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THE EFFECT OF INCOME LEVEL ON THE RELATIONSHIP BETWEEN THE
PERSONAL SUPPORT MATRIX AND SUSTAINED BREASTFEEDING

A Dissertation submitted in partial fulfillment of the requirements for the degree of
Doctor of Philosophy at Virginia Commonwealth University.

by

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I would like to dedicate this work to the memory of three very important people in my life. Without my parents, Carl and Elva Mann, I would not have dared to dream of this goal. My mother encouraged me to go back to school for my bachelor's degree in 1994, and she died before I started my coursework. I did it Mom, and thank you. I could not have continued this journey without my father. Dad was my biggest cheerleader during the completion of my bachelor's degree, and he continued that cheering during my master's degree. He died before I graduated from my master's program, but his words stayed with me. He told me, "You will finish and you will go on." I finished Dad, and thank you. When I started this doctoral adventure my advisor and mentor was Dr. Sharron S. Humenick, a skilled counselor and a person of profound words. Dr. Humenick was instrumental in the establishment of this dissertation, and this work is an extension and elaboration of her work. Sharron died before I finished but she is here in these pages. Thank you, Sharron.

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Abstract

THE EFFECT OF INCOME LEVEL ON THE RELATIONSHIP BETWEEN THE
PERSONAL SUPPORT MATRIX AND SUSTAINED BREASTFEEDING

By SANDRA MANN GOSSLER, PhD, RN

A Dissertation submitted in partial fulfillment of the requirements for the degree of Doctor
of Philosophy at Virginia Commonwealth University.

Virginia Commonwealth University, 2007

Major Director: MARTHA W. MOON, PhD, RN, MPH
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The Healthy People 2010 Objectives for the population of the United States include the objective for women to sustain breastfeeding at a higher rate than they are currently. The American Academy of Pediatrics (AAP) now recommends that all infants be fed human milk for the first year of life instead of the previously recommended first six months of life. Breastfeeding initiation rates are rising, but breastfeeding duration rates continue to fall. It was hypothesized that the support system of the women may play a role in the duration of breastfeeding. The purpose of this research study was to investigate the support system and breastfeeding rates of mothers during the first six weeks after delivery

and to determine if income level had an effect on these systems and rates. Mothers were interviewed during their hospitalization for childbirth regarding their perception of their support system currently in place. A questionnaire was administered regarding support from friends, family members, co-workers, and health care professionals and the responses were quantified. Mothers were contacted weekly to determine if breastfeeding was being sustained and who was the most supportive person to them. At the end of six weeks or when breastfeeding was discontinued, the mothers were interviewed a second time to determine if the support system had changed. The results of this study showed that income level affected the duration of breastfeeding and the mother's perception of her support system. Additionally, the results showed that the evaluation of the support system changed only slightly over time. The results showed preliminary ability of the study tool to predict breastfeeding at six weeks by income.

This document was created using Microsoft Word 2003. The statistical package used for data analysis was JMP version 6.

CHAPTER 1

The purpose of this study was to investigate the effect of income level on the relationship between the personal support matrix and breastfeeding duration. The personal support matrix was defined as infant feeding practices and opinions of friends, family members, and co-workers that are potentially supportive to the mother. These types of supports were evaluated as predictors of breastfeeding duration. Income level was distinguished as the mother being of either low income or not-low income. Low income status was defined by the mother's self-report of participation or eligibility for participation in the Virginia State Health Department Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) or participation in, or eligibility for participation in the Virginia Medicaid program. Breastfeeding duration was self-reported by the mother as breastfeeding through the first six weeks postpartum or discontinuing breastfeeding before the sixth week postpartum. In Chapter 1, the problem statement, purpose of the study, significance, specific aims, research questions, and the definition of the study variables are discussed.

Statement of the Problem

The challenge of sustained breastfeeding continues to be a health care issue in the United States. Previous research has shown marginal improvements in the overall

breastfeeding initiation rates in the population. However, despite the slowly increasing rates, the sustained breastfeeding goals of the Healthy People 2010 Objectives have not been attained. Those in the low income population continue to have difficulty with this issue (Dennis, 2002a; DHHS, 1999; Hill, 2000; Riordan & Gill-Hopple, 2001). Although the initiation rates show an increase, breastfeeding rates at 6 months of age in the low income population continue to range below the 50% recommended by the Healthy People 2010 Objectives (DHHS, 1999). For example, data for the year 2000 in Virginia showed the percentage of WIC mothers who were breastfeeding in the hospital immediately postpartum was 47.8% and at 6 months 21.1%. In 2001, the rates dropped to 46.4% breastfeeding in the hospital and 15% breastfeeding at 6 months. However, in 2002 the initiation rates increased to 51.8% but breastfeeding at 6 months continued at 15%. The most recent data (2003) show that the initiation rate has decreased slightly to 50.7% and breastfeeding at 6 months has increased slightly to 16.7% (Virginia Department of Health [VDH], 2004). The data demonstrate that low income women in Virginia sustained breastfeeding at a rate well below the Healthy People 2010 Objectives. This low rate of sustained breastfeeding may have multiple contributory factors which could include a minimal support system or a support system that may operate in ways not previously acknowledged (Kramer & Kakuma, 2002; Li et al., 2005; Ryan, Wenjun, & Acosta, 2002; VDH, 2004).

