The Relationship of Breastfeeding Self-Efficacy to Breastfeeding Duration and Breastfeeding Exclusivity of Full-Term Infants in the Neonatal Intensive Care Unit: A Mixed Method Study

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THE RELATIONSHIP OF BREASTFEEDING SELF-EFFICACY TO BREASTFEEDING DURATION AND BREASTFEEDING EXCLUSIVITY OF FULL-TERM INFANTS IN THE NEONATAL INTENSIVE CARE UNIT: A MIXED METHOD STUDY

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KAREN HYLTON-MCGUIRE

Submitted in partial fulfillment of the requirements

For the degree of

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(April 19, 2018)
The dissertation of Karen Hylton-McGuire

Entitled THE RELATIONSHIP OF BREASTFEEDING SELF-EFFICACY TO BREASTFEEDING DURATION AND EXCLUSIVITY OF FULL-TERM INFANTS IN THE NEONATAL INTENSIVE CARE UNIT: A MIXED METHOD STUDY in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

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Abstract

Background

Research demonstrates better health outcomes for both women and their infants when infants are breast-fed. There is evidence that an increasing number of full-term, normal birth weight infants are being admitted to the Neonatal Intensive Care Unit (NICU) and that these infants receive less breast milk than their well full-term and preterm infant counterparts. The effect of short-term admission of full-term infants to the NICU on maternal breastfeeding self-efficacy and breastfeeding exclusivity and duration, and the facilitators of and barriers to breastfeeding success reported by these mothers, has not been well explored.

Purpose

The purpose of this study was to explore the relationship of breastfeeding self-efficacy to breastfeeding duration and breastfeeding exclusivity of full-term infants discharged from the NICU and to explore the facilitators and barriers that influence breastfeeding success for a woman with a full-term infant in the NICU. Factors that may affect the breastfeeding self-efficacy of mothers with a full-term infant in the NICU were also explored.

Method

This was a mixed method study where quantitative and qualitative data were collected concurrently. The Critical Incident Technique (CIT) was used to identify the facilitators and barriers to breastfeeding success. The breastfeeding self-efficacy scale for preterm and ill infants (BFSE-SF-IP) was used to measure the mothers’ breastfeeding self-efficacy. One week after the infant’s discharge, the researcher contacted the mothers, who completed the BSFE and described what they thought facilitated or hindered their breastfeeding success. Mothers were contacted three weeks later to ascertain breastfeeding status and formula usage. Data on other maternal
and infant variables were also collected. All data was interpreted and integrated to form a phenomenon of a successful mother breastfeeding a full-term infant in the NICU.

**Results**

The sample was comprised of 41 ethnically diverse postpartum women who were predominately married, well educated, first-time mothers, and delivered by cesarean section. Most had no prior breastfeeding experience. The Cronbach’s alpha of the BSEF-SF-IP in this sample was .953. Regression analyses using the BFSE score and other factors revealed the BFSE to be the only significant predictor of breastfeeding duration and exclusivity at four weeks after discharge and accounted for 47 percent of the variance in the amount of formula used at four weeks. There was a positive correlation between breastfeeding experience, number of live births, breastfeeding at one and four weeks and BFSE scores. There was also a strong negative correlation between breastmilk pumping at one week, formula usage at one and four weeks and BFSE scores.

Mothers identified 67 critical incidents as facilitators for and barriers to breastfeeding success in the NICU and one week postpartum. The most frequently cited facilitators in the NICU were nurses/lactation consultant support, and breastfeeding skills. The most common cited barriers to breastfeeding success were feeding the infant formula, separation from the baby, scheduled feedings and not enough breastmilk. After the baby was home for one week, mothers most often reported the facilitators to be family support, determination, and staying with the baby. Not having enough milk and infant not taking the breast were the most frequently cited barriers to breastfeeding success at one week.
Integration

Women with a moderate to high BFSE score were more likely to be exclusively breastfeeding one-week post discharge. These women generally were experienced mothers with other children. They identified the use of formula, scheduled feedings, and separation from their infants as barriers to breastfeeding success in the NICU. Family support and determination was their key to facilitators for breastfeeding success at one-week at home time frame.

First time mothers with a moderate to high BFSE identified facilitators for breastfeeding success in the NICU as the nurse/lactation consultant support and developing breastfeeding skills. They had a fear of not producing enough milk in the NICU and at home. They also spoke of determination and support as a facilitator to breastfeeding success.

Mothers with a lower BFSE scores, were predominately first-time mothers. They all reported not enough milk as a barrier to successful breastfeeding. The majority of these mothers also reported the infant not latching. First-time mothers were also the only ones in the study who identified physically not feeling well or having a cesarean section as a barrier to successful breastfeeding in the NICU.

Summary and Recommendations

This study demonstrated positive breastfeeding self-efficacy can determine successful breastfeeding at one and four weeks after discharge. The research and practice implications of this study suggest that breastfeeding self-efficacy enhances breastfeeding success and warrants further study.
Dedication

This dissertation is dedicated to my parents James and Dorthy Hylton who imparted the importance of an education and fostered my pursuit of my education. It is also dedicated to all of the breastfeeding mothers who inspire and amaze me daily. It has been my privilege to have been able to be a small part of their lives while they journey through the challenges and rewards of motherhood. The participants in this study generously gave of their time to help me to understand their perspectives of what helped and hindered their breastfeeding success. The following statement from UNICEF 1991, conveys the importance and significance of supporting mothers to be successful in their efforts to breastfeed their infants.

Imagine that the world had invented a new “dream product” to feed and immunize everyone born on Earth. Imagine also that it was available everywhere, required no storage or delivery — and helped mothers to plan their families and reduce the risk of cancer... Then imagine that the world refused to use it... (T)his scenario is not, alas, a fiction. The 'dream product' is human breastmilk, available to us all at birth, and yet we are not using it.
Acknowledgements

No one can complete a doctoral degree by themselves. There are numerous people along this journey that support, mentor, and propel you toward this goal. I would like to thank each of them.

This dissertation would not have come to fruition without my dissertation committee. Their professionalism and dedication to nursing research is evident. First and foremost, I need to acknowledge the dedication and professionalism of my chairperson, Dr. Ann Marie Paraszczuk. Her knowledge, mentorship, support, compassion and friendship were invaluable along this journey. Our shared compassion for breastfeeding mothers guided this work. We are now kindred spirit, and I will never be able to express my sincere appreciation for the way in which she selflessly shared her time and knowledge. I will always be eternally grateful.

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CHAPTER 1

Statement of the Problem

Introduction

There are numerous short and long-term health benefits for both women and their infants when infants are breast-fed (American Academy of Pediatrics, 2012a). The breastfeeding initiation rates in the United States have increased substantially over the last 50 years; however, considerable declines are noted for infants receiving only breastmilk for the first six months and breastfeeding for one year (Center for Disease Control and Prevention, 2016). The latest data from the Center for Disease Control and Prevention (2016) reports that 81 percent of women begin breastfeeding shortly after birth, but the percentage of women who breastfeed only, falls to 44 percent at three months and 22 percent at six months. The reason for this decline in breastfeeding rates is multifactorial but stems mainly from inadequate support mothers receive from the healthcare system and providers, their own families, governmental policies and employers (Center for Disease Control and Prevention, 2016).

A known barrier that reduces initiation, exclusivity, and duration of breastfeeding is the separation of infants from their mothers in the early days following birth (Crenshaw, 2014). The current practice of rooming-in, that is, to keep healthy infants with their mothers for the postpartum hospital stay, addresses this known impediment to successful breastfeeding. Infants who need to be admitted to the Neonatal Intensive Care Unit (NICU) are separated from their mothers for varying periods of time at a point when frequent breastfeeding is essential to promote adequate milk production.

Infants admitted to the NICU are at increased risk for adverse health outcomes due to their prematurity, decreased weight, or illness (Kachoria & Oza-Frank, 2015). There is an
increased emphasis on the provision of breast milk for the preterm infant to prevent short and long-term sequelae. Evidence has shown that necrotizing enterocolitis, a bowel disease effecting preterm infants is less likely to occur if the infants are given an all human milk diet; preterm infants fed human milk have considerable improvement in their feeding tolerance and a decrease in late onset sepsis (Sullivan, Schanler, Kim, Patel, Trawoger, Kiechl-Kohlendorfer, et al., 2010).

There is evidence that an increasing number of full-term, normal birth weight infants are being admitted to the NICU for various health issues including, possible sepsis, hypoglycemia, and respiratory distress. Full-term infants admitted to the NICU, receive less breast milk than their preterm counter-parts (Kacchoria & Oza-Frank, 2015). Preterm infants require a smaller amount of volume of milk than full-term infants and are often on intravenous fluids longer. Mothers are then more likely to be able to meet the breast milk needs of a preterm infant than that of a full-term infant. Preterm infants have decreased energy levels and therefore do not present feeding cues to demand feedings and are often fed through gavage feeding tubes at regular intervals. It is common practice in the NICU for infants to be fed on a set schedule. The early postnatal period is a crucial time when a mother of a full-term infant needs to establish an adequate milk supply and have around the clock access to her infant, instead of breastfeeding her infant on a rigid every three-hour schedule. The researcher has observed that these circumstances result in supplementation with formula to meet the caloric and volume needs of the full-term infant in the NICU.

There is a difference between the intestinal flora of a breast fed infant and that of a formula fed infant that leads to the functional benefits that breast milk feedings have over infant formula feedings (Harmsen, Wildeboer-Veloo, Raangs, Wagendorp, Klijn, Bindels, et al., 2000). Immune cells, immunoglobulins, long chain polyunsaturated fatty acids, cytokines, nucleotides,
hormones, and bioactive peptides present in human milk assist the vulnerable developing immature immune system; these components help mature the intestines, and reduce gastric damage (Spatz & Lessen, 2011). This provides greater protection from gastrointestinal infections and development of gastrointestinal tolerance of dietary allergens. Supplementation with formula changes the microbiome and the intestinal flora resulting in increased health issues (Harmsen et al., 2000).

According to Dennis (1999), breastfeeding self-efficacy refers to a mother’s confidence in her ability to breastfeed her infant. Positive breastfeeding self-efficacy is known to enhance breastfeeding exclusivity and duration (Dennis, 2006). The development of breastfeeding self-efficacy can be impaired when the infant is admitted to the NICU, resulting in decreased breastfeeding. Considering the association of short and long-term health risks, it is important to identify the impact that a NICU admission may have on breastfeeding self-efficacy and outcomes. It is also important to identify the facilitators and barriers that contribute to successful, exclusive, and increased duration of breastfeeding for full-term infants discharged from the NICU.

**Background**

The American Academy of Pediatrics (AAP) (2012a) considers breastfeeding and human milk the normative nutrition for infants. The AAP has classified breastfeeding as a healthcare decision, not a lifestyle choice, because of the numerous health benefits for infants and mothers (American Academy of Pediatrics, 2012a). According to Brenner and Buescher (2011), human milk is not just food. Human milk contains both nutritive and nonnutritive components, and “is a complex, sophisticated, and highly integrated human infant support system that provides the infant with protection, information, and nutrition” (Brenner & Buescher, 2011, p.1767).
The improvement in infant health outcomes attributed to breastfeeding is staggering (American Academy of Pediatrics, 2012a; Brenner & Buescher, 2011). According to the Surgeon General (2011), there is a 72 percent reduction in hospitalizations for lower respiratory infections for infants with exclusive breastfeeding for four months or more. These beneficial effects last for two months after the last breast milk is received by the infant.

Breastfeeding has been shown to have protective effects for chronic illness later in life. Childhood inflammatory bowel disease is reduced by 31 percent with exclusive breastfeeding (Barclay, Russell, Wilson, Gilmour, Satsangi, & Wilson, 2009). Breastfeeding for nine months reduces an infant’s odds of becoming overweight by more than 30 percent (Center for Disease Control, 2011). Type 1 diabetes is reduced by 30 percent, and type 2 diabetes mellitus is reduced by 40 percent in infants exclusively breastfed for three months (Das, 2007; Rosenbauer, Herzig, & Giani, 2008). In infants breastfed six months or longer, there is a 20 percent decrease in acute lymphocytic leukemia and a 15 percent decrease in infants with acute myeloid leukemia (Rudant, et al. 2010). Breastfeeding for three months or longer significantly increases intelligence scores, and higher teacher ratings at 6.5 years of age (Kramer, Aboud, Mironova, Vanilovich, Platt, Matush, et al. 2008; Victoria, Bahl, Barros, Franca, Horton, Krasevec, Murch, & Sankar, 2016). Quigley, Hockley, Carson, Kelly, Renfrew, & Sacker (2012) found higher cognitive developmental scores in term infants who were fed an exclusive breast milk diet for four to six months and preterm infants who were fed exclusive breast milk for two months.

According to the United States Surgeon General (2011), there are excessive outcome risks among full-term non-breastfeeding infants. Compared to breastfeeding infants, formula fed infants have a higher risk of developing certain conditions. There is a 100 percent excessive risk of developing otitis media, a 47 percent excessive risk of developing eczema, atopic dermatitis,
and a 178 percent excessive risk of contracting gastrointestinal infection with diarrhea and vomiting. The risk of hospitalization for lower respiratory tract diseases in the first year is 257 percent higher for formula fed infants. Formula fed infants with a family history of asthma have a 67 percent added risk of developing asthma and without a family history of asthma, a 35 percent added risk. Not breastfeeding increases the risk of childhood obesity by 32 percent, type 2 diabetes mellitus by 64 percent, acute lymphocytic leukemia by 23 percent, acute myelogenous leukemia by 18 percent, and sudden infant death syndrome by 56 percent.

There are also significant maternal health benefits from breastfeeding and associated risks of not breastfeeding. Mothers have a decreased incidence of postpartum blood loss (American Academy of Pediatrics, 2012a). There is a longer interval between pregnancies in mothers who breastfeed and a lower incidence of postpartum depression (Pope & Mazmanian, 2016; Sridhar & Salcedo, 2017). Child abuse and neglect occur less frequently in breastfeeding mothers (Strathearn, Mamun, Najman, & O’Callaghan, 2009). Mothers with gestational diabetes are less likely to develop type 2 diabetes with an increased duration of breastfeeding. Mothers who breastfeed have a lower risk and severity of rheumatoid arthritis when they breastfeed longer (Karlson, Mandl, Hankinson, & Grodstein, 2004). Postmenopausal women, who have breast-fed their children 12 to 23 months cumulatively, had a significant reduction in hypertension, hyperlipidemia, cardiovascular disease, and diabetes (Groer, Jevitt, Sahebzamni, Beckstead, & Keefe, 2013). Mothers who have breast-fed have a reduced risk of premenopausal breast cancer and a reduced risk of ovarian cancer and osteoporosis. Physiological differences in women during months of breastfeeding may have a role in explaining later risks for midlife disease such as diabetes, cardiovascular disease, and metabolic syndrome (Earle, Mokomane, &
Heymann, 2011; Groer et al., 2013; United States Department of Health and Human Services, 2011).

The AAP (2012a) recommends exclusive breastfeeding for the first six months of life, with the introduction of solid foods at that age and continued breastfeeding until one year. Continuation of breastfeeding beyond one year of age should occur for whatever length of time the mother and the infant desire. The World Health Organization (2015) recommends exclusive breastfeeding for the first six months of life to achieve optimal growth, development and health and to introduce safe complementary foods and continued breastfeeding for up to two years of age or beyond. Breastfeeding is thus a global health recommendation.

**Statement of the Problem**

Mothers are recognizing the improved health outcomes and getting the message that breastfeeding is beneficial for their infants and themselves. The initiation rates have slowly increased, and 81 percent of mothers are now initiating breastfeeding in the United States (Center for Disease Control, 2016). However, exclusive and long-term breastfeeding rates quickly decline to 44 percent at three months and 22 percent at six months (Center for Disease Control, 2016). These statistics suggest there are obstacles for mothers to overcome to meet their own breastfeeding goals and the recommendation of the American Academy of Pediatrics.

A known obstacle to successful breastfeeding is separating the mother from the infant (The World Health Organization, 2017). This can occur with the admission of an infant to the Neonatal Intensive Care Unit (NICU). This separation can inhibit early and frequent breastfeeding that maintains and supports lactation. Lack of or early cessation of breastfeeding may affect the health of the mother and the child. Infants that require NICU care are at greater risk for negative health outcomes than healthy full-term infants (Colaizy & Morriss, 2008).
Research indicates that full-term infants admitted to the NICU receive less breast milk than their preterm counterparts (Coliaizy & Morriss, 2008; Kachoria & Oza-Frank 2015). The numerous health problems experienced by extremely low birth weight infants and preterm infants have made human milk consumption an imperative to reduce the risk of complications. Hence, mothers of these infants have been strongly encouraged by health care providers to provide expressed breast milk to prevent necrotizing enterocolitis, sepsis, and improve feeding tolerance. Whether mothers of full-term infants in the NICU, who may not be as small or sick as many preterm infants, receive similar encouragement and support to breastfeed or provide expressed breastmilk needs to be explored.

The separation that results from an infant’s admission to the NICU may undermine a mother’s confidence in her ability to breastfeed her infant. Dennis (1999) developed the concept and theory of breastfeeding self-efficacy based on Bandura’s theory of self-efficacy as a framework to study breastfeeding confidence in mothers. Research that has been previously conducted on healthy full-term infants demonstrates a relationship between breastfeeding self-efficacy and maternal breastfeeding behaviors with lower breastfeeding self-efficacy associated with formula supplementation and early cessation of breastfeeding (Dennis & Faux, 1999; Dennis, 2003).

**Purpose of the Study**

The purpose of this study was to explore the relationship of breast feeding self-efficacy to breastfeeding duration and breastfeeding exclusivity of full-term infants discharged from the Neonatal Intensive Care Unit (NICU) and to explore the facilitators and barriers that influence breastfeeding success for a woman with a full-term infant in the NICU. Factors that may affect the breastfeeding self-efficacy of mothers with a full-term infant in the NICU were explored.
Research Questions

Quantitative research question

• What is the relationship of breastfeeding self-efficacy to the breastfeeding duration and exclusivity of women breastfeeding a full-term infant in the NICU?

