

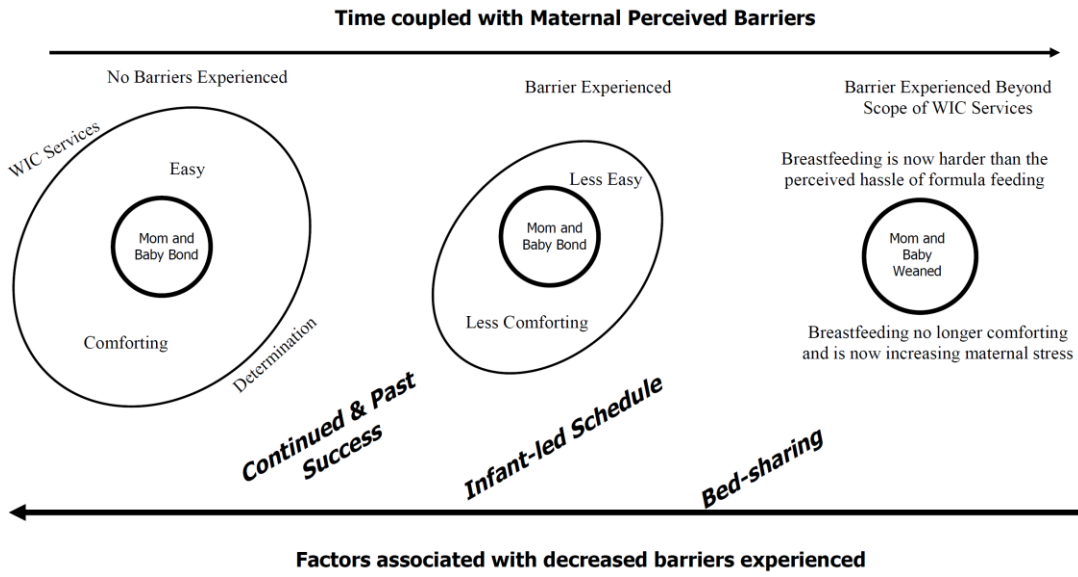
Yes (1)

A-4: Consent Form

A copy will be attached to any printed versions.

A-5: Preliminary Models





Vita

Lacey Raburn is from Dickson, Tennessee. She attended East Tennessee State University where she graduated with a degree in Family and Consumer Sciences with a concentration in nutrition. From there, she attended the University of Tennessee, Knoxville and where she received a Master of Science in Nutrition Science in 2011. She also completed her Dietetic Internship through the University of Tennessee in August of 2011. Lacey plans to become a Registered Dietitian so she can work in the field of outpatient, pediatric nutrition counseling in Crossville, Tennessee.