Despite the fact that human milk has been shown to be the optimal nutrition for a human infant, many barriers, whether perceived or real, remain for women who wish to begin to breastfeed or continue to breastfeeding their infant (Khoury et al., 2002). These

barriers may include time constraints, lack of support from others, contradictory information, embarrassment, social constraints, maternal attitudes toward breastfeeding, and the attitudes of others toward the breastfeeding mother (Hill, 2000; Humphreys, Thompson, & Miner, 1998; Khoury, Mitra, Hinton, Carothers, & Sheil, 2002). Personal barriers may include restriction in lifestyle, inconvenience, and the potential for physical discomfort (Ryser, 2004). Lack of support from families and friends can be shown to be a barrier (Humenick, Hill, & Wilhelm, 1997; Khoury et al., 2002). This lack of support has also been shown to influence the initiation of breastfeeding and sustained breastfeeding (Humenick, Hill, & Wilhelm, 1997; Khoury et al., 2002). With health care costs continually rising and support services diminishing, women need identifiable resources to address barriers to sustained breastfeeding. This factor remains especially important for low income women who want to sustain breastfeeding. Additionally, nurses need tools to recognize mothers in the early postpartum period that may have multiple barriers to breastfeeding in order to provide them with or direct them toward appropriate support services and resources (AAP, 2005; DHHS, 1999; Ryan et al., 2002).

The Research Gap

A gap exists in the research literature regarding the influence of income on the support system of a mother and breastfeeding duration. A few studies identify the father of the infant, the maternal grandmother, or sisters as influential in breastfeeding support. An expanded support system which is composed of extended family members, friends, and co-workers has not been adequately examined regarding effects on breastfeeding duration. This expanded support system identified as the personal support matrix may have

significant influence on breastfeeding duration. By investigating the strength of influence of the personal support matrix, researchers may be able to design appropriate interventions to support the breastfeeding goals of the mother. A research study was needed to identify the extent to which the influence of the personal support matrix affects breastfeeding duration.

Purpose

The purpose of this study was to investigate the effect of income level of a mother and the personal support matrix on breastfeeding duration. It was hypothesized that the positive experiences, beliefs, and knowledge of friends, family members, and co-workers in the mother's personal support matrix influences and helps sustain breastfeeding. Additionally, it was hypothesized that women of low income may have a support matrix that functions in ways previously not identified that influences sustained breastfeeding.

Significance

The feeding of human breast milk to infants can be directly linked to multiple physiological benefits for the infant and the mother (AAP, 1997, 2005; Institute of Medicine, 1991; Lawrence, 2000; Mortensen, Michaelsen, Sanders, & Reinisch, 2002). Some of the benefits to infants include immunological protection against infection, and reduced incidence of various disease processes such as diabetes, asthma, and eczema (Hoppu, Kalliomäki, Laiho, & Isolauri, 2001; Ivarsson, Hernell, Stenlund, & Persson, 2002; Stone, 2004). Mothers also benefit from breastfeeding their infants and a recognized benefit that is unique to childbirth is a sense of empowerment for the mother when she realizes her ability to provide complete nutrition for her infant (Locklin, 1995; Locklin &

Naber, 1993). Additionally, mothers who breastfeed typically have a more rapid recovery from childbirth, a decreased incidence of osteoporosis later in life, and a decreased incidence of premenopausal ovarian and breast cancers (Lawrence, 2000). Sustained breastfeeding enhances and maintains these health benefits

The necessity of protecting infant health through breastfeeding continues to be a national health objective (DHHS, 1999). Previous research has shown that the support offered by friends and family to breastfeeding mothers affects breastfeeding outcomes (Humenick et al., 1997; Humenick et al., 1998). Because the goals of sustained breastfeeding, as stated in the Healthy People 2010 Objectives, have not been met and are not being met, it is important to identify breastfeeding mothers who are at risk for inadequate or minimal support systems (Dennis, 2002a; DHHS, 1999; Hill, 2000; Riordan & Gill-Hopple, 2001). By identifying and assisting at-risk mothers, health care professionals may assist in increasing breastfeeding duration rates.