• What is the relationship between maternal and infant factors and breastfeeding self-efficacy of women breastfeeding a full-term infant in the NICU?

Qualitative research question

• What do women whose full-term infants who were in the NICU, perceive are the facilitators and barriers that influence their breastfeeding success?

Integrated mixed method question

• Does the breastfeeding success of mothers of full-term infants admitted to the NICU emerge as the single phenomenon when the quantitative and qualitative data are integrated, and an interpretation is formed?

Significance

With the increasing incidence of full-term infants being admitted to the NICU the importance of identifying the impact of a NICU admission on breastfeeding outcomes is imperative. Identifying whether there is a relationship between breastfeeding self-efficacy and breastfeeding duration and breastfeeding exclusivity of full-term infants discharged from the Neonatal Intensive Care Unit (NICU) will lead to more information about the problem, particularly information about the factors that affect breastfeeding self-efficacy. It is also important to identify the facilitators and barriers for a woman breastfeeding a full-term infant in the NICU to enhance the facilitators and address the barriers to promote successful breastfeeding. This information will provide insight about the breastfeeding self-efficacy of a
mother with a full-term infant in the NICU and lead to the development of interventions to increase breastfeeding success.

**Definition of Terms**

For the purposes of this study the following terms will be defined as:

*Breastfeeding Self-Efficacy* - is a salient variable in breastfeeding duration since it predicts (a) whether a mother chooses to breastfeed or not, (b) how much effort she will expend, (c) whether she will have self-enhancing or self-defeating thought patterns, and (d) how she will respond emotionally to breastfeeding difficulties (Dennis, 1999). Breastfeeding self-efficacy will be measured by the Breastfeeding Self-Efficacy (Short Form) for mothers of preterm and ill newborns. Ill newborns can be preterm, late preterm, or full-term. This instrument was used for all premature and ill infants admitted to the NICU regardless of gestational age. The range of possible scores is 18-90. A score of less than 42 will be categorized as low self-efficacy, 43-66 as moderate self-efficacy, and 67-90 as high self-efficacy.

*Full-term Infant* - is defined as one born from the gestational age of 37 weeks to 42 0/7 weeks. Each day of the week is reported in increments designated as day 1 through 7. This is the recommended classification of deliveries from 37 weeks of gestation by the American College of Obstetricians and Gynecologists (2013):

- Early term: 37 0/7 weeks through 38 6/7 weeks
- Full-term: 39 0/7 weeks through 40 6/7 weeks
- Late term: 41 0/7 weeks through 41 6/7 weeks
- Post term: 42 0/7 weeks and beyond

*The Neonatal Intensive Care Unit* (NICU) - is a hospital unit that specializes in the care of preterm and ill newborns after birth. According to the American Academy of Pediatrics (2012b),
there are four levels of NICUs. This research was conducted in a Level III plus NICU. A Level III plus NICU can provide a range of subspecialty care including sustained life support for newborns less than 32 weeks and less than 1500 grams and manage all critically ill infants with prompt access to a range of pediatric subspecialists.

*Breastfeeding exclusivity* – is defined as breastfeeding the infant solely at the breast or providing only pumped expressed breast milk feedings, with no formula supplementation given to the infant.

*Breastfeeding success* - is defined by the researcher as the provision of exclusive breastmilk feedings at four weeks after discharge from the NICU.

*Facilitator* – is something that helps to bring about an outcome (as learning, productivity, or communication) by providing indirect or unobtrusive assistance, guidance, or supervision. A facilitator will be defined as an intervention, situation, or environment that is deemed supportive of successful breastfeeding.

*Barrier* – is something immaterial or material that impedes or separates individuals from obtaining their goal. A barrier will be defined as an obstacle, behavior, or incident that impedes successful breastfeeding.

**Conclusion**

Breastfeeding provides numerous short and long-term health benefits for both women and their infants. The frequency of the admission of full-term infants to the NICU is rising. Evidence indicates that infants admitted to the NICU, because of their separation from their mothers, consume less breast milk than their healthy full-term counterparts who room-in and are discharged with their mothers. Full-term infants admitted to the NICU also consume less breast
milk than preterm infants in the NICU, because of the pressure on the mother to produce a set amount of breastmilk before her body is physiologically able to do so.

Self-efficacy is a salient variable in breastfeeding duration and success. It is important to identify the relationship between breastfeeding-self efficacy and breastfeeding duration and breastfeeding exclusivity and factors that affect breastfeeding self-efficacy. This evidence can lead to the development of effective interventions to promote initiation and sustained breastfeeding for the full-term infants admitted to the NICU who are at risk for low breastmilk consumption which then results in formula supplementation and increased health risks. In addition, identifying the barriers and facilitators of breastfeeding will expand knowledge in this area and help nurses to ascertain actions and conditions that will enhance breastfeeding success in this vulnerable population.
CHAPTER 2

Review of the Literature

Introduction

Breastfeeding confers numerous improved infant and maternal health outcomes (American Academy of Pediatrics, 2012a; Brenner & Buescher, 2011). A mother’s confidence in her ability to breastfeed enhances her likelihood of breastfeeding success (Dennis, 2003; Wheeler & Dennis, 2013). The impact of maternal breastfeeding self-efficacy and other factors that hinder early breastfeeding on breastfeeding exclusivity and duration has been described in the literature. This chapter includes a review of the literature that addresses the factors related to this study and is divided into seven sections. The first section explains the theory that serves as a framework for the research questions of this study. Section two will describe the research on the concepts of self-efficacy and breastfeeding self-efficacy and its effect on breastfeeding outcomes. The third section will summarize the research that describes the short and long-term benefits of breastfeeding for the infant and the mother. The fourth section will describe studies of mothers’ experiences of having a full-term infant in the NICU and breastfeeding. The fifth section pertains to factors, such as separation of mother and infant in the early postnatal period, that have been shown to negatively affect breastfeeding in infants. The sixth section will review the current trends in Neonatal Intensive Care admissions and their impact on breastfeeding, and the seventh section will describe the impact of separation bonding and breastfeeding.

Bandura’s Theory of Self-Efficacy

The theoretical framework that guided the study was Bandura’s Theory of Self-Efficacy (Bandura, 1977). According to Bandura (1997), self-efficacy is a dynamic cognitive process in which an individual evaluates his or her ability toward the performance of a given task; individuals with high self-efficacy will more likely initiate behaviors, persevere in the face of
adversity, and succeed in mastering new behaviors. Bandura suggested that four factors determine the level of an individual’s self-efficacy in a particular realm of life; these factors are (a) personal mastery experiences, (b) vicarious mastery experiences, (c) verbal persuasion, and (d) physiological and affective states.

Personal successful mastery experiences lead to the expectation of repeated future good outcomes. Vicarious mastery experiences involve observation of a similar other who is successful and can also lead to the expectation of future good outcomes for the self. Verbal persuasion, or the assurance by others that one can achieve a good outcome, bolsters self-efficacy (Dennis, 1999). Finally, physiological and affective states (such as a very high level of arousal or negative mood) can influence perception of efficacy; with the reduction or reinterpretation of such states, higher perceived self-efficacy can be achieved (Nichols, Schutte, Brown, Dennis, & Price, 2009). Individuals incorporate four sources of information when choosing to perform and maintain a behavior: (1) performance accomplishments, (2) vicarious experiences, (3) verbal persuasion, and (4) inferences made for the individual’s physiologic and or affective state (Bandura, 1977). This research study used Bandura’s theory of self-efficacy to explore the relationship of breastfeeding self-efficacy to the duration and exclusivity of women breastfeeding a full-term infant in the NICU.

**Breastfeeding Self-Efficacy**

Dennis (1999) developed the breastfeeding self-efficacy concept and theory, by incorporating Bandura’s (1977) Social Cognitive Theory. Bandura’s Theory of Self-Efficacy is derived from the Social Cognitive Theory. Self-efficacy refers to individuals’ perceived confidence in their ability to perform a specific behavior. It is a cognitive process by which individuals use their ability to regulate their motivation, thought processes, emotional states and
social environment to direct behavior (Bandura, 1977). Self-efficacy is predictive of health behaviors (Dennis, 1999). “Self-efficacy is a pivotal factor in the performance of specific behavior since it reflects individuals’ perceptions about their abilities and not necessarily their true abilities” (Dennis, 1999, p.196). Self-efficacy perceptions are based on beliefs in abilities in specific situations and does not refer to personality characteristics operating independently for contextual factors (Dennis, 1999). Therefore, an individual’s self-efficacy is situation specific and diverse.

According to Dennis (1999) breastfeeding self-efficacy refers to a mother’s confidence in her ability to breastfeed her infant, and it predicts the following: whether a mother chooses to breastfeed or not; how much effort she will expend; whether she will have self-enhancing or self-defeating thought patterns; and how she will emotionally respond to breastfeeding difficulties. Breastfeeding self-efficacy is influenced by four main sources of information: (1) performance accomplishments (e.g., past breastfeeding experiences); (2) vicarious experiences (e.g., watching other women breastfeed); (3) verbal persuasion (e.g., encouragement from influential others such as friends, family, and lactation consultants); and (4) physiological responses (Dennis, 1999).

The model that Dennis and Faux (1999) used as a framework to study breastfeeding confidence and to develop the Breastfeeding Self-Efficacy Theory is displayed in Figure 1.

**Figure 1. Development of Breastfeeding Self-Efficacy Theory**
Breastfeeding Self-Efficacy Scale (BSES)

Dennis and Faux (1999) developed the Breastfeeding Self-Efficacy Scale (BSES) to assist healthcare professionals to assess new breastfeeding mothers’ breastfeeding self-efficacy, measure breastfeeding confidence, and plan interventions to foster breastfeeding success. The BSES, is a 33 item, five-point Likert scale self-report instrument, to assess breastfeeding self-efficacy expectancies in new mothers. In developing this instrument, the items of the BSES were empirically generated, then validated by an expert panel. A pilot study with 130 participants was conducted to test psychometric properties, factor composition, and predictive and constructive validity. A Cronbach’s alpha coefficient of .96 was achieved for the BSES in this study. The factor analysis indicated the instrument had technical and interpersonal subscales suggesting the instrument is bidimensional (Dennis, 1999).

The results of the study demonstrated that the scale was easy to administer, and the BSES scores predicted which women would continue to breastfeed up to six weeks postpartum. The sum of the items produces a possible score of 33-165. Higher scores indicate higher levels of breastfeeding self-efficacy. Lower scores indicate lower breastfeeding self-efficacy (Dennis, 1999). Therefore, the BSES is useful to identify mothers with low breastfeeding confidence, and to plan interventions to modify variables that hinder breastfeeding successes to help mothers achieve their breastfeeding goals.

According to Dennis (2003), internal consistency statistics of the BSES suggested item redundancy. To reduce the number of items on the original BSES, Dennis conducted a study to psychometrically assess the revised Breastfeeding Self-Efficacy Scale short form (BSES-SF). A sample of 491 breastfeeding mothers participated in a longitudinal study and completed mailed questionnaires at one, four, and eight weeks postpartum. The survey instruments distributed in
the mailed envelopes included the BSES, the Edinburgh Postnatal Depression Scale, the Rosenberg Self-Esteem Scale, and the Perceived Stress Scale. Using strict explicit reduction criteria, 18 items were deleted from the original BSES. The new 14-item BSES-SF had a Cronbach’s alpha of .94. Construct validity was assessed using factor analysis, comparison of contrasting groups, and correlations with similar construct measures. Predictive validity was supported by the significant differences between breastfeeding and bottle-feeding mothers at four and eight weeks postpartum. The BSES-SF exhibited psychometric results that indicate its usefulness to measure breastfeeding self-efficacy. The BSES-SF is a simplified more parsimonious instrument to identify breastfeeding mothers at risk for early cessation of breastfeeding. Therefore, for mothers with identified low breastfeeding self-efficacy, strategies can be developed to build individual confidence, and programs to promote breastfeeding success can be implemented and evaluated for effectiveness.

Blyth, Creedy, Dennis, Moyle, Pratt, and De Vries (2002) identified that many high-risk factors affecting breastfeeding initiation and duration are unmodifiable. Therefore, it is important to identify modifiable variables and developed supportive interventions that enhance breastfeeding duration. The authors conducted a prospective survey study with 300 women to assess the effect of maternal confidence or breastfeeding self-efficacy on breastfeeding duration. Women were recruited in their last trimester of pregnancy and contacted at one and four months postpartum. Telephone interviews were conducted to determine feeding methods, and breastfeeding self-efficacy using the BSES. Of the 92 percent of the women that initiated breastfeeding, only 60 percent of the mothers were still breastfeeding at four months postpartum, and only 28.6 percent were exclusively breastfeeding. BSES scores were related to breastfeeding outcomes at one week and four months. Mothers with high BSES were more likely to be
breastfeeding, and breastfeeding exclusively, at one week and four months than mothers with lower BSES scores. This research demonstrated that maternal breastfeeding self-efficacy is a predictor of breastfeeding duration and exclusivity.

The BSES-SF was translated into many languages and utilized for many different populations. Some examples of the different languages and populations are: Mandarin-Chinese, Italian, Spanish, Swedish, Aboriginal, Croatian, Turkish, Portuguese, Brazilian, United Kingdom, Polish, Australian, African American, and adolescents. All of these studies demonstrated the validity and usefulness of the breastfeeding self-efficacy scale (Creedy, Dennis, Blyth, Moyle, Pratt, De Vries, 2003; Dai, & Dennis, 2003; Dennis, Hearman, & Mossman, 2011; Eksioglu, & Ceber, 2011; Gerharsson, Nyqvist, Mattsson, Volgsten, Hildingsson, & Funkquist, 2014; Gregory, Penrose, Morrison, Dennis, & MacArthur, 2008; Pavicic Bosnjak, Rumboldt, Stanojevic, & Dennis, 2012; Ip, Gao, Choi, Chau, & Xiao, 2016; McCarter-Spaulding, & Dennis, 2010; McQueen, Montelpare, & Dennis, 2013; Oria, Ximenes, deAlmeida, Glick, & Dennis, 2009; Petrozzi, & Gagliardi, 2016; Torres, Torres, Rodriguez, & Dennis, 2003; Wulke, & Dennis, 2007; Zubaran, Foresti, Schumacher, Thorell, Amoretti, Muller, & Dennis, 2010).

Wheeler and Dennis (2013) modified the BSES-SF for mothers of ill or preterm infants. The BSES-SF for Mothers of Ill or Preterm Infants is an 18 item, 5-point Likert scale instrument with responses that range from not at all confident (1) to always confident (5). The modified scale was evaluated by 12 expert health care providers and piloted with 10 mothers of ill and preterm infants. The Cronbach alpha of the BSES-SF for ill and preterm infants achieved in this study was .88. The scale has additional items that address pumping of breast milk, and the specific challenges to mothers with infants in the NICU (Appendix B). For the psychometric
testing of The Breastfeeding Self-Efficacy Instrument for ill and preterm infants, the sample consisted primarily of preterm infants (80.7 percent, n = 130); with only 16.1 percent term infants (n = 26), and 3.1 percent post term (n = 5). Because of the small numbers of full-term infants included in the research with this instrument, the validity of the Breastfeeding Self-Efficacy Instrument for ill and preterm infants needs further investigation for use with a population of sick full-term infants.

Benefits of Breastfeeding

There are three systematic reviews on the beneficial effects of breastfeeding on health outcomes for term infants and their mothers in developed countries published by the Agency for Healthcare Research and Quality (AHRQ), the American Academy of Pediatrics (AAP), and the Lancet. The review by the AHRQ searched English publications from several sources including Medline, CINAHL, Cochrane library, bibliographies, and suggestions from experts. The articles were of eligible comparisons between breastfeeding and 15 infant health outcomes and six maternal health outcomes. Over 9000 abstracts were screened; 32 studies on term infant health outcomes, 43 on maternal health outcomes and 28 systematic reviews or meta analyses were included in the AHRQ report (Ip, Chung, Raman, Chew, Magula, DeVine, Trikalinos, & Lau, 2007).

The AHRQ concluded that a history of breastfeeding in infants was associated with a reduction in the risk of acute otitis media, non-specific gastroenteritis, severe lower respiratory tract infections, atopic dermatitis, asthma, obesity, type 1 and type 2 diabetes, childhood leukemia, and sudden infant death syndrome. The review did not reveal a relationship between breastfeeding of term infants and cognitive performance (Ip, Chung, Raman, Chew, Magula, DeVine, Trikalinos, & Lau, 2007).
The maternal health outcomes described by the AHRQ reported an association between a reduced risk of type 2 diabetes, breast and ovarian cancer and a history of lactation. A risk of postpartum depression was reported to be associated with early cessation or no breastfeeding. The review revealed no association between osteoporosis, and the return to pregnancy weight loss could not be clearly established (Ip, Chung, Raman, Chew, Magula, DeVine, Trikalinos, & Lau, 2007).

The AAP updated their policy statement regarding breastfeeding recommendations in 2012. They included recently published research and systematic reviews reaffirming that “breastfeeding and human milk are the reference normative standards for infant feeding and nutrition” (American Academy of Pediatrics, 2012a, p. 827). The AAP summarized and updated the AHRQ meta-analysis by adding an expanded analysis based on more recent studies. Their review concluded that breastfeeding had positive health effects on: respiratory tract infections, otitis media, gastrointestinal infections, necrotizing enterocolitis, sudden infant death syndrome, infant mortality, allergic disease, celiac disease, inflammatory bowel disease, obesity, diabetes type 1 and 2, childhood leukemia, lymphoma, and neurodevelopmental outcomes for all infants. In particular, preterm infants were shown to have significant and substantial health benefits from breastfeeding, such that the AAP recommends that all preterm infants receive human milk.

The AAP (2012a) also reported that there are positive health outcomes for mothers who breastfeed. Breastfeeding has been shown to decrease postpartum blood loss, promote rapid involution of the uterus, increase child spacing, decrease postpartum depression, decrease child abuse and neglect, promote faster return to pre-pregnant weight, and decrease the incidence of type 2 diabetes, rheumatoid arthritis, cardiovascular disease, and breast and ovarian cancer.
The AAP also included economic benefits in their review. A cost analysis based on the AHRQ report, concluded that if 90 percent of mothers could meet the AAP recommendations to exclusively breastfeed for 6 months, 13 billion dollars in health care costs could be saved annually (Bartick & Reinhold, 2010). These savings do not include the savings related to decrease in absenteeism, or adult deaths from diseases acquired in childhood. The AAP concluded that strategies to increase breastfeeding exclusivity for six months would have a national economic benefit.

Another systematic review was reported in the Lancet series on breastfeeding in 2016. The series consisted of two papers about breastfeeding. The first paper focused on the epidemiology, mechanisms, and lifelong effects of breastfeeding in the 21st century (Victoria, Bahl, Barros, Franca, Horton, Krasevec, Murch, & Sankar, 2016). For high income countries, the authors examined systematic reviews of published studies, meta-analyses, grey literature, and they also contacted researchers and public health practitioners for data. The systematic reviews and meta-analysis was commissioned by the World Health Organization for the background of this breastfeeding series.

The Lancet series integrated the results of 28 meta-analyses between the association of breastfeeding and outcomes for mothers and children. The results indicated that breastfeeding provides protection against the development of diarrhea, acute otitis media, asthma, oral malocclusions, and lower respiratory infections and reduced the admissions to hospitals for respiratory infections. Based on the evidence available in the meta-analysis, the authors indicated that the probability of mortality due to infections disease may have been underestimated. This review did not find evidence for the protection of allergic disorders, eczema, food allergies, but did find some protection for allergic rhinitis. Breastfeeding longer than 12 months was associated
with increased dental carries (Victoria, Bahl, Barros, Franca, Horton, Krasevec, Murch, & Sankar, 2016). This was the only negative finding reported.

The Lancet series reported the integrated results of 113 studies on the long-term effects in children for non-communicable diseases, obesity, and intelligence. Longer breastfeeding was associated with the reduction of overweight and obesity. There was also a reduction in type 2 diabetes, and a possible protective effect against type 1 diabetes. Reduction in leukemia was associated with breastfeeding. The Lancet authors also identified a consistent association with higher performance in intelligence tests, higher attainment in school, and higher earnings throughout life. In this review, no effect of breastfeeding on systolic or diastolic blood pressure or total cholesterol levels in children was found (Victoria, Bahl, Barros, Franca, Horton, Krasevec, Murch, & Sankar, 2016).

The authors of the Lancet series also assessed the benefits of breastfeeding for mothers. They confirmed the positive effect of breastfeeding on child spacing, breast cancer, ovarian cancer, postpartum depression, type 2 diabetes, and Body Mass Index (BMI). There was no evidence for the effect of breastfeeding on osteoporosis (Victoria, Bahl, Barros, Franca, Horton, Krasevec, Murch, & Sankar, 2016).

The Lancet report included an analysis of the effect of breastfeeding on mortality for children and mothers. It estimated that 823,000 deaths would be averted if breastfeeding was a near universal levels. The authors projected that preventable deaths for children would be reduced by 87 percent, and that high-income countries would benefit most from increasing breastfeeding rates because of their higher incidence of breast cancer (Victoria, Bahl, Barros, Franca, Horton, Krasevec, Murch, & Sankar, 2016).
Victoria, Bahl, Barros, Franca, Horton, Krasevec, Murch, and Sankar (2016) summed up the conclusion from their systematic review this way. The reproductive cycle of all mammals includes pregnancy and suckling of the young. To neglect the importance of breastfeeding and replace it with artificial products, affects the health of the world. They concluded that there is possibly no health behavior, other than breastfeeding, that can affect such varied outcomes in the two individuals involved, a mother and her child.

The reviews reported by the AHRQ, AAP, and the Lancet series all identified the beneficial effects of breastfeeding and the consequences of not breastfeeding in high-income countries and confirmed that breastfeeding has a major effect on long-term health, nutrition, and development of the child, as well as on the health of the mother. Almost all the published reports of the health outcomes of breastfeeding are observational cohort studies. There are ethical and practical difficulties in conducting randomized controlled trials to investigate the benefits of breastfeeding. Therefore, methodological issues have been raised in theses observational studies, which are identified limitations in this area of research. However, despite the criticism, the conclusions put forth in these reviews identify that there are beneficial health outcomes of breastfeeding for mothers and their infants (Victoria, Bahl, Barros, Franca, Horton, Krasevec, Murch, & Sankar, 2016; The American Academy of Pediatrics, 2012; Ip, Chung, Raman, Chew, Magula, DeVine, Trikalinos, & Lau, 2007).

**Experience of Breastfeeding in the NICU**

Palmer, Carlsson, Mollberg, and Nystrom (2012) used a reflective lifeworld phenomenological research approach to describe the lived experience of initiating breastfeeding under severe difficulties for mothers of full-term healthy infants. The inclusion criteria included Swedish-speaking mothers of a single full-term pregnancy, who experienced a very difficult
prolonged maternity stay because of breastfeeding difficulties. Eight mothers were asked to participate in the study and none refused. All of the women were living with the father of the child and were from both rural and urban areas. Seven women were primiparous, one was multiparous. They had varying delivery modes, and their ages ranged from 20-37. The interviews were conducted within two months of birth and the data was collected by tape recordings. The first author conducted all the interviews and asked the mothers to describe their experience of initiating breastfeeding. At the time of data collection, four women were breastfeeding, one was exclusively pumping and feeding expressed breast milk, and three had stopped breastfeeding earlier than they had planned. The authors analyzed the data using the reflective lifeworld research and phenomenology descriptions according to Dahlberg. The analysis was completed jointly by the co-authors to protect against researcher biases and maintain closeness to the text to understand the phenomenological meaning of the data. This approach is characterized as a movement between the parts of the whole, and the whole. The authors identified the essential meaning of the experience as existential lostness, as a mother forcing herself into a constant fight. The elements of the essential meaning are shattered expectations, a lost time for closeness, being of no use to the infant, being forced to expose oneself, and gaining strength through sharing.

Boucher, Brazal, Graham-Certosini, Carnaghan-Sherrard, and Feeley (2011) investigated the experience of mothers of breastfeeding infants at 33 and 36 weeks gestational age in the NICU and their breastfeeding initiation and progression. The study was a qualitative descriptive design. A convenience sample of ten mothers was recruited from a level III NICU. The interviews were conducted with mothers whose infants were in the NICU for at least five days. These authors reported the mothers recognized breastfeeding in the NICU as being different
from what they had anticipated. They described these different breastfeeding factors in the NICU as maintaining milk production, the regimen of the NICU, mother as learner, personal motivation, and forming attachments.

Nystrom and Axelsson (2002) explored the lived experience of mothers of full-term infants with mild medical conditions treated in the NICU for two to ten days. The authors used a phenomenologic-hermeneutic approach and conducted tape-recorded interviews with eight women at one to two months postpartum. The data were analyzed in several steps, ranging from a naïve reading to a structural analysis. These mothers reported experiencing emotional strain, grief, closeness and care. The authors described the emergence of three themes: feelings of being an outsider, lack of control, and of caring. Feelings of being an outsider were comprised of the subthemes; despair, powerlessness, homelessness, and disappointment. The theme lack of control contained descriptions of emotional instability. The subthemes were: threat, guilt, and insecurity. The third theme was caring. The subthemes of caring were: trust, love, anxiety, relief, closeness, and explanation. The authors concluded that even though an infant is not seriously ill, separating a mother from her infant in the first week of life, is emotionally stressful and a strain for the mother. The results of this study emphasize the needs of a mother to be involved in the decisions concerning her infant, and for ongoing support to deal with anxieties and worries.

Facilitators and Barriers

A known obstacle to successful breastfeeding is separating the mother from the infant (The World Health Organization, 2017). The admission of an infant to the Neonatal Intensive Care Unit (NICU), separates the infant from the mother. According to Bergman (2014), a human being is at its most alert state in its entire life after vaginal birth. The elevation of
noradrenalin is ten times higher at birth and will never be that high again. These high levels of noradrenalin open up the lungs and promote and ensure early bonding. When the newborn is placed on the mother’s skin her warmth activates a pathway from the infant’s amygdala to the frontal lobe and connects the emotional and social brain circuits. Constant uninterrupted physical presence of the mother ensures this happens. Bergman (2014) concludes that there are critical periods that reproductive biology affirms for the newborn and the mother. The newborn provides stimulation such as eye contact, nipple stimulation and sounds that work together to trigger the neural circuits in the mother. Oxytocin in the anterior cingular gyrus produces fierceness for the defense of her child that only lasts a few hours. The early suckling produces prolactin that assures mammogenesis is optimal. There is a window of two days for this to occur. The separation of the newborn from his mother can inhibit early and frequent breastfeeding that maintains and supports lactation. The author identified a facilitator to support breastfeeding is skin-to-skin care and rooming-in.

Trends

Colaizy and Morriss (2008) state that ten percent of full-term infants in the United States will require NICU care. Infants that are admitted to the NICU are breastfed at lower rates than healthy newborns (Colaizy & Morriss, 2008). An analysis of the PRAMS data from 27 states over 4 years revealed that full-term infants in the NICU were less likely ever to be breastfed. Preterm infants were more likely to be breastfed than full-term infants (Colaizy & Morriss, 2008). There was no explanation given in this report as to why preterm infant would receive more breastmilk than their full-term counter parts in the NICU.

Harrison and Goodman (2015), in an epidemiologic trend analysis in neonatal care in the United States from 2007 to 2012, concluded the incidence of NICU admissions is rising.
Preterm infant’s admissions remained steady over this period of time, however the weight of infants admitted to the NICU is increasing. The infants were larger and less premature. Infants weighing more than 2500 grams represented more than half of the admissions to the NICU. These infants are less likely to have serious illness.

Kachoria and Oza-Frank (2015), examined trends in breastfeeding initiation among NICU admitted infants in Ohio from 2006-2012. Their analysis revealed the gap between breastfeeding among NICU admitted and non-admitted infants was lessening. This was especially true for the very-low birth weight infants. However, the findings revealed that nearly 40 percent of mothers of term infants were not initiating breastfeeding in the NICU. In this study, term infants represented the largest proportion of NICU admissions. The authors speculate that a growing awareness of the need for breastmilk in the very premature infant may contribute to this disparity.

Mukkhopadhyay, Lieberman, Puopolo, Riley, and Johnson (2015), in an observational study that included 692 nulliparous women intending to breastfeed, compared well term infants with term infants separated from their mothers due to the need of sepsis evaluation. During the study period, term asymptomatic infants were evaluated for early onset sepsis for the following risk factors: inadequate intrapartum antibiotic prophylaxis, maternal fever, chorioamnionitis, duration of rupture of membranes greater than 18 hours, and sustained fetal tachycardia. Infants that met the criteria were transferred to another area for sepsis evaluation. Asymptomatic infants were transferred back to their mother’s room. Breastfeeding initiation among mothers of infants separated in the first two hours and mothers whose infants were not separated in the first two hours were compared. Delayed initiation of breastfeeding was more common in the infants separated from their mothers in the first two hours. Formula supplementation was also greater
among these infants. The authors concluded that separation in the first two hours of life for early sepsis evaluations of asymptomatic term infants was associated with increased early formula supplementation and delayed breastfeeding initiation.

Shim, Yang, Messina, and Mintzer (2018), conducted a retrospective study of term asymptomatic infants admitted to the NICU who received antibiotic therapy for greater than or less than 48 hours and compared their breastmilk feeding rates to that of well newborns rates at discharge. Exclusive breastmilk feedings were higher for well newborns than infants admitted to the NICU for antibiotics less than 48 hours. No difference was seen in breastmilk discharge rates in infants with greater than 48-hour antibiotic therapy. A multivariate logistic regression analysis of the NICU infants revealed older maternal age, less children, a first feeding of breastmilk, and more lactation consultant visits were associated with increased discharge breastmilk feedings.

**Separation**

There were several landmark studies conducted in the 1970s that prompted many of the changes in maternity care that exist today. Kennell, Trause, and Klaus (1975) described several studies of separation of mothers and infants. In a controlled study of 28 primiparas mothers, 14 mothers were given their nude infants at birth in bed for one hour, in the first two hours after delivery. They were also given five extra hours on the next three days after delivery. The other 14 mothers received the routine care of the hospitals at that time. They were shown the infant at birth, were given the opportunity for a brief contact at six to eight hours, and then were permitted 20 to 30 minutes for feeding every four hours. The two groups did not differ in birth weight, sex, marital status, and socioeconomics. Mothers were randomly assigned to groups. The providers making the observations in the follow-up encounters did not know which group the mothers were
assigned to. When the mothers returned at one month, there were significant differences between the groups. The mothers who saw and spent time with their infants at birth stood near their infants, watched during the exam, showed more soothing behaviors, more eye to eye contact, and fondling with feeding. They were more reluctant to leave their infants with someone else than the mothers who had the later contact after birth with their infants. At one year the groups were also different. The mothers with the more contact at birth spent more time assisting the provider with the infant and soothing their crying infant than the mothers who were only given a glimpse of their infants at birth. At two years, five mothers were randomly selected from each group and the language behaviors with their child were compared. The mothers with the prolonged contact at birth used twice as many questions, more words per proposition, fewer content words, more adjectives, and fewer commands than the mothers with less contact.

In another study, six mothers were given their infants to breast feed shortly after birth. Another group of six mothers did not have contact until 16 hours later. All mothers had intended to breastfeed. After two months, all six mothers in the early contact group were still breastfeeding, but only one mother in the delayed contact group was still breastfeeding (Kennell, Trause, & Klaus, 1975).

Kennell, Trause, and Klaus (1975) reported another study of nine mothers who were given their infants nude, skin to skin, after they left the delivery room. A second group of ten mothers, were separated as per the usual routine. Both groups of infants were then sent to the nursery for twelve hours. At twelve hours, the mothers’ interaction with their infants were observed. The early contact group showed more attachment behaviors. They fondled, kissed, looked into the face of their infants and gazed and held their infants closer than the separated group.
Kennell, Trause, and Klaus (1975) based on these studies, concluded there is an early time sensitive period after birth for an affectional bond to develop. The effect of this early interaction may influence later mothering behaviors. These effects may last up to two years. The authors concluded that hospital practices that interfere with sustained mother infant interaction should be minimized. While the finding of these studies are quite dated they provide valuable evidence on how separation can affects maternal infant bonding and breastfeeding.

Conclusion

There are many studies addressing the needs of women breastfeeding the very-low birthweight, preterm, and late preterm infants admitted to the NICU. However, there is a paucity of studies addressing facilitators and barriers facing breastfeeding women of full-term infants in the NICU, and their breastfeeding self-efficacy. A positive breastfeeding self-efficacy is known to contribute to breastfeeding success. Full-term infants admitted to the NICU consume less breastmilk than their preterm counterparts, and healthy full-term infants who are not separated from their mothers in the early postnatal period. In this population of full-term infants admitted to the NICU, the relationship of breastfeeding self-efficacy to the duration and exclusivity of breastfeeding has not been explored. Because of the small numbers of full-term infants included in the previous research with the BSES-SF-IP, the validity of this instrument for use with a population of sick full-term infants needs further investigation. It is important to examine the factors that affect breastfeeding success in this population of infants because of the known benefits of breastfeeding as well as the risks of not breastfeeding over the life span of an individual.
CHAPTER 3
Research Methods

Breastfeeding self-efficacy can affect exclusivity and duration of breastfeeding. This research study was designed to investigate the relationship of breastfeeding self-efficacy and breastfeeding outcomes. This chapter describes the research design, sample, variables, instruments, data analysis, data management and the protection of human subjects for this study.

Design

The research was a mixed method study that used an exploratory, comparative, correlational and concurrent parallel convergent design. Philosophical underpinning of mixed method research is pragmatism (Polit & Beck, 2012). The convergence model was used in a triangulation design. Quantitative and qualitative complementary data were obtained simultaneously about breastfeeding self-efficacy, and the facilitators for and barriers to breastfeeding success. The quantitative and qualitative strands had equal importance. A triangulation design was used to converge the analysis of breastfeeding self-efficacy in mothers of full-term infants admitted to the Neonatal Intensive Care Unit (NICU) in the quantitative arm of the study and the identified facilitators for and barriers to breastfeeding success, in the qualitative arm of the study. This was done to the offset the weaknesses and enhance the strengths of the qualitative and quantitative arms of the study (Polit & Beck, 2012).

The quantitative arm of this study was an exploratory, prospective, non-experimental, comparative, and correlational design wherein the researcher investigated breastfeeding self-efficacy and breastfeeding outcomes. In this part of the study, the independent variable was breastfeeding self-efficacy. The dependent variables were the duration and exclusivity of breastfeeding mothers of full-term infants discharged from the NICU. Data collected for other
variables included; maternal age, marital status, previous breastfeeding experience, education, ethnicity, gravida, para, length of gestation, delivery type, body mass index (BMI), reason for infant admission to the NICU, infant birth weight, length of stay, and amount of formula supplementation to correlate these factors with breastfeeding self-efficacy. In the qualitative arm of the study, interview data was obtained to identify the perceived facilitators and barriers mothers of full-term infants admitted to the NICU reported they encountered when breastfeeding in the NICU and at home one week after the infants’ discharge.

Sample/Population

A level III plus NICU on Long Island was utilized to recruit women who were breastfeeding a full-term infant in the NICU. This hospital is a designated Baby Friendly facility. As a certified Baby Friendly Hospital, the hospital adheres to the World Health Organization’s (WHO) Ten Steps to Successful Breastfeeding and the International Code of Marketing of Breast-Milk Substitutes. However, there are only two Baby Friendly requirements that apply to the NICU. These are that mothers begin pumping within six hours of birth and that infants are placed skin-to-skin as soon as the infant is medically able, and the mother is available. The other Ten Steps to Successful Breastfeeding, such as non-separation of infants and mothers, do not apply to infants admitted to the NICU.

Approximately 45 percent of infants admitted to this level III plus NICU were full-term infants, born between 37 weeks – 41 weeks gestation. An a priori power analysis was conducted and indicated that for a large effect size, a sample size of 40 is needed to achieve at least 80 percent power at a .05 level of significance. A convenience sample was obtained of English-speaking breastfeeding mothers whose full-term infants born at 37 weeks or greater were admitted to the NICU and were discharged within 14 days of admission. It was necessary to
exclude non-English speaking mothers because the interviews were conducted in English. Mothers who were admitted to the Medical Intensive Care Unit (MICU) were excluded because their own medical condition precluded them from breastfeeding their infants in the NICU. Mothers whose full-term infants were admitted to the NICU with congenital anomalies, or those infants with the diagnosis of neonatal absence syndrome (NAS), were also excluded because these conditions may affect the mother’s ability to breastfeed. Both qualitative and quantitative data were collected from all participants and used in both arms of the study.

Quantitative

Instrument

The 18-item breastfeeding self-efficacy short form for ill or preterm infants (BSES-SF-IP) was used to collect data on breastfeeding self-efficacy in this study. The development of the scale was guided by Bandura’s Social Cognitive Theory (Dennis and Faux, 1999). Dennis and Faux (1999), sought to capture the premise of Bandura’s Social Cognitive Theory that the belief of a person’s ability to perform a behavior will achieve a desired outcome. The original Breastfeeding Self-Efficacy Scale (BSES) was a 33 item, 5-point Likert scale, designed to measure postpartum mothers’ perception of their ability to breastfeed. The responses ranged from not at all confident to always confident. Content validity was established using a content validity index score. The scores were calculated by three measurement experts and four content experts, yielding a content validity score of .86 (Dennis, 1999). The original BSES scale was shortened to a 14-item scale for use with the same population (Dennis, 2003). Content validity was not repeated for the short form. The Breastfeeding Self-Efficacy short form (BSES-SF) was administered at one week, and data was collected at four and eight weeks postpartum to assess exclusive breastfeeding. Predictive validity was demonstrated by the relationship of
breastfeeding self-efficacy scores and mothers’ breastfeeding behaviors at four and eight weeks (Dennis, 2003). The construct validity was also established through comparisons on result of contrasting groups and correlations with similar construct measures. Previous research also demonstrated strong reliability of the instruments; the Cronbach alpha for the BSES, 33-item scale was .96 and the Cronbach alpha was .97 for the 14 item BSES-SF shorten scale (Dennis and Faux, 1999: Dennis, 2003). The BSES and the BSES-SF have been translated and adapted for use in research in many countries including, Western Iran, Australia, China, and Turkey. The BSES-SF has been the most used breastfeeding self-efficacy scale. There have been over 40 articles published using this instrument and the Cronbach alpha scores are between .83 and .93 (Tuthill, McGrath, Graber, Cusson, & Young, 2016).

The Breastfeeding Self-Efficacy scale for ill and preterm infants (BSES-SF-IP) is a scale that has been adapted from the original developed by Dennis and Faux (1999). The BSES-SF-IP was modified to be used with mothers of ill or preterm infants (Wheeler & Dennis, 2013). It is an 18 item, 5-point Likert scale survey with response options that consist of not at all confident (1) to always confident (5). The modified scale was assessed by 12 expert health care providers and piloted with 10 mothers of ill and preterm infants. The Cronbach alpha of the BSES-SF-IP was reported as .88. The scale has additional items that address pumping of breastmilk, and the specific challenges to mothers with infants in the NICU.

Information was extracted from the mother and infant medical record and entered on a printed data collection form developed to record this data. Demographic data collection points included were: date of admission, maternal age, marital status, education, previous breastfeeding experience, ethnicity, gravida, para, length of gestation, delivery type, BMI and infant birth
weight, reason for admission to the NICU, length of stay, and the amount of formula supplementation.

**Data collection**

**Quantitative**

Mothers of full-term infants breastfeeding in the NICU were approached on the postpartum unit or in the NICU by the researcher before their infants’ discharge to be enrolled in the study. After obtaining informed consent, demographic and contact information was recorded on an individual data sheet (Appendix A). Mothers were contacted by the researcher either by email, text, or phone within one week after their infant was discharged from the NICU. At that time, arrangements were made to speak with the mother by phone to be consistent with the data collection method used during the previous psychometric testing of the instrument. The mothers were asked verbally to answer the 18 questions of the Breastfeeding Self-efficacy short form for ill and or preterm infants (BSEF-SF-IP), whether they were breastfeeding exclusively, and if not, how much formula the infant was receiving daily. The researcher recorded the mothers’ responses to the BSEF-SF-IP (Appendix B). Mothers were informed they were going to be contacted again three weeks after the initial phone contact to determine whether they were still breastfeeding, breastfeeding exclusively, or how much formula daily they were feeding their infant.

**Qualitative**

During the phone interview conducted one week after the infants’ discharge, the participants were asked five open-ended questions (Appendix E). These questions obtained subjective data to determine their perception of the facilitators and barriers that contributed to or
hindered their breastfeeding success. The researcher audio recorded the responses which were then transcribed.

**Quantitative data analysis**

A Binary Logistic regression procedure was conducted to identify the relationship of the breastfeeding self-efficacy (BFSE) score and the duration and exclusive of breastfeeding. A linear regression was used to analyze the relationship of breastfeeding self-efficacy and the amount of formula supplementation used at one and four weeks. Pearson’s product-moment correlations were used to identify relationships between; maternal age, marital status, education, previous breastfeeding experience, ethnicity, gravida, para, length of gestation, delivery type, infant birth weight, body mass index (BMI), the reason for infants’ admission to the NICU, length of stay, amount of formula, and breastfeeding self-efficacy. Reliability analysis was conducted to determine the reliability of the BSEF-SF-IP with this sample of mothers of full-term infants admitted to the NICU.

**Qualitative data analysis**

Analysis of the interview data was conducted using the Critical Incident Technique (CIT) on all participants of facilitators for and barriers to breastfeeding success. Critical incidents are described as effective or ineffective extreme behaviors that inhibit or enhance the chances of accomplishing a goal (Flanagan, 1954). This technique uses a method of collecting data about what facilitates or hinders a way to approach a situation. It is a method of collecting data that enables the researcher to use a set of protocols to directly observe human behavior to understand what inhibits or helps facilitate problem solving solutions to practical situations. Critical Incident Technique (CIT) is a five-step process used to identify aims of the study, outline plans
for data collection, identify participants, collect data, analysis of the data, and report and interpret
the findings.

**Interpretative Integration**

Quantitative data were analyzed using statistical analysis and qualitative data were
analyzed using CIT. A meta-matrix approach was used to perform analytic integration of the two
analyses. The use of matrices assists in identifying patterns and making comparisons across
quantitative and qualitative data sources (Polit & Beck, 2012). Castro, Kellison, Boyd, and
Kopak, 2010 stated that such interpretations can be narratively summarized and reported. The
synthesis that resulted produced an interpretation of the single phenomenon, breastfeeding
success of mothers of full-term infants admitted to the NICU.

**Data Management**

Institutional Review Board (IRB) approval was obtained from NYU Winthrop Hospital
and Molloy College. The identity of the participant, the information obtained, and all research
records were kept confidential throughout this study. The participants’ names were not used
when reporting the results. The data collected, and interview responses and notes made by the
researcher were coded and kept in a locked file cabinet or in password protected electronic file
and were only accessible to the researcher. Data will be kept for five years and recorded
interviews will be erased at the end of this time. Results of this study may be presented at
professional conferences or published in a professional journal.

**Conclusion**

In this study, the relationship of breastfeeding self-efficacy to the duration and
exclusively of breastfeeding of mothers of full-term infants in the NICU was explored. The
breastfeeding self-efficacy scale for preterm and ill infants was used to measure the
breastfeeding self-efficacy of mothers who were breastfeeding their full-term infants in the NICU. Mothers were interviewed by the researcher at one week after discharge and contacted again three weeks later to ascertain if they were continuing to breastfeed their infants, and the amount of formula supplementation, if any, they have fed their infants. The researcher also explored the mothers’ perception of facilitators and barriers to their exclusivity and duration of breastfeeding during the first interview. Quantitative analysis was conducted using statistical procedures and CIT was used for qualitative analysis. The results of the quantitative and qualitative analyses were compared and contrasted using meta-matrix analysis to achieve an integrated interpretation of the study findings.
Chapter 4

Results and Findings

This researcher examined the relationship of breastfeeding self-efficacy to breastfeeding duration and exclusivity of full-term infants in the neonatal intensive care unit (NICU). Additionally, the facilitators for and barriers to breastfeeding success were also explored. Data were collected over a four-month period in a level III NICU. During the study period, 101 full-term infants, 47 percent of the total admissions, were admitted to the NICU from August to December of 2017. Thirty-three of these cases were not eligible because the mothers were not breastfeeding, or were Spanish speaking only, or the infants had congenital anomalies, Neonatal Abstinence Syndrome, were twins, or in the NICU longer than 14 days. Fourteen full-term infants were discharged before the researcher was able to enroll them in the study. Three eligible participants refused to participate in the study. In total, the researcher enrolled 51 participants into the study, but ten of the participants were either unable to be contacted or withdrew from the study. The final sample consisted of 41 postpartum women.

The following research questions were used to guide this study.

Quantitative Research Questions

• What is the relationship of breastfeeding self-efficacy to the breastfeeding duration and exclusivity of women breastfeeding a full-term infant in the NICU?

• What is the relationship between maternal and infant factors and breastfeeding self-efficacy of women breastfeeding a full-term infant in the NICU?

Qualitative Research Question

• What do women whose full-term infants who were in the NICU, perceive are the facilitators and barriers that influence their breastfeeding success?
**Integrated Mixed Method Question**

- Does the breastfeeding success of mothers of full-term infants admitted to the NICU emerge as the single phenomenon when the quantitative and qualitative data are integrated, and an interpretation is formed?

**Description of the Participants**

The sample was comprised of postpartum women between the ages of 22 and 39 with a mean age of 33 and an interquartile range of 28-35. The infants were delivered between 37 weeks and zero days and 41 weeks and three days. The mean weeks of gestation were 39 weeks and three days. Twenty-six of the women (63.4 percent) were delivered by cesarean section and 15 (36.6 percent) had vaginal deliveries. The majority (68.3 percent) were first time mothers and 70.3 percent had no prior breastfeeding experience. The median Body Mass Index, (BMI) for the mothers in this sample was 31.9 and interquartile range was 28.7-37. Individuals with BMIs over 25 are categorized as overweight; those with BMIs above 30 are considered to be obese (Centers for Disease Control and Prevention, 2017).

Fifty one percent of the infants admitted to NICU were discharged home after three to five days. Their birth weights were between 3.040 kilograms (kg.) and 4 kg with a mean of 3.43 kg. For the majority of infants, the reason for admission to the NICU was related to sepsis. They either were infants of mothers with elevated temperatures, admitted to the NICU for confirmed sepsis, or to rule-out sepsis. Other diagnoses for the infants included respiratory distress, hypoglycemia, hyperbilirubinemia, low tone, and cardiac symptoms. The distribution of the sample by marital status, ethnicity, education, and number of pregnancies and live births is displayed in Table 1.
Table 1

*Baseline characteristics of n=41 women included in study*

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>13</td>
<td>31.71</td>
</tr>
<tr>
<td>Married</td>
<td>28</td>
<td>68.29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>23</td>
<td>56.10</td>
</tr>
<tr>
<td>Black/AA</td>
<td>7</td>
<td>17.07</td>
</tr>
<tr>
<td>Latina</td>
<td>4</td>
<td>9.76</td>
</tr>
<tr>
<td>Asian</td>
<td>5</td>
<td>12.20</td>
</tr>
<tr>
<td>mixed</td>
<td>2</td>
<td>4.88</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>12</td>
<td>29.27</td>
</tr>
<tr>
<td>Bachelor’s</td>
<td>14</td>
<td>34.15</td>
</tr>
<tr>
<td>Master’s</td>
<td>13</td>
<td>31.71</td>
</tr>
<tr>
<td>Doctoral</td>
<td>2</td>
<td>4.88</td>
</tr>
</tbody>
</table>

Number of pregnancies Median (IQR)  
<table>
<thead>
<tr>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 pregnancies (1-2)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

Number of live births  
<table>
<thead>
<tr>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

The distribution of infants by reason for admission to the NICU is displayed in table 2.

Table 2

*Infant characteristics of n=41 infants included in the study*

<table>
<thead>
<tr>
<th>Reason for admission</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased maternal temperature</td>
<td>6</td>
<td>14.63</td>
</tr>
<tr>
<td>R/O Sepsis</td>
<td>4</td>
<td>9.76</td>
</tr>
<tr>
<td>Cardiac Issue</td>
<td>4</td>
<td>9.76</td>
</tr>
<tr>
<td>Hypoglycemia</td>
<td>6</td>
<td>14.63</td>
</tr>
<tr>
<td>Low tone</td>
<td>1</td>
<td>2.44</td>
</tr>
<tr>
<td>Respiratory distress</td>
<td>10</td>
<td>24.39</td>
</tr>
<tr>
<td>Confirmed sepsis</td>
<td>7</td>
<td>17.07</td>
</tr>
<tr>
<td>Hyperbilirubinemia</td>
<td>2</td>
<td>4.88</td>
</tr>
<tr>
<td>Infant temp</td>
<td>1</td>
<td>2.44</td>
</tr>
</tbody>
</table>
Breastfeeding Outcomes for this sample

At one week after discharge, 32 women (78 percent) were feeding some of the infant’s feedings at the breast and 15 (36.6 percent) were exclusively breastfeeding directly at the breast. Five (12 percent) of the women were exclusively bottle feeding their pumped breastmilk and 16 (39 percent) of the women were pumping their breasts but were using infant formula in addition to their pumped breast milk to feed their infants. At one week after discharge, approximately half of the infants were receiving formula between one and 36 ounces a day. Forty infants received formula in the hospital for various reasons which included; mothers inability to physically come to the NICU for every feeding and or were unable to express enough volume of colostrum in the first few days after delivery to meet the infants’ needs. Only one infant did not receive formula in the hospital.

At four weeks after discharge, 27 (65.9 percent) of mothers were feeding their infants at the breast and 17 (41.5 percent) were exclusively feeding at the breast. Only 10 (2.4 percent) of women were exclusively pumping breastmilk and bottle feeding their infants their pumped breast milk. At this point in the study, 14 (34.1 percent) of the women were pumping their breasts but were using infant formula in addition to their pumped breast milk to feed their infants. At four weeks, 18 (43.9 percent) of infants were receiving two to 24 ounces of formula a day. The percentage of women breastfeeding and exclusively breastfeeding at one and four weeks post discharge is displayed in table 3.

Table 3

<table>
<thead>
<tr>
<th>Breastfeeding outcomes</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women breastfeeding</td>
<td>N (%)</td>
</tr>
<tr>
<td>At 1-week post discharge</td>
<td>32 (78%)</td>
</tr>
<tr>
<td>1 week exclusively post discharge</td>
<td>15 (36.6%)</td>
</tr>
<tr>
<td>At 4 weeks post discharge</td>
<td>27 (66%)</td>
</tr>
<tr>
<td>4 weeks exclusively post discharge</td>
<td>17 (41%)</td>
</tr>
</tbody>
</table>
Breastfeeding Self-Efficacy instrument

The Breastfeeding Self-Efficacy (BSEF) scores ranged from 18-89. Based on the minimum and maximum scores possible on this instrument with all items are answered (18-90), the mean BSEF score of 63.87 was interpreted to be in the moderate range of the scale. An analysis was conducted to determine the reliability of the Breastfeeding Self-Efficacy Scale for preterm and ill infants (BSEF-SF-IP) in this sample and yielded a Cronbach’s alpha of .953.

Research Question One

A Binary Logistic regression procedure was conducted to identify the model that best predicted breastfeeding duration and exclusivity of full-term infants admitted to the NICU. As seen in table 4, the BFSE score was the only significant predictor of breastfeeding at four weeks post discharge. Women with a one-point increase in the BFSE score had 11 percent higher odds of breastfeeding at four weeks compared to women with a one-point lower BFSE score.

Table 4

<table>
<thead>
<tr>
<th>Factor</th>
<th>Unadjusted Odds ratio</th>
<th>(95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFSE score continuous</td>
<td>1.11 (1.04,1.19)</td>
<td>0.003</td>
<td></td>
</tr>
<tr>
<td>Maternal age continuous</td>
<td>1.01 (0.88,1.15)</td>
<td>0.93</td>
<td></td>
</tr>
<tr>
<td>Delivery Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal reference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-section</td>
<td>1.5 (0.4, 5.7)</td>
<td>0.55</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School reference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelors</td>
<td>1.25 (0.24,6.6)</td>
<td>0.61</td>
<td></td>
</tr>
<tr>
<td>Masters/Doctoral</td>
<td>0.75 (0.15,3.7)</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>0.60 (0.16,2.3)</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>Non-white reference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>1.25 (0.31,5.1)</td>
<td>0.76</td>
<td></td>
</tr>
<tr>
<td>Married reference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BF experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>reference N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1.05 (0.25,4.4)</td>
<td>0.94</td>
<td></td>
</tr>
</tbody>
</table>

As seen in table 5, only the BFSE score was significantly associated with exclusive breastfeeding at four weeks post discharge. Women with one-point increase in the BFSE score
have 15 percent higher odds of exclusive breastfeeding at four weeks compared to women with a one-point lower BFSE score.

Table 5

*Predictors of Exclusive Breast Feeding at four weeks post discharge*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Unadjusted Odds ratio</th>
<th>(95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFSE score</td>
<td>continuous</td>
<td>1.15 (1.06,1.25)</td>
<td>0.001</td>
</tr>
<tr>
<td>Maternal age</td>
<td>continuous</td>
<td>1.06 (0.93,1.2)</td>
<td>0.37</td>
</tr>
<tr>
<td>Delivery Type</td>
<td>Vaginal</td>
<td>reference</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>C-section</td>
<td>1.1 (0.3, 4.0)</td>
<td>0.89</td>
</tr>
<tr>
<td>Education</td>
<td>High School</td>
<td>reference</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Bachelors</td>
<td>1.4 (0.30, 6.6)</td>
<td>0.44</td>
</tr>
<tr>
<td></td>
<td>Masters/Doctoral</td>
<td>0.70 (0.15, 3.4)</td>
<td>0.44</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>White</td>
<td>0.80 (0.23,2.8)</td>
<td>0.73</td>
</tr>
<tr>
<td></td>
<td>Non-white</td>
<td>reference</td>
<td>N/A</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Single</td>
<td>0.83 (0.22,3.2)</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>reference</td>
<td>N/A</td>
</tr>
<tr>
<td>BF experience</td>
<td>No</td>
<td>reference</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>2.7 (0.7, 10.6)</td>
<td>0.16</td>
</tr>
</tbody>
</table>

A linear regression was conducted using maternal age, delivery type, education, ethnicity, marital status and breastfeeding experience to analyze the relationship of breastfeeding self-efficacy and the amount of formula supplementation used at four weeks. The BFSE score was the only variable that significantly predicted the outcomes regarding formula use (p < .001). The BFSE scores accounted for 47 percent of the variance in the amount of formula used at four weeks.

**Research Question Two**

The relationship between breastfeeding self-efficacy scores and delivery type, gravida, para, marital status, breastfeeding experience, maternal age, body mass index (BMI), gestational age, breastmilk pumping at one week and four weeks, formula usage at one week and four weeks, formula amounts at one week and four weeks, exclusive breastfeeding at one week and four weeks, and discharge from the NICU or regular nursery was analyzed using the Pearson
product-moment-correlation coefficient. A one-way analysis of variance was conducted to identify if there was a difference in the breastfeeding self-efficacy scores of mothers with different educational levels, ethnicity and the NICU admission diagnosis of their infants. There were no statistically significant differences noted in the scores based on these variables.

The variables with statistically significant correlations with the BFSE scores are displayed in Table 6.

Table 6

<table>
<thead>
<tr>
<th>Factor</th>
<th>Pearson’s correlation</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastfeeding experience</td>
<td>.322</td>
<td>.040</td>
</tr>
<tr>
<td>Para</td>
<td>.404</td>
<td>.009</td>
</tr>
<tr>
<td>Breastfeeding exclusively 1 week</td>
<td>.573</td>
<td>.000</td>
</tr>
<tr>
<td>Breastfeeding at 1 week</td>
<td>.396</td>
<td>.010</td>
</tr>
<tr>
<td>Breastfeeding exclusivity 4 weeks</td>
<td>.669</td>
<td>.000</td>
</tr>
<tr>
<td>Breastfeeding at 4 weeks</td>
<td>.594</td>
<td>.000</td>
</tr>
<tr>
<td>Breastmilk pumping at 1 week</td>
<td>-.385</td>
<td>.013</td>
</tr>
<tr>
<td>Formula at 1 week</td>
<td>-.564</td>
<td>.000</td>
</tr>
<tr>
<td>Formula amount at 1 week</td>
<td>-.707</td>
<td>.000</td>
</tr>
<tr>
<td>Formula at 4 weeks</td>
<td>-.572</td>
<td>.000</td>
</tr>
<tr>
<td>Formula amount 4 weeks</td>
<td>-.695</td>
<td>.000</td>
</tr>
</tbody>
</table>

As seen in table 6, there was a strong positive correlation between breastfeeding experience, number of live births, breastfeeding exclusivity at one week, breastfeeding at one week, breastfeeding exclusively at four weeks, breastfeeding at four weeks and breastfeeding
self-efficacy. There was also a strong negative correlation between breastmilk pumping at one week, formula usage at one week, formula amount at one week, formula usage at four weeks, amount of formula at four weeks and breastfeeding self-efficacy.

**Research Question Three**

Audio recordings of the interviews with 40 participants were conducted with their permission. The researcher telephoned all the participants initially. Telephone conversations lasted between 10 and 30 minutes. In all but three cases, several attempts were needed in order to reach the mother and conduct the interview. If the researcher was unable to contact the participants after three attempts, a text message was sent. In total, 15 participants responded by text and arrangements were made to either call at that time or at a specific time in the future. If the participants did not respond to text, an email was sent. One interview was conducted solely by text message after several audio phone calls were disconnected. Four participants responded by email with a time that was convenient for them to be called.

Participants were asked five open-ended questions to direct them to incidents that either helped or hindered their breastfeeding success in the NICU and at home. For example, participants were asked, “Tell me what you found most helpful to help you be successful when breastfeeding your full-term infant in the NICU. Please describe what it was about those interventions that made them the most helpful.” The list of open-ended questions that participants were asked during the interview is located in Appendix C. Each mother identified their facilitators for and barriers to breastfeeding success both in the NICU and at one week after the infant was discharged home from the NICU.

The recordings and transcripts were stored securely prior to, during, and after the data analysis. Audio recordings were transcribed by the researcher. The participants were identified
only by number and pseudonyms were assigned. Two recordings were of poor technical quality and could not be deciphered. One mother never produced any breastmilk; consequently, the researcher did not ask the participant the five open-ended questions. One recoding was transcribed from the text messages. The researcher replayed the audio recordings after transcription to verify accuracy. The transcripts were read and re-read to get an overall impression of the findings. To maintain trustworthiness of the interpretation, two other registered nurses, one with a master’s degree in psychology and another with a research doctorate read and reread the transcripts independently and compared the transcripts to the researchers’ analysis. They agreed with the researchers’ interpretation and the organization of the data into categories of facilitators and barriers.

Critical incident technique (CIT) was used to extract the data from the narrative. The term critical is used to define an incident that must have distinct impact on an outcome (Polit & Beck, 2012). Flanagan (1954) developed the CIT as a method of collecting data about what facilitates or hinders a way to approach a situation. CIT is a five-step process used to identify aims of the study, outline plans for data collection, identify participants, collect data, analysis of the data, and report and interpret the findings (Flanagan, 1954). The researcher used this process to identify through interview what the mothers perceived to be effective or ineffective behaviors that influenced their chances of accomplishing their goal of successful breastfeeding.

A constant comparison approach as described by Polit and Beck (2012) was used to summarize the incidents and name them according to their meaning. For example, when comparing and contrasting the incidents, breastfeeding skills were noted to include positioning, breast massage and latching the infant onto the breast. Having a cesarean section, or not being able to get out of bed was grouped as not physically feeling. The two professionals who
volunteered to review the transcript concurred with the researchers’ identification and organization of the critical incidents and into facilitators for and barriers to breastfeeding success. The incidents were then further categorized as facilitators for or barriers to breastfeeding success in the NICU and one week after discharge.

Sixty-seven critical incidents were extracted from the narrative data using the Critical Incident Technique (CIT). Of these critical incidents, 18 were incident facilitators for breastfeeding success in the NICU and 22 incident barriers to breastfeeding success in the NICU. After the first week at home, the mothers reported 12 incident facilitators for breastfeeding success and 15 incidents as barriers to breastfeeding success. For both time frames (in the NICU and after one week at home), the number of barriers exceeded the number of facilitators reported by the participants. The types of facilitators and barriers incidents were grouped, and percentages were determined for each time frame (in NICU or at home one-week post discharge) based on the total number of facilitators or barriers to breastfeeding success in each time frame.

**Facilitators for and Barriers to Breastfeeding Success in the NICU**

**Facilitators for Breastfeeding Success in the NICU**

The most frequently cited facilitators for breastfeeding success in the NICU were nurses’ support -13 (72 percent), lactation consultant support -11 (61 percent), and breastfeeding skills -8 (44 percent). When the NICU facilitator incidents that pertained to support from all staff (nurses, lactation consultants, and other health providers) were combined, there were 26 incidents that comprised 85 percent of the NICU breastfeeding success facilitator incidents.
Breastfeeding skills

The importance of breastfeeding skill was demonstrated by the following quote. Arlene stated, “I think the most helpful thing was breastfeeding skills (they) help a lot for me. Breastfeeding skills are so helpful.”

The list of facilitators for and barriers to breastfeeding success in the NICU are displayed in table 7.

Table 7 Critical Incidents NICU

<table>
<thead>
<tr>
<th>Facilitators in the NICU</th>
<th>Barriers in the NICU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastfeeding skills; positioning, latching, breast massage</td>
<td>Not enough breastmilk</td>
</tr>
<tr>
<td>Positive attitude/persistence</td>
<td>NICU environment/Lack of privacy</td>
</tr>
<tr>
<td>Lactation Consultants teaching skills</td>
<td>Infant not taking the breast</td>
</tr>
<tr>
<td>Providers support</td>
<td>Formula</td>
</tr>
<tr>
<td>Nurses support</td>
<td>Fast flow of the bottle or syringe</td>
</tr>
<tr>
<td>Access to the baby</td>
<td>Infant fussy at the breast</td>
</tr>
<tr>
<td>Being called for feedings</td>
<td>Baby confused about different ways of getting milk</td>
</tr>
<tr>
<td>Pumping</td>
<td>Separation from baby</td>
</tr>
<tr>
<td>Husband support</td>
<td>Stress (emotional drain, depression)</td>
</tr>
<tr>
<td>Schedule to come to feed</td>
<td>No rest</td>
</tr>
<tr>
<td>Separate room for breastfeeding</td>
<td>Scheduled feedings (no demand feedings)</td>
</tr>
<tr>
<td>Breastfeeding Class</td>
<td>Trusting others to care for the baby</td>
</tr>
<tr>
<td>Parent room staying over night</td>
<td>Nurses not wanting you there</td>
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<tr>
<td>Nipple Shield</td>
<td>Nurses impatience</td>
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<td>Having to go home</td>
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<td>Not being allowed to be in the NICU</td>
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<td>Better Communication</td>
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<td>Physically not well</td>
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<td></td>
<td>First baby</td>
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<td>Not pumping</td>
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Nurse support

Glenda spoke of the nurses’ support.

“I can tell(you) that nurse support. They were amazing and very helpful. Even with the effort from my mother and mother in law that I should try as much as I can to do breastfeeding ...., I need the skin to skin contact and use the pumps as much as I can….also nurses encouraged me a lot when I went there to hold the baby, to have the
skin to skin contact. Whenever I left the NICU they would say go and do the pumping now cause you know the hormones are now kind of activated and I would have milk as soon as possible... I can tell that my motivation was also the nurses’ support”

**Lactation support**

Sarah described the lactation consultants, and nurse’s support as helpful for her to obtain breastfeeding skills when she came to feed her infant in the NICU.

When the lactation consultant came in that was when we kind of got it more figured out. So having her there [lactation consultant] was probably the most helpful because before that we had kind of just started and the nurse there [in the NICU] she was trying her best to work with us but he just wasn’t latching or taking it at all and we really didn’t know what we were doing. When we finally talked to the lactation consultant and [she] sat down with us and helped us it helped us; immensely to get going on this whole breastfeeding thing.

**Barriers to Breastfeeding Success in the NICU**

The most common cited barriers to breastfeeding success incidents were feeding the infant formula, 12 (54 percent), being separated from the infant, 10 (45 percent), scheduled feedings (no demand feedings), 10 (45 percent), and not enough breastmilk, 9 (41 percent).

When grouping the barriers to breastfeeding success in the NICU, those that pertained to separation of the mother from the infant (mother physically not feeling well enough to go to the NICU or mothers having been discharged home without the infant), the 17 incidents represented 77 percent of the overall NICU breastfeeding success barrier incidents reported. Sixty-three percent of the mothers were delivered by cesarean section. These mothers typically remain on bedrest for at least 12 hours after delivery. Seventy-one percent of the participants were discharged home without their infants. Other reported NICU barriers to breastfeeding success were attributed to formula supplementation. Use of formula in this NICU is a shared decision based on the medical staffs’ recommendation and the mothers’ desires and circumstances. The decision to supplement with formula was a joint decision between the provider and the mother.
These barriers were described by mothers as the fast flow of formula from the bottle or syringe, the infant being confused about different ways of getting milk and scheduled instead of demand feedings; these accounted for 28 (79 percent) of the NICU breastfeeding success barriers.

**Formula**

Anna described her frustration with the use of formula, and scheduled feedings that were barriers to her breastfeeding success in the NICU.

*Well I don’t think it helped me, it hindered me because they started her on the formula right away. I wasn’t able to breast feed right away. They started her on the three hour formula schedule so to me it hindered me with breastfeeding so I don’t think it was helpful*

Martha described her experience with formula supplementation in the middle of the night.

*I guess it was the first full night that I had access to her where I was going in and feeding probably about three in the morning...one of the nurses who was very helpful. The baby had been falling asleep at the breast and I had only had access to her maybe three times before that. So the baby was falling asleep at the breast and they were doing testing on her that didn’t have anything to do with her condition but with her sugar levels and she said that if I wanted her to, she [the nurse] could top her off with formula after I nurse her because she kept falling asleep. And this was my 4th child and I never have done that in the hospital before where I allowed formula before but because of her situation and it was the middle of the night I said that’s fine. So she did it I think for the next two feedings she topped her off so when I would go and go to feed her or go to feed her on the scheduled times, I think that she was so sleepy because she was so full I couldn’t get her to wake up enough to eat. So my nursing sessions were pretty unsuccessful for those two or three times and then because then there was one time I forget about 5 o’clock in the morning or whatever time it was and after 30 minutes I wasn’t able to wake her up at all. She was just sleeping, and she wouldn’t eat so I said I would come back at 6, and she said well if you don’t come back at 6, I will go ahead and give her a little bit of formula and I just went back to bed and I fell asleep until 7. So, when I went to nurse her the following time at 9 o’clock or 8 o’clock whatever time schedule, she refused my breast. It was like nipple confusion and she was screaming at me and she was angry, and she didn’t want to take, and she wouldn’t latch properly. My nipple would go into her mouth it was a so lazy suck and that was new, and I knew right away that this is my fault. I shouldn’t have allowed a bottle because she went after the bottle but then the day time nurse who was super helpful in helping me get her back. I stayed for two hours straight just trying to get her to nurse and we were not giving up. We were not giving her anything else. We used a little sweet-ease to help me get back on track so that was difficult. That was discouraging we had only
had a few sessions together... I had nursed my other children for several months, but I knew once I gave the formula or the bottle often that it was difficult sometimes to switch back. So, I knew better but I was just tired, and I wanted the best for her and I don’t think that was the right decision........

**Fast flow of the bottle or syringe**

Jane also described the rate of formula flow from a syringe as a barrier to her breastfeeding success in the NICU.

*The baby was not getting enough from me, so they had to give the formula. And I know a friend that told me that regardless if I am not doing formula whatever I have is enough for the baby, not to do formula at all. And even with the syringe it was a faster flow than the breast directly.*

**Fussy at the breast**

Jane also spoke of the infant being fussy at the breast. “She was getting so fussy when she was latching onto my breasts. So she would get the milk faster from the syringe than she did from my nipple.”

**Separation from the infant**

Arlene identified being separated from her infant as a barrier to her breastfeeding success. “I guess not being able to be with him full time throughout the day and having to send my milk downstairs.”

Moira also spoke about separation and the uncomfortable environment in the NICU.

*Privacy and not being allowed in often enough, it was hard in the beginning setting up in the chairs and the screen it was not very comfortable. It was hard. Not being able to be there all day every day. That was hard.*

Diana also revealed separation as a barrier to breastfeeding in the NICU.

*Obviously not being near my infant... Like not being able to stay in the hospital and breastfeed on demand that she you know what I mean I had to go home and pump and bring the stuff. So my proximity to my baby [barrier].*
Scheduled Feedings

Rose described the scheduled feedings as not being helpful.

*I felt that being on a strict three-hour schedule wasn’t maybe what our baby needed. I think our baby needed to be on a two-hour schedule and maybe sometimes a four-hour schedule so being on someone else’s schedule I don’t think is ideal for everyone or every newborn and had he been in our room, I probably would have nursed him a bit more but having to get the elevator to go down stairs walk after a c section made it difficult.*

Physically not well

Irene discussed how her physical condition was a barrier to her successful breastfeeding in the NICU.

*I had a hard time actually breastfeeding in the NICU because I couldn’t because I had the c section and I was still recovering. It was very, very difficult to get out of bed. I was actually allowed to get out of bed for the whole first day after delivery … Definitely the fact that I had a c section was the hardest part.*

Not enough milk

Jane stated, “The baby was not getting enough from me,…”

Stress/depression

Angela revealed she had a preexisting condition that she perceived affected her breastfeeding experience.

*I should mention I have a history of depression which became ah it got a little worse during the pregnancy and a little bit after especially with the fact that I wasn’t confident in myself learning to breast feed as a first-time mother.*

Mary also spoke of the stress in the NICU. “I felt like I was really stressed out when my baby was in NICU.”

Facilitators for and Barriers to Breastfeeding Success at One Week at Home

The list of facilitators and barriers to breastfeeding success mothers described after one week at home is displayed in table 8.
The facilitators for breastfeeding success that were most often reported by mothers after the baby was home for one week were family support, 7 (58 percent), determination, 6 (50 percent), and staying with the baby, 5 (42 percent). Not having enough milk, 10 (83 percent), infant not taking the breast, 7 (58 percent), and time, 8 (67 percent) were the most frequently cited barriers to breastfeeding success at one week.

**Facilitators for Breastfeeding Success at One Week at Home**

**Family support**

Jane described the support of her family as a facilitator for her breastfeeding success at one week at home from the hospital time frame. “My family, mother, and the father as well basically helping me the first few days. I can kind of get the hang of it [breastfeeding] and doing it myself the past few days.”
Sally also described her family support as a facilitator for her breastfeeding success at one week. “So, I was able to be successful because I had support, family support, so I was able to spend a lot of time one on one with the baby and family took care of everybody else.”

**Being with the baby**

Melody recalled being with her baby. “Being that he was here. If he was crying I could just pick him up and feed him. I didn’t have to wait for specific feeding times. In the NICU they are all set with their schedule….”

**Determination**

Grace stated, she knew it would work because it worked with her other son.

*Just remembering that it worked with my first son and also he had a good appetite so watching him respond to it. That helped me be successful when we got home. I also felt like I had missed some time with him in the hospital. They took him so the chance for me to get time with him.*

Janice also spoke of determination as the key to her success. “I think because I am an experienced breastfeeding mom, my third baby that you know, I wasn’t hindered… I am experienced, so I just pushed through it.”

**Barriers to Breastfeeding Success at one week at home**

**Lack of Breastmilk**

Katherine described the lack of enough milk and her struggle to latch her infant as a barrier to her breastfeeding success at one week.

*She was so used to the bottle getting a lot of milk without working hard I guess. When I was giving her the breast in the beginning of the time when my breast was not producing so much milk. She was just getting used to latching it. She was having a hard time getting enough milk by this time she gets hungrier. I just have to give her the bottle. The first week I was having such a hard time because she was so used to the bottle.*
Edna also spoke of not enough milk.

I feel like sometimes when he breastfeeds .... I feel like my body doesn’t produce enough at night. During the day he is satisfied but at night when it gets closer to the night, I have to supplement because he is not getting enough

Time consuming

Kathy reported about the time restraints. “It is really time consuming.”

Summary of Qualitative Analysis

Sixty-seven critical incidents were extracted from the narrative data using the Critical Incident Technique. Eighteen incidents were facilitators for breastfeeding success in the NICU and 22 incidents were barriers to breastfeeding success in the NICU. After the first week at home, the mothers reported 12 incident facilitators for breastfeeding success and 15 incidents to barriers. The types of facilitators and barriers incidents were grouped, and percentages were determined for each time frame (in NICU or at home one-week post discharge) based on the total number of facilitators or barriers to breastfeeding success in each time frame. The most cited facilitators for breastfeeding success in the NICU were nurse’s support, lactation consultant support, and breastfeeding skills. The most common cited barriers to breastfeeding success incidents were feeding the infant formula, being separated from the baby, scheduled feedings (no demand feedings), and not enough breastmilk.

The facilitators for breastfeeding success that were most often reported by mothers after the baby was home for one week were family support, determination, and staying with the baby. Not having enough milk, infant not taking the breast, and time, were the most frequently cited barriers to breastfeeding success at one week.
Research Question Four

Interpretative Integration

Quantitative data were analyzed using statistical analysis and qualitative data were analyzed using CIT. The outcomes of these two analyses were compared and contrasted to synthesize the results and produce an interpretation of the single phenomena, breastfeeding success of breastfeeding mothers of full-term infants admitted to the NICU. A meta-matrix analysis was used to integrate the quantitative and qualitative data. This method is widely used by researchers to determine patterns and make comparisons from different data sources (Polit & Beck, 2012). A matrix was constructed to correspond to the individual participants. The participants were first grouped by BFSE scores, those with scores of 63 and above were placed in one group and those with scores below 63 in the other group. This was done to see if there was any identified pattern of facilitators for and barriers to breastfeeding success that corresponded to the BFSE score. The participants were then placed in groups of first time or second time mothers.

Experienced Mothers with Moderate to High BFSE

Women with a mean BFSE score of 63.87, interpreted to be in the moderate range of the scale, were more likely to be exclusively breastfeeding at one-week post discharge. These women generally were experienced mothers with other children. They identified the use of formula, scheduled feedings, and separation from their infants as barriers to breastfeeding success in the NICU. Family support and determination were their key to facilitators for breastfeeding success at the one week at home time frame.
Separation from the infant

Mary described being separated from her infant and scheduled feedings as a hindrance to breastfeeding in the NICU. “The fact that he wasn’t near me the whole time and not being able to do the on-demand feeding. In the NICU they are all set with their schedule ...”

Previous breastfeeding experience

Donna described the importance of her previous breastfeeding experience and her determination to be successful.

Just my experience in the past with my other two children and feeding on demand. I am an experienced breastfeeding mother if this was my first baby and this happened I think the fact that I didn’t have the baby in my room, I didn’t have the one-on-one, I would have all been hindered... I wasn’t hindered but if this was my first baby there definitely would have been issues that he was in the NICU I think I would have had a lot of issues breastfeeding. But I am experienced, so I just pushed through it.

Family support

Joan emphasized her husband’s support as a facilitator to her breastfeeding success. “My husband stayed home the entire week and that definitely helped … my husband being home to help with my 3-year-old trying to not feel left out.” Ann also speaks about her husband’s support and being able to nurse on demand. “The help of my husband, my husband bringing the baby to me, not having to really move, around very much, being able to nurse on demand for the most part and having all of the equipment at my fingertips.”

First Time Mothers with Moderate to High BFSE

First time mothers with a mean BFSE of 63.87 or above identified facilitators for breastfeeding success in the NICU as the nurse’s support, lactation consultant support, and developing breastfeeding skills. They had a fear of not producing enough milk in the NICU and at home. They also spoke of determination and support as a key to breastfeeding success.
Nurses’ Support

Eileen talked about the amount of support she received. “The amount of help that the nurses gave, meaning all the knowledge that they had. And if you have any problems consult the professionals for to get some help cause they gave me different advice to feed the baby.”

Determination/Support/Breastfeeding skills

Renee spoke of her experience in the NICU and at home. She expressed her determination, the support she received, and the breastfeeding skills she developed while breastfeeding her infant. She also described the importance of the assistance she received from the lactation consultant.

She [the baby] was not touching the breast at all, I was just struggling the day that she [the lactation consultant] helped us; that was the only day she [the baby] was able to take it and then after that I tried so many times that she wouldn’t take it in the NICU but when we came home the first week she was not even holding it [the breast] she was not even touching it. She would start crying ... I got scared that she this is my first baby but then a little bit later I said, you know what, I have to try it [breastfeeding] so I gave her the breast milk by bottle but when after a little bit I give her a less amount so she...

I couldn’t breastfeed her at all. I think the first day I tried I tried breastfeeding two times in the NICU but she was not taking it and that was like the first time... the first day on Saturday then the first time she was actually taking it was when the lactation consultant came to help us out....

Kind of I am not sure with the NICU situation to get her to the breast I had to keep trying. I didn’t give up.

Not Enough Milk

Maureen also spoke of her struggle to breastfeed her infant and not having enough milk.

“In the NICU the baby was not getting enough from me, so they had to give the formula.”

First Time Mothers with Low BFSE Scores

Mothers with a BFSE score of less than 63.87 were predominately first-time mothers. They all reported not having enough milk as a barrier to successful breastfeeding. The majority
of these mothers also reported the infant not latching. These first-time mothers were also the only ones in the study who stated that physically not feeling well or having a cesarean section was a barrier to successful breastfeeding in the NICU.

**Not Enough Milk**

Irene spoke of her lack of confidence of whether the infant was getting enough milk. “I don’t know of anything that needs to be added but just a lack of confidence in myself to know that he is getting enough from me.”

Sandy expressed her realization that the NICU hindered her milk supply.

*It’s just been interesting I think the biggest hindrance was that he was in the NICU. There wasn’t much we could do but try to get my milk supply going and making sure it was enough, because I think when we got home it [the breastmilk] wasn’t still fully in even though we had gotten home almost a week after he had been in the NICU. My milk wasn’t fully in so I don’t think he was really getting everything he needed so he was losing weight, so it just made it extra stressful*

**Physically Not Well**

Irene considered her cesarean section as a barrier to successful breastfeeding in the NICU.

*Definitely the fact that I had a c section was the hardest part. Definitely the pain and the fact that I couldn’t get out of bed for the first couple of days just feeling all the medications I was on was making me tired and I couldn’t walk to the NICU on my own.*

Iris also talked about how her cesarean section contributed to her immobility and served as a barrier to her successful breastfeeding.

*First, I had a cesarean section, so I was a little immobile for the first couple of hours so having a pump available in the room to have the opportunity to offer him breast milk. I did have the opportunity obviously to go to the NICU at my will and I went when I was able to walk so I was able to go to every feeding to try and latch and breastfeed him as much as possible.*
Amy stated her physical well-being as a deterrent to her successfully breastfeeding in the NICU.

*Being separated that I actually had to go down there [the NICU] to feed her. I was not physically in the best of shape afterwards, so it was hard for me to even move around let alone get down to feed her and it was a little bit weird trying to breastfeed someone in the middle of a room.*

No further relationships were noted considering the demographic data and the qualitative narrative.

**Conclusion**

The breastfeeding self-efficacy scale for preterm and ill infants was used to measure the breastfeeding self-efficacy of mothers who were breastfeeding their full-term infants in the NICU. A Binary Logistic regression procedure was conducted to identify the relationship of the BFSE score, duration of any and exclusive breastfeeding. Of all the variables used the BFSE score was the only significant predictor of breastfeeding at four weeks post discharge. There was a strong positive correlation between breastfeeding experience, number of live births, breastfeeding at one week and four weeks, breastfeeding exclusivity at one week and four weeks and the breastfeeding self-efficacy score. There was also a strong negative correlation between breastmilk pumping at one week, formula usage at one week, formula amount at one week, formula usage at four weeks, amount of formula at four weeks and the breastfeeding self-efficacy score.

CIT was used to analyze the qualitative arm of the study. Sixty-seven critical incidents were extracted from the data. The most frequently reported facilitators for breastfeeding success in the NICU were nurses’ support, lactation consultant support, and breastfeeding skills. The most common cited barriers to breastfeeding success in the NICU were feeding the infant formula, being separated from the baby, feeding the infant on a schedule instead of when the
infant indicated the need to feed, and perceived inadequacy of breastmilk. Mothers described the 
facilitators for breastfeeding success one week after the infant had been discharged home as 
family support, determination, and staying with the baby. Mothers described not having enough 
milk, and the infant not taking the breast as the most frequently cited barriers to breastfeeding 
success at one-week post discharge.

The integration of the quantitative and qualitative arms of the study highlighted 
differences in the facilitators and barriers reported by first-time mothers and experienced 
mothers. First-time mothers with BFSE scores in the moderate to high range identified 
nurse/lactation consultant support and developing breastfeeding skills as facilitators to 
breastfeeding success in the NICU. They had a fear of not having enough milk in the NICU and 
at home. They also spoke of determination and support as key to breastfeeding success. 
Experienced mothers identified the use of formula, scheduled feedings, and separation from their 
infants as barriers to breastfeeding success in the NICU. Family support and determination was 
reported to be their key to facilitators to breastfeeding success at one week after discharge. A 
schematic diagram of the process used to analyze and integrate the quantitative and qualitative 
data is displayed in Figure 2. A pictorial representation of the interpretative integration of the 
findings in this study is presented in Figure 3.
Figure 2. Depiction of Study Analysis
Figure 3. Interpretative Integration Analysis Results

Experienced mothers with children High BFSE

Facilitators for Breastfeeding Success
- Family support
- Determination

Barriers to Breastfeeding Success
- Use of formula
- Scheduled feedings
- Separation from their infants

Mothers with High BFSE

Facilitators for Breastfeeding Success
- Nurse’s support
- Lactation consultant support
- Developing breastfeeding skills
- Determination

Barriers to Breastfeeding Success
- Use of formula
- Scheduled feedings

First Time mothers with Low BFSE

Barriers to Breastfeeding Success
- Not enough milk
- Physically to feeling well
- Infant not latching
Chapter 5

Summary

This study examined the relationship of breast feeding self-efficacy and breastfeeding duration and exclusivity of mothers of full-term infants admitted to the Neonatal Intensive Care Unit (NICU). Mothers’ perceptions of the facilitators for and barriers to breastfeeding success were also explored. The study was a mixed method design that used an exploratory, comparative, correlational and concurrent convergent design. The convergence model was used in a triangulation design to converge the analysis of the breastfeeding self-efficacy in mothers of full-term infants admitted to the NICU in the quantitative arm of the study and the identified facilitators for and barriers to breastfeeding success, in the qualitative arm of the study. This was done to produce an interpretation of the single phenomena, breastfeeding success of mothers of full-term infants admitted to the NICU. Identification of the factors that contribute to or interfere with breastfeeding success for mothers of full-term infants in the NICU can inform and guide health care providers to develop effective interventions to support these breastfeeding mothers and increase the exclusivity and duration of breastfeeding at home.

Discussion

Trends

According to Hooven, Randis, and Polin, (2018), although the short and long-term advantages of breastfeeding are well established, there is a paucity of information about the effect of short term admissions to the NICU on breastfeeding full-term infants. Mukhopadhyay et al. (2015) found that early onset sepsis evaluations for asymptomatic term infants that resulted in the separation of mothers and infants significantly interfered with breastfeeding initiation and led to increased formula supplementation. Use of formula supplementation was also noted to be a
prominent factor in this researcher’s study. Of the 41 study participants, whose infants remained in the NICU on average for three to five days, 40 of the infants were supplemented with formula in the NICU. Mothers also identified formula supplementation, and issues related to formula supplementation, such as increased flow rate from a bottle or syringe when compared to the breast in the initial period after birth as a barrier to breastfeeding success. Data was not collected in this study regarding the decision and reasons for formula supplementation. Mothers frequently commented that scheduled feedings were also a barrier to breastfeeding success.

Breastfeeding infants eat on demand or not at regular intervals. Perhaps the infants were too sleepy or not hungry to feed at the scheduled time. It is impossible to make an infant feed at the breast when they are not ready. However, feeding with bottle or syringe is possible even when the infant is not hungry. This is one of the differences between breast and bottle feeding.

Current research identifies a trend toward increasing numbers of full-term infant admissions to the NICU (Harrison & Goodman, 2015, Kachoria & Oza-Frank, 2015). Schulman, Braun, Lee, Profit, Duernas, Bennett, et. al (2018) reported that 79.2 percent of these full-term NICU admissions are also characterized by low illness acuity. Many of these infants are admitted for issues involving sepsis or to rule-out sepsis which then results in the separation of the infant from the mother (Hooven, Randis, Polin, 2018; Mukhopadhyay et al. 2015). Full-term low acuity admissions also accounted for a large number of the admissions in the NICU used in this study. For this study’s sample, the primary NICU admitting diagnosis for their full-term infants was related to sepsis. During the four-month study period, 47 percent of the admissions to this NICU were full-term infants and the majority were admitted for sepsis related issues.
Theoretical Framework/Breastfeeding Self-Efficacy

The theoretical framework guiding the study is Bandura’s Theory of Self-Efficacy (Bandura, 1977). According to Bandura (1997), self-efficacy is a dynamic cognitive process in which an individual evaluates his or her ability toward the performance of a given task; individuals with high self-efficacy will more likely initiate behaviors, persevere in the face of adversity, and succeed in mastering new behaviors. Dennis (1999) developed the concept and theory of breastfeeding self-efficacy based on Bandura’s theory of self-efficacy as a framework to study breastfeeding confidence in mothers. Previously conducted research on healthy full-term infants demonstrates a relationship between breastfeeding self-efficacy and maternal breastfeeding behaviors with lower breastfeeding self-efficacy associated with formula supplementation and early cessation of breastfeeding (Dennis & Faux, 1999; Dennis, 2003). In this current study, the researcher explored the relationship of breastfeeding self-efficacy and breastfeeding duration and exclusivity of mothers of full-term infants whose infants remained in the NICU for less than 14 days. The Breastfeeding Self-Efficacy scale for ill and preterm infants (BSES-SF-IP) was administered verbally to women at one week after their infants were discharged from the NICU. The duration of breastfeeding was characterized by any breastfeeding or exclusive breastfeeding at four weeks after discharge. Four weeks postpartum was selected for the point to measure duration, because the highest incident of breastfeeding cessation has been noted to occur at one-month postpartum (Center for Disease Control and Prevention, 2015). In this study the breastfeeding self-efficacy (BFSE) score was the only significant predictor of breastfeeding at four weeks post discharge. This addressed the researcher’s question: What is the relationship of breastfeeding self-efficacy to the breastfeeding duration and exclusivity of women breastfeeding a full-term infant in the NICU?
In this study of breastfeeding mothers of full-term infants in the NICU, the BFSE scores were the only predictor of breastfeeding success in breastfeeding women who had a full-term infant in the NICU. This is not completely congruent with Dennis’ (2006) best fit regression model findings that predicted breastfeeding self-efficacy scores of 522 breastfeeding mothers of healthy full-term infants at one-week postpartum. Although data on many of the same variables that Dennis used in the 2006 study were collected in this study, Dennis (2006) found that for women breastfeeding healthy full-term infants, the best fit regression model identified eight variables that accounted for 57 percent of the variance in the BSES scores at one week postpartum. The eight variables were support, delivery type, maternal education, pain relief, postpartum care satisfaction, breastfeeding progress, infant feeding method as planned and maternal anxiety. This researcher did not include support, pain relief, postpartum care satisfaction, breastfeeding progress or maternal anxiety as variables in the data collection. Delivery type and maternal education were the two common data collection points included in both studies. Dennis (2006) investigated the variables that were significant in predicting BFSE scores, whereas in the current study, BFSE scores were used with other variables to identify how well they predicted breastfeeding duration and exclusivity. Although delivery type and maternal age were entered into the regression model in the current study, the BFSE score was the only significant predictor and accounted for almost half of the variance in the amount of formula used at four weeks post discharge. The differences in the use of the BFSE scores in the two studies affects the ability to fully compare the results. This study explored the relationship of BFSE to duration and exclusivity and one and four weeks post discharge from the NICU. The purpose of Dennis (2006) study was to develop a multifactorial predictive model of BFSE in the first week
postpartum. The differences could also be attributed to the difference in study population, sample size and data collection time frame.

The second research question in the current study was: What is the relationship between maternal and infant factors and breastfeeding self-efficacy of women breastfeeding a full-term infant in the NICU? Several demographic variables were collected to address this question. There was a strong positive correlation between breastfeeding experience, number of live births, breastfeeding exclusivity at one week, breastfeeding at one week, breastfeeding exclusively at four weeks, breastfeeding at four weeks and breastfeeding self-efficacy. Dennis (2006) examined diverse maternal characteristics and characterized them into seven domains: socio-demographic, psychological, pregnancy-related, stressors, social support, obstetrics, infant feeding, and maternal adjustment. She found mothers who were older, more educated, and multiparous had higher BFSE scores (Dennis, 2006). This study sample was comprised of predominately older, well-educated mothers and also found a correlation between BFSE scores and exclusivity and duration among more experienced breastfeeding mothers than those new mothers who had not breastfed before.

Dennis (2006) also found mothers’ mode of delivery impacted BFSE scores. Mothers that experienced increased interventions such as cesarean deliveries had lower BFSE scores. This study did not find a correlation between mode of delivery, BFSE scores, exclusivity and duration of breastfeeding at one or four weeks. But cesarean delivery and not feeling well physically was reported in the narrative data as barriers to breastfeeding success for the first-time mothers in this sample.

The BSES-SF-IP is a scale that was adapted from their first Breastfeeding self-efficacy scale developed by Dennis and Faux (1999). The BSES-SF-IP was modified to be used with
mothers of ill or preterm infants (Wheeler & Dennis, 2012). The scale has additional items that address pumping of breastmilk, and the specific challenges to mothers with infants in the NICU. Wheeler and Dennis (2012) reported adequate reliability when they utilized the BSES-SF-IP (Cronbach alpha of .88), but their research included a sample size consisting primarily of preterm infants (80.7 percent, n = 130); only 16.1 percent were term infants (n = 26), and 3.1 percent post term (n = 5). Despite the small numbers mothers of full-term infants included in the previous research, the researcher for the current study determined that the BSES-SF-IP was appropriate to use with a sample of mothers of only full-term infants in the NICU. The Cronbach alpha that resulted from the analysis conducted for the current study adds to the literature by confirming the reliability of the BSES-SF-IP for use with mothers whose full-term ill infants are admitted to the NICU.

**Facilitators and Barriers**

In this study the most frequent reported facilitators of breastfeeding success in the NICU were nurses’ support, lactation consultant support, and breastfeeding skills. At home after one week, family support, determination, and staying with the baby were the most reported facilitators. The most common reported barriers to breastfeeding success in the NICU were formula, being separated from the baby, scheduled feedings (no demand feedings), and not enough breastmilk. Mothers described not having enough milk, and the infant not taking the breast, as the most frequent barriers to breastfeeding success at one-week post discharge. This addressed research question three; what do women, whose full-term infants who were in the NICU, perceive are the facilitators and barriers that influence their breastfeeding success?

A systematic literature review was conducted by Wood, Woods, Blackburn and Sanders (2016) to identify studies that evaluated the efficacy or effectiveness of interventions on
breastfeeding initiation, duration, or exclusivity. The studies focused on breastfeeding interventions based on three factors: acquisition of breastfeeding knowledge and skills, emotional support by healthcare providers, and self-efficacy in the mothers’ ability to breastfeed. These align with the three most common facilitators of breastfeeding success reported by mothers in this current study; nurse, lactation consultant, and family support.

Although there were some differences in the predominant barriers reported in the NICU (formula use, separation and scheduled feedings) and one week following discharge (infant not taking the breast, time consuming) in this study, the mother’s concern about the adequacy of their milk supply was a reported barrier not only while in the NICU but persisted after the first week at home. This finding and the impact on the breastfeeding success is consistent with published literature. The primary reason women stop breastfeeding worldwide is perceived insufficient milk supply (Brown, Dodds, Legge, Brtanton, & Semenic, 2014). In a study conducted by Odom, Li, Scanlon, Perrine, and Grummer-Strawn (2013), 60 percent of mothers did not meet their breastfeeding goals and the reasons mothers reported for not breastfeeding as long as they desired, was the perceived complicated process of building a milk supply and breastmilk pumping. Ineffective milk transfer and insufficient milk production that are a consequence of improper latching can begin a cascade of negative events that undermine breastfeeding. Like all mothers around the world, breastfeeding mothers of full-term infants that were discharged from the NICU in this study experienced common breastfeeding problems and reported not enough milk and the infant not taking the breast as barriers to their breastfeeding success.

Published literature identifies that low breastmilk intake and ineffective breastfeeding is particularly problematic for this population of infants admitted to the NICU. Research indicates
that full-term infants admitted to the NICU receive less breast milk than their preterm and full-term healthy counterparts (Coliaizy & Morriss, 2008; Kachoria & Oza-Frank 2015; Shim, Yang, Messina, & Mintzer, 2018). The reason for this was not expounded upon in the studies, but one possible explanation may be the relationship between the time of infant discharge and the milk volume. Separation of the mother and infant in the early days after birth can affect the volume of milk particularly in the first three to seven days after birth. It is likely that many of the full-term infants admitted to the NICU are discharged before the mother's milk has come to sufficient volume; this may contribute to the difficulty the mothers experience with the infant taking the breast, which may further compromise mothers' milk supply. Another factor related to the low acuity of illnesses of the infant and short duration of the NICU stay. The compelling evidence of the protective benefits of breastfeeding for the preterm infant most likely prompts the NICU staff to strongly encourage mothers of preterm infants to express breastmilk for their babies. But the paucity of evidence on the risks of not breastfeeding for less ill full-term infants in the NICU may potentially affect the encouragement to express breastmilk and breastfeed that mothers of full term NICU infants receive. Also with the short duration of the NICU stay, the amount of healthcare provider support provided is limited as this is not available on a 24 hour basis at home as it was in the hospital. Nurse/lactation provider support was reported as an important facilitator to breastfeeding success particularly for the first-time mothers in this study. Lack of or early cessation of breastfeeding may affect the health of the mother and the child. Infants that require NICU care are at greater risk for negative health outcomes than healthy full-term infants (Colaizy & Morriss, 2008).
Integration of Quantitative and Qualitative Data

The fourth question addressed in this research study was: Does the breastfeeding success of mothers of full-term infants admitted to the NICU emerge as the single phenomena when the quantitative and qualitative data are integrated, and an interpretation is formed? The facilitators for and barriers to breastfeeding success of mothers with moderate to high BFSE were different depending on whether they were experienced mothers or first-time mothers. There was also a difference in the facilitators and barriers identified by mothers whose BFSE were below the moderate range. Upon review of the Breastfeeding Self-Efficacy Scale for Mothers of Ill and/or Preterm Infants (Appendix B), it is evident that many of questions that the mothers responded to in the quantitative arm of the study (i.e., I can pump enough milk for my baby, I can keep wanting to breastfeed, I will be able to determine that my baby is getting enough milk, I will be able to breastfeed my baby without using formula as a supplement) emerged as commonly reported facilitators for and barriers to breastfeeding success.

First time mothers, because of their lack of breastfeeding experience and confidence may be more vulnerable to early cessation of breastfeeding leading to decreased health benefits for the mother and the infant. The qualitative narrative data exposed a distinct set of facilitators for and barriers to breastfeeding success of breastfeeding first-time mothers of infants in the NICU and at one-week post discharge that were different than those reported by mothers who had other children. First-time mothers with a BFSE score in the moderate to high range identified nurse’s support, lactation consultant support, and developing breastfeeding skills as facilitators to breastfeeding success in the NICU. They had a fear of not producing enough milk both in the NICU and at home. They also spoke of determination and support as a key to breastfeeding success.
In this study, first-time mothers called more on professional help to support them to acquire breastfeeding skills in the NICU. A study conducted by Mattar, Chong, Chan, Chew, Tan, Chan, et al. (2007), demonstrated a significant difference in predominate or exclusive breastfeeding at three and six months when breastfeeding mothers were educated and counseled by a lactation consultant prenatally, compared to mothers receiving usual breastfeeding education and/or prenatal care. However, there was no significant difference at two and six weeks, between the three groups (Mattar et al. 2007). The Center for Disease Control and Prevention, (2015) has identified that time frame between two and six weeks as the period when breastfeeding rates dramatically decrease.

It has been this researcher’s experience that first-time mothers breastfeeding an infant in the NICU are particularly vulnerable to lack of confidence because they need to acquire all the skills a first-time mother needs to obtain. Breastfeeding is simply one of those skills. Holding, diapering, bathing, and calming are other skills they have not accomplished. Separation from the infant, with limited access because of fatigue or medical complications, contributes to the lack of acquisition of skills. Mothers may have had only a few opportunities to even hold the infant before they are discharged. In this study the average length of stay was three to five days. It is difficult to even become somewhat proficient at acquiring a skill without performing that skill many times. Separation also contributes to the lack of confidence a mother may feel as she sees her infant connected to a monitor, with an intravenous catheter, in an incubator, under phototherapy lights with eye shields covering her infants’ eyes, or with other medical equipment in use. The NICU can be a frightening place to parents with all the people, pieces of equipment and alarms, which may undermine parents’ confidence in their ability to adequately care and feed their infants.
Whether she is a first-time mother or a mother of many children, mothers with an infant in the NICU experience a sense of loss of a normal postpartum experience. As Nystorm, and Axelsson (2002) concluded, even though an infant is not seriously ill, separating a mother from her infant in the first week of life, is emotionally stressful and a strain for the mother.

Experienced mothers identified the use of formula, scheduled feedings, and separation from their infants as barriers to breastfeeding success in the NICU. All the experienced breastfeeding mothers in this study had the infants from previous deliveries with them in their room. It can be hypothesized that they knew separation, introducing formula, and scheduled feedings were barriers to breastfeeding success. Family support and determination was reported to be their key facilitators for breastfeeding success at one week after discharge. Having to care for other children was one of the barriers that mothers reported, which highlights why family support to take care of the other children was important to experienced mothers.

There was also a strong negative correlation between breastmilk pumping at one week, formula usage at one week, amount of formula at one week, formula at four weeks, amount of formula at four weeks and breastfeeding self-efficacy. In this NICU all breastfeeding mothers of admitted infants are asked to pump. This stimulates more of a milk supply and offers an opportunity to give breastmilk to the infant that is sleepy or refusing the breast. However, this can be detrimental to feeding at the breast. In the first few days the colostrum is thick and may not be expressed easily from the breast with a breast pump. Well infants are able to extract the colostrum from the breast; a breast pump is not as efficient at expressing colostrum. Hence when the mother, who is using a breast pump at this point, does not see much production, she concludes that there is no milk in her breasts. Experienced breastfeeding mothers know that feeding at the breast will increase the volume of milk and feeding on demand enhances this
process. If a mother is unable to latch her infant on the breast, she may continue to pump her breast, and bottle feed the infant with her pumped breast milk. This becomes time consuming and exhausting because the mother is doing twice the amount of work. Mothers often find pumping and then bottle feeding her expressed milk unsustainable. If a mother is unable to latch her infant onto the breast, she may discontinue pumping and formula feed. However, there is a subset of mothers that prefer to bottle feed their pumped breastmilk, to assure the infant is receiving enough milk. Pumping or the notion that feeding at the breast does not supply the infant with enough milk may contribute to mothers’ perception of insufficient milk supply or lack of confidence in the ability of the infant to consume enough breastmilk. This remains the number one reason women discontinue breastfeeding (Center for Disease Control, 2015).

**Implication of findings**

**Nursing**

The interpretative integration of the quantitative and qualitative results in this study reveals the image of the single phenomenon, breastfeeding success of mothers of full-term infants admitted to the NICU. These mothers need timely dedicated breastfeeding support from the health care staff. All health care staff in the NICU need to incorporate breastfeeding support at every encounter with this mother and her family. Frontline NICU nurses, and neonatal nurse practitioners (NNP) are particularly positioned to supply this support. Mothers overwhelmingly reported the support of the NICU nurses as a facilitator for or the lack thereof as a barrier to breastfeeding success in the NICU.

Nurses can assure a comfortable environment with privacy in which the mother can bond with her infant. As part of the healthcare team, nurses can advocate for the mothers emphasizing their significant role in their infants’ nutrition and comfort. They need to have an awareness of
the best practices to support these vulnerable mothers keeping in mind that these mothers are grieving the loss of a healthy newborn and the normal postpartum experience. These mothers are separated from their infants, and breastfeeding may be the only thing that validates their motherhood at this time. Nurses need to recognize that the mother is the only one that can breastfeed her baby and should support the key role she plays in the infant’s well-being (Nystrom & Axelsson, 2002; Palmer, Carlsson, Mollberg, & Nystrom, 2012).

Nurses can also play a vital role in support of these mothers in the outpatient setting. Breastfeeding education and interventions to increase breastfeeding self-efficacy should begin in the early antepartum period and then continue through the hospital stay and beyond. Follow up breastfeeding support is also important to the mother’s breastfeeding success. Nurses can advocate for home health care visits for full-term infants discharged from the NICU. These visits provide the opportunity for nurses to evaluate how the infant is breastfeeding and provide further assistance and support especially for the mother who may feel too overwhelmed to seek out assistance on her own.

Maternal child home care nurses also need the education and skills to support a breastfeeding mother or to know when to refer her to an Internationally Board Certified Lactation Consultant (IBCLC). They need to use current evidence when providing support and education to mothers and not rely solely on their own past parenting skills that may or may not be aligned with current research and recommendations. It is important that these nurses incorporate the family into their educational support sessions. As was demonstrated by this study’s findings, family members play a key role in the success of breastfeeding mothers.

Maternal child nurses in leadership roles within a healthcare system are well poised to emphasize the importance of breastfeeding and supporting the mother’s choice to breastfeed her
child to promote acceptance of breastfeeding of infants as the norm in the NICU. Nursing leadership can enhance the competency of NICU nurses by providing time for education and acquisition of skills to increase nurses’ confidence when supporting these mothers at the bedside. Leadership can also arrange for nursing appropriate nurse/patient ratios for nurses to be able to support and educate families and deliver evidence-based nursing care to breastfeeding mothers whose infants are in the NICU.

**Public Policy**

The entire NICU team needs to incorporate best practices into their care delivery model. Every effort to provide care in an environment that emphasizes minimal separation of mothers and infants should be considered. Mothers need to be encouraged and provided with a comfortable place to stay with their infants, day and night. Consideration of the benefits and risks is needed when care will result in separation of mothers from their infants and strategies to minimize separation should become part of the standard of practice.

Health care public policy makers can enact legislation that aligns with evidence-based guidelines to promote mother infant bonding and breastfeeding, ensuring that separation of mothers and infants rarely occurs. Breastfeeding is already considered as a health care decision, because of its many short and long-term health benefits for mother and infant (American Academy of Pediatrics, 2012a). Public policy should include reducing the barriers for mothers to be successful in implementing the American Academy of Pediatrics (2012a) recommendations, particularly in this population of mothers who are breastfeeding a full-term infant in the NICU. The admission of full-term infants to the NICU is rising, the amount of breastmilk they receive is less than their full-term and preterm counterparts, and thus they are at greater risk for negative
health outcomes (Coliaizy & Morriss, 2008; Kachoria & Oza-Frank 2015; Shim, Yang, Messina, & Mintzer, 2018).

Legislators need to provide funding to support lactation services. Lactation centers should be built and staffed daily with qualified IBCLCs and family nurse practitioners (FNP) to assure access and accommodate the needs of all breastfeeding women. Medicaid plans should offer reasonable reimbursement for lactation services, so the disparities encountered in lactation support can be eliminated.

Breastfeeding can have a powerful impact on health care savings in United States (Bartick, & Reinhold, 2010). There is possibly no other health behavior, as breastfeeding, that can affect such varied outcomes in the two individuals involved, a mother and her child. To neglect the importance of breastfeeding and replace it with artificial products, affects the health of the world (Victoria, Bahl, Barros, Franca, Horton, Krasevec, Murch, & Sankar, 2016).

**Limitations**

This study had several imitations. The study design employed a convenience sample of 41 breastfeeding mothers of full-term infants admitted to the NICU for less than 14 days. There was no randomization. Although an a priori power analysis was conducted indicating that for a large effect size, a sample size of 40 was needed to achieve at least 80 percent power at a .05 level of significance, the sample size was small for quantitative analysis. The researcher was unable to enroll 14 eligible participants because they were discharged before the researcher was able to be contact them. These individuals may have had different BFSE scores and identified other facilitators for and barriers to breastfeeding success in the NICU and one week after discharge. The sample excluded non-English speaking mothers. Perhaps these mothers may also have had higher or lower BFSE scores and identified different facilitators for and barriers to
breastfeeding success. Although this sample included mothers of ethnically diverse backgrounds, for the most part, they reported higher levels of education. This may reflect a higher socioeconomic status for this sample of mothers. A sample of less educated mothers may have also provided different results.

Other limitations to the study include the setting from which the sample was obtained. The infants of the mothers who voluntarily participated in this study were admitted to a level III NICU in one hospital with the Baby Friendly Hospital Designation in a suburb of a major city in the North-East region of the United States. Even though the criteria to be designated as a Baby Friendly Hospital does not fully apply to the NICU, there are a few NICU specific requirements. In a designated Baby Friendly Hospital, the overall philosophy is more breastfeeding oriented and supportive of parents’ needs. As such, these findings may not be generalizable to other mother infant dyads in other hospitals or geographic areas. Perhaps a sample from a non-certified Baby Friendly hospital or multiple sites or a different regional or an urban setting would have produced different results.

The researcher telephoned, texted, and emailed the participants to complete the Breastfeeding Self-efficacy scale for premature and ill newborns. The responses were then recorded at that time. The information was not anonymous to the researcher. Reporting their responses to the researcher may have influenced the participants’ scores or the narrative data they provided.

Finally, the researcher is a Board Certified Lactation Consultant (IBCLC), and the lactation educator working with the lactation team at the hospital where the sample was recruited. The mothers were aware of the researcher’s lactation experience, and this may have
influenced their enrollment in the study or the way that they answered questions for the qualitative part of the study.

While the above limitations may affect interpretation of the study findings, nevertheless, it is believed that the results contribute to what is known about the experience of mothers who breastfeed full term infants admitted to the NICU for two weeks or less. The impact of breastfeeding self-efficacy and the facilitators for and barriers to successful breastfeeding reported in this study has implications for both nursing and healthcare systems and can form the basis for review and improvement in current practice.

**Recommendations**

There is limited data of the effects of a short-term NICU admission on breastfeeding success. The current study added to the existing literature by exploring the relationship of breastfeeding self-efficacy to breastfeeding duration and breastfeeding exclusivity of full-term infants in the Neonatal Intensive Care Unit and the facilitators for and barriers to successful breastfeeding in the NICU and at one-week post discharge. The study also demonstrated the reliability of the Breastfeeding Self-efficacy scale for premature and ill newborns for this sample of 37-41 week gestational age infants. The study also highlights areas where future research is needed that can impact mothers’ breastfeeding success.

Recommendations for future research include conducting multi-center, multi-regional studies with larger samples. Consideration to conducting studies in NICUs of different sizes and environmental layouts, and in hospitals with and without Baby Friendly certification, is recommended. A longitudinal study may also be of benefit to determine if the BFSE scores continued to affect breastfeeding exclusivity at two, three, and six months after discharge. A phenomenological study of the experience of breastfeeding a full-term infant in the NICU may
also provide more insight into other factors mothers may be facing when breastfeeding a full-term infant in the NICU.

It is also recommended that other research studies include non-English speaking mothers and more diverse samples in terms of levels of education and socioeconomic backgrounds. Disparities in breastfeeding rates among ethnic minorities and economically disadvantaged mothers have been reported in the literature (Anstey, Chen, Elam-Evans, & Perrine CG, 2017). Expanding research to include all groups of women would be beneficial to identify the similarities and differences in their experience of breastfeeding an infant admitted to the NICU and tailor interventions to improve effectiveness. The BFSE scores of mothers of infants with neonatal abstinence syndrome (NAS) and the facilitators for and barriers to breastfeeding success these mothers identify could also be explored. A known intervention to decrease withdrawal symptoms in infants with NAS is the act of breastfeeding. The impact of breastfeeding self-efficacy on successful breastfeeding suggests that future research should be directed at improving breastfeeding self-efficacy scores in breastfeeding mothers of full-term infants in the NICU and screening mothers to provide targeted support and interventions to enhance breastfeeding success and to prevent breastfeeding failure.

Conclusion

This study explored the phenomenon of successful breastfeeding of mothers who have had an infant that was admitted to the NICU for a short-term admission. Through a mixed-method convergent design, this study demonstrated positive breastfeeding self-efficacy correlates with successful breastfeeding at one and four weeks after discharge. The research and practice implications of this study suggest that breastfeeding self-efficacy enhances breastfeeding success and warrants further study.
References


Creedy, D., Dennis, C., Blyth, R., Moyle, W., Pratt, J., & De Vries, S. (2003), Psychometric characteristics of the breastfeeding self-efficacy scale: Data from an Australian sample. *Research for Nursing Health, 26*(2), 143-152. doi: 10.1002/nur.10073


UNICEF (1991), Slightly reworded from Take the Baby-Friendly Initiative! A global effort with hospitals, health services and parents to breastfeed babies for the best start in life.

UNICEF, New York


Appendix A

Demographics

Demographic collection of data

Name: ________________________________________________________________

Email address: __________________________________________________________

Phone cell: _____________________________________________________________

Date of admission________

Maternal age: ___ Marital status____ Level of education _____

Previous breastfeeding experience_____

Ethnicity_____

Gravida___ Para _____

Weeks gestation _________

Delivery Type __________ BMI_________

Reason for admission to the NICU____________________

Infant birth weight ________________

Length of stay __________

Breastfeeding at 1 week after discharge_____ exclusive______amount of formula_____

Breastfeeding at 4 weeks after initial contact_____exclusive____amount of formula_____


Appendix B

Breastfeeding Self-Efficacy Scale for Mothers of Ill and/or Preterm Infants

For each of the following statements, please choose the answer that best describes how confident you are about breastfeeding your new baby. Please mark your answer by circling the number that is closest to how you feel. There are no right or wrong answers.

1 = not at all confident
2 = not very confident
3 = sometimes confident
4 = confident
5 = very confident

1. I can pump enough milk for my baby
2. I can deal with the fact that breast pumping and breastfeeding can be time consuming
3. I can successfully cope with the breastfeeding situation (pumping and actual breastfeeding) like I have with other challenging tasks
4. I can manage the breastfeeding situation to my satisfaction
5. I can keep wanting to breastfeed
6. I can be satisfied with my breastfeeding experience
7. I can get help with breastfeeding if and/or when I need it

When my baby is ready to actually breastfeed:

8. I will be able to determine when my baby needs to be fed
9. I will be able to ensure that my baby is properly latched on for the whole feeding
10. I will be able to determine that my baby is getting enough milk
11. I will be able to manage to breastfeed even if my baby is crying
12. I will be able to breastfeed my baby without using formula as a supplement
13. I will be able to comfortably breastfeed with my family members present
14. I will be able to finish feeding my baby on one breast before switching to the other breast
15. I will be able to breastfeed my baby for every feeding
16. I will be able to manage to keep up with my baby’s breastfeeding demands
17. I will be able to tell when my baby is finished breastfeeding
18. I will be able to switch from mostly pumping to mostly or completely breastfeeding my baby
Appendix C

Interview Protocol

Mothers Perspectives on breastfeeding a full-term infant in the NICU: A Critical Incident Technique

The aim of the study is to explore what mothers who recently had a full-term infant in the NICU believe helped or hindered their breastfeeding success. The following questions will help me to understand your perspectives.

1. Tell me what you found most helpful to help you be successful when breastfeeding your full-term infant in the NICU.
   a. Please describe what it was about those interventions that made them the most helpful.

2. Tell me what you found least helpful or what prevented you from being successful when breastfeeding your full-term infant in the NICU.
   a. Please describe what it was specifically about those circumstances or interventions that prevented you from breastfeeding your infant.

3. What helped you be successful in your first week at home?

4. What hindered you from being successful in the first week at home?

5. Is there anything else you would like to tell me about your experience of feeding a full-term infant in the NICU or when you came home?
Appendix D

Author Permission
Appendix E
Consent

INFORMED CONSENT/AUTHORIZATION FORM

Project Title: The Relationship of Breastfeeding Self-Efficacy to Breastfeeding Duration and Breastfeeding Exclusivity of Full-Term Infants in the Neonatal Intensive Care Unit: A Mixed Method Study
Name of Principal Investigator: Karen Hylton-McGuire PhD(c), RNC-NIC, IBCLC
Name of Sub-investigator(s): Melissa Fazzari PhD.
Protocol version and date Version 1, 6/26/2017
Anticipated number of research participants at this site: 40

What information is on this form?
This consent/authorization form gives you detailed information about this research study. It explains the purpose, procedures, and the possible benefits and risks of the study; and what you will be asked to do if you choose to be in this study. Please take your time to make your decision. Clinical trials include only patients who choose to take part; your participation is entirely voluntary. You may want to discuss your decision with your friends and family. If you decide to participate, you will receive a signed and dated copy of this form to keep for your records. It also describes the way I (Karen Hylton-McGuire) would like to use and share information about you.
This research study is sponsored by the Department of Nursing at NYU Winthrop Hospital.

Why is this study being done?
You are being asked to participate in a research study to explore what the effect of having a full-term baby in the Neonatal Intensive (NICU) has on breastfeeding. Factors that may affect the breastfeeding self-efficacy of mothers with a full-term infant in the NICU will also be explored. We hope to learn what affect your breastfeeding self-efficacy or how confident you feel breastfeeding your infant has on you feeding your infant only breast milk and how long you breastfeed. We also hope to find what you think helped or hurt you to reach your breastfeeding goals.

Why are you asking me to consider participating in this study?
You are being asked as a possible participant in this study because you are breastfeeding a full-term infant in the Neonatal Intensive Care Unit.
This research study is looking for 40 participants. We expect 40 participants to enroll in this study here at NYU Winthrop.

How long will I be in this study?

98
This research study is expected to take approximately 1 year. Your participation in this study may last up to 6 months. You will be asked to be contacted 3 times.

**What will I be asked to do if I choose to be in this study?**

If you agree to take part, your contact and demographic information including: Date of admission, maternal age, marital status, education, previous breastfeeding experience, ethnicity, gravida, para, length of gestation, delivery type, BMI and infant birth weight, reason for admission to the NICU, length of stay, and the amount of formula supplementation will be recorded on an individual data sheet. You will be contacted by the principal investigator either by email, text, or phone within one week after your baby has been discharged from the NICU. At that time, arrangements will be made to speak with you by phone. You will be asked the questions from the breastfeeding self-efficacy short form for ill and or preterm infants survey (BSEF-SF-IP), whether you are breastfeeding exclusively, and if not, how much formula your baby is receiving daily. The principal investigator will record your responses. There is no right or wrong answers. You will be contacted again three weeks after the initial phone contact to determine whether you are continuing to breastfeed, breastfeeding exclusively, or how much formula daily you are feeding your baby.

During the phone interview conducted one week after your baby’s discharge, you will be asked five open ended questions. These questions will obtain information to determine your perception of the things that helped or affected your breastfeeding success. The principal investigator will audio record your responses from the phone conversations on a Sony IC recorder (ICD-PX333/PX333F) which will then be transcribed. This should take approximately 30 minutes. The principal investigator will not include your name to ensure confidentiality. You will be asked to be contacted 6 months after your baby’s discharged from the NICU.

**What are the risks of being in this study?**

No negative side effects are anticipated by conducting this research. If you experience any discomfort or stress during the survey, you may discontinue the survey or discuss your feelings with the principal investigator immediately following the survey. You should report any problems to Karen Hylton-McGuire, 516-663-9365.

**Audio/Video Photos**

One aspect of this study involves making audio recordings of you. A recording of your interview is being made to better understand the things that helped or hurt your breastfeeding success. These interviews will be used to determine what will help other mothers in the future. Your identity as a participant in this research study will be kept confidential throughout this study. The information obtained in this research and all research records will be kept confidential and taped interviews will be erased at the conclusion of the project. Your name will not be used. Your interview responses and notes made by the investigator will be coded and kept by her in a double locked file cabinet. She will be the only person to hear the recorded interviews.

You give permission to make audio recordings during this study.

_____ Yes  _____ No

___________ Your initials here indicate that you know that audio recordings of you will be made during this study.
What will be the benefit(s) for me if I participate in this study?

Results of this study are for research purposes only. However, this study may help others in the future if there is a connection between breastfeeding confidence and the amount of time mothers breastfeed and if they breastfeed only.

Are there any alternatives to being in this study?

There are no alternatives to participation in this study, except that you may choose not to take part in this study.

Confidentiality

This section of the consent form describes how your information in this research study will be used, shared and safeguarded in relation to this study. Your information will only be used in accordance with this authorization/informed consent form and as required or allowed by law. Please read it carefully before signing it.

Authorization to Use Your Health Information for Research Purposes

The federal privacy regulations, Health Insurance Portability and Accountability Act (HIPAA) requires that we get your permission to use personal identifiable health information about you that is either created by or used in connection with this research study. This permission is called an Authorization. The personal identifiable health information (PHI) we will use includes the entire research record and supporting information from your medical records, results of laboratory tests, and both clinical and research observations made during your participation in the research.

What Personal Information Will Be Used or Disclosed?

Your identity will be kept as confidential as possible as required by law. Except as required by law, you will not be identified by name, social security number, address, telephone number, or any other direct identifier.

Who May Use or Disclose the Information?

Your research records may be disclosed outside of NYU Winthrop Hospital, but in this case, you will be identified only by a unique code number. Information about the code will be kept in a secure location and access limited to only research study personnel.

The results of this research study may be presented at scientific or medical meetings or published in scientific journals. However, your identity will not be disclosed.

Who May Receive or Use the Information?

Organizations that may request to inspect and/or copy your research and medical records for quality assurance and data analysis include groups such as:
The Food and Drug Administration (FDA), the Department of Health and Human Services (HHS), regulatory agencies in other countries, and to NYU Winthrop Hospital.

Your identity, the information obtained and all research records will be kept confidential throughout this study. Your name will not be used when reporting the results. The data collected and interview responses and notes made by the principal investigator will be coded and kept in a double locked file cabinet or in a double password protected electronic file and will only be accessible to the principal investigator. Data will be kept for five years and recorded interviews will be erased at the end of this time. Results of this study may be presented at professional conferences or published in a professional journal.

If I sign, can I revoke it or withdraw from the research later?
If you decide to participate in this study, your Authorization allowing us to use and disclose your identifiable health information will expire at the end of the research study, unless you withdraw your authorization sooner. You always have the right to withdraw your Authorization by putting your request in writing to Karen Hylton-McGuire as stated below in the “Voluntary Participation and Withdrawal from Study” section of this form. If you withdraw your Authorization, you will also be removed from the study, but you will continue to receive any standard medical care and any other benefits to which you would normally receive as a patient at NYU Winthrop Hospital. However, if you do not send us this request in writing we may continue to use your personal identifiable health information that was collected up until your withdrawal from the research study to maintain the integrity of the study.

Will I be informed if there are any significant new findings?
Any new findings discovered during this research study that may affect your decision to continue to take part in this study will be shared with you by your study researcher or as such information becomes available. At times, you may even be asked to sign another informed consent document.

What will happen if I have a research-related injury?
If as a result of your participation you experience physical injury from known or unknown risks of the research procedures as described, immediate medical care and treatment, including hospitalization, if necessary, will be available. No funds have been set aside for compensation; therefore you will be responsible for the costs of such medical treatment, either, directly or through your medical insurance and/or other forms of medical coverage.

Will there be any additional costs and/or payments?
There will be no cost to you for participating in this study.
Voluntary Participation and Withdrawal from Study

Your participation in this study is voluntary. You may refuse to participate or you may withdraw from the study at any time during the duration of the study without penalty or loss of any care and without affecting your future medical care at NYU Winthrop Hospital.

You have the right to refuse to sign this Authorization/Consent form and refuse to take part in this research study. If you choose not to authorize the use and disclosure of your personal identifiable health information (PHI) or to take part in this research study, any standard medical care and any other benefits which you would normally receive as a patient at NYU Winthrop Hospital will not be affected.

If you withdraw from participating in this study, you may also want to withdraw your authorization for us to use your personal identifiable health information. Any identifiable health information that has already been used and disclosed to Karen Hylton-McGuire cannot be withdrawn. If you do decide to withdraw, we ask that you contact Karen Hylton-McGuire in writing and let her know that you are withdrawing your authorization for the use and disclosure of your identifiable health information. Karen Hylton-McGuire’s mailing address is 259 First Street, Mineola, NY, 11501.

However, even after you have requested that we no longer use your personal identifiable health information, we may have to continue to use the information that has been collected prior to your withdrawal in order to ensure the research study can be completed as necessary. We are unable to take back anything we have already done or any information we have already shared with your permission.

We may continue using and sharing the information obtained prior to your withdrawal if it is necessary for the soundness of the overall research.

It is important that you remember to send your request to withdraw your authorization for us to use your individually identifiable health information in writing to Karen Hylton-McGuire. If you do not send us this request in writing we may continue to use your identifiable health information that was collected up until your withdrawal from the research study.

Who can I contact if I have questions, complaints or concerns?

If you have any questions or concerns about this study, you may contact Karen Hylton-McGuire at 516-663-9365.

If you have any concerns, complaints or questions about your rights as a research participant, or any other matter related to your participation in this project, you may call NYU Winthrop Hospital’s administrative office of the Institutional Review Board Committee (IRB) at (516)
663-2552. The IRB is a committee required by federal regulations and New York State law. It is an independent committee comprised of NYU Winthrop Hospital’s physicians and staff, as well as lay members of the community not affiliated with the institution. The IRB reviews all proposed research involving human subjects before any study may begin at NYU Winthrop Hospital.

If you have any questions or concerns that you feel you would like to discuss with someone who is not on the research team, you may also call the Director of Patient Relations at NYU Winthrop Hospital (516) 663-2058

**Consent to Participate**

You have read this page and the preceding 5 pages of this consent form. In addition, the study investigator has explained to you the procedures in this study and the potential risks and side effects. You have been given the opportunity to ask questions about this study. You are aware that if you decide not to participate or to withdraw your consent, this will not affect any further treatment at this study site or any treatment. You voluntarily consent to participate in this study. You will receive a copy of this signed and dated consent form. You have not waived any of your legal rights by signing this consent form.

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Appendix F

[Email]

[EXTRIBNet Board Action]

From: Justin Brown
To: Fazziol, Melissa; McGuire, Karen
Cc: [EXTRIBNet Board Action]

Subject: [EXTRIBNet Board Action]

Please note that NYU Winthrop Hospital Institutional Review Board has taken the following action on IRBNet:

Project Title: [10943241] The Relationship of Breastfeeding Self-Efficacy to Breastfeeding Duration and Breastfeeding Exclusivity of Full-Term Infants in the Neonatal Intensive Care Unit: A Mixed Method Study
Principal Investigator: Karen Hinton-McGuire, PhD (c), RNC-NIC, IBCLC
Submission Type: New Project
Date Submitted: July 7, 2017
Action: APPROVED
Effective Date: August 7, 2017
Review Type: Expedited Review

Should you have any questions you may contact Justin Brown at jbrown1@winthrop.org

Thank you,
The IRBNet Support Team

www.irbnet.org
Appendix G

Institutional Review Board
1000 Hempstead Avenue
Rockville Centre, NY 11571
www.molloy.edu

Tel. 516.323.3801
Tel. 516.323.3711

Date: August 9, 2017
To: Karen Hylton-McGuire
From: Kathleen Maurer Smith, Ph.D.
Co-Chair, Molloy College Institutional Review Board
Patricia Eckardt, Ph.D., RN
Co-Chair, Molloy College Institutional Review Board

SUBJECT: MOLLO Y IRB REVIEW AND DETERMINATION OF EXPEDITED STATUS
Study Title: The Relationship of Breastfeeding Self-Efficacy to Breastfeeding Duration and Breastfeeding Exclusivity of Full-Term Infants in the Neonatal Intensive Care Unit: A Mixed Method Study

Approved: August 9, 2017
Approval No: 11130307-0809

Dear Karen:

The Institutional Review Board (IRB) of Molloy College has reviewed the above-mentioned research proposal and determined that this proposal is approved by the committee. It is considered an EXPEDITED review per the requirements of Department of Health and Human Services (DHHS) regulations for the protection of human subjects as defined in 45CFR46.101(b) and has met the conditions for conducting the research. Please note that as Principal Investigator (PI), it is your responsibility to be CITI Certified and submit the evidence in order to conduct your research.

You may proceed with your research. Please submit a report to the committee at the conclusion of your project.

Changes to the Research: It is the responsibility of the Principal Investigator to inform the Molloy College IRB of any changes to this research. A change in the research may change the project from EXPEDITED status that would require communication with the IRB.

Sincerely,

Kathleen Maurer Smith, Ph.D.

Patricia Eckardt, Ph.D., RN