Specific Aims

A modification of the Theory of Planned Behavior was used as the theoretical framework for investigating the influence of a woman's personal support matrix on breastfeeding duration. The following specific aims were developed for this study: (1) to evaluate the relationship between income level and the continuation of breastfeeding through the first 6 weeks postpartum with logistic regression, (2) to evaluate the relationship between the personal support matrix and the continuation of breastfeeding through the first 6 weeks postpartum with logistic regression, and (3) to determine whether

the personal support matrix score changes from the initial survey to the 6 week follow-up survey or when breastfeeding was discontinued with repeated measures analysis.

Research Questions

1. To what extent does income level influence the continuation of breastfeeding through the first 6 weeks postpartum?
2. To what extent does the mother's personal support matrix influence the continuation of breastfeeding through the first 6 weeks postpartum?
3. To what extent does the personal support matrix score change from the initial postpartum survey to the 6 week postpartum survey or when breastfeeding is discontinued?

Definition of Study Variables

For this study, "Breastfeeding" was defined as the infant receiving daily human milk for nutritional maintenance whether directly from the mother's breast or pumped milk being finger-fed or through a bottle. "Weaned" or "Discontinued Breastfeeding" was defined as the infant receiving no human milk. Breastfeeding data were obtained by weekly phone calls to the mothers to inquire as to whether they were continuing to breastfeed their infants. Mothers answered with a "yes" or "no" response to this question. The total number of days of breastfeeding during the initial 6 week postpartum period or to when breastfeeding was discontinued was recorded with a maximum of 42 days.

The "Income Level" variable was identified as either low income or not-low income. Low income was defined by the mother's self-report of participation or eligibility

for participation in the Virginia Department of Health Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) or participation or eligibility for participation in the Virginia Medicaid program (VDH, 2006a). Eligibility requirements for WIC include being pregnant, breastfeeding, being postpartum, having a child younger than 5 years old, and being a resident of the State of Virginia (Income eligibility guidelines are included in Appendix A). Medicaid, a federally funded, state-run program, provides medical assistance for individuals and families with limited incomes and resources. Eligibility requirements vary slightly among localities but typically include the following: having children and a limited income, receiving or being eligible to receive Supplemental Security Income, being a pregnant woman who meets the income requirements (usually, a family of four making \$23,225 a year or less is eligible), having family assets of \$2000 or less, or receiving adoption or foster care assistance (VDH, 2006b) (Additional eligibility requirements are included in Appendix A). Mothers who qualify as low income were designated “WIC” mothers. Mothers who deny participation in or eligibility for WIC or Medicaid were designated “Non-WIC” mothers.

The “Personal Support Matrix” variable was defined as infant feeding practices of friends, family members, and co-workers that are potentially supportive to the mother. The personal support matrix was measured by a 16-item questionnaire administered to the mothers during the first 6 to 48 hours postpartum and administered again at 6 weeks postpartum or when breastfeeding is discontinued. Additionally, mothers were asked to identify the person they felt was most supportive during the weekly breastfeeding data collection or when breastfeeding was discontinued.

Summary

Breastfeeding duration continues to be an important health care issue with implications for long-term health status and well-being of infants and mothers. Researchers maintain that the continued ingestion of human milk throughout the first year of life provides growth and immunological benefits that cannot be duplicated with artificial breastmilk substitutes. As health care costs continue to rise, women need identifiable and affordable resources to address barriers to sustained breastfeeding, and this issue remains an especially important one for low income women. The personal support matrix may play a greater role in influencing breastfeeding barriers and duration than previously known. Therefore, further investigation of the effect of income level on breastfeeding support and duration was an important step in developing interventions and programs that promote, support, and protect long-term breastfeeding.

CHAPTER 2 REVIEW OF LITERATURE

The following review of literature presents the theoretical basis for the study and the significance of human milk to infant health. The review also highlights current research by professional organizations regarding the importance of breastfeeding promotion. Additionally, the review examines the Healthy People 2010 Objectives for maternal, child, and infant health (DHHS, 1999). Selected research regarding infant feeding practices, breastfeeding support, and breastfeeding duration - with an emphasis on the experiences of low income women - are also presented. Furthermore, the review examines sources of influence on initiation and duration of breastfeeding, as well as interventions involving sources of influence and support.

Background and Theory

Choosing an infant feeding method can involve the influence of multiple sources in a mother's life (Bentley et al., 1999; Earle, 2002; Hauck & Irurita, 2003; Humphreys et al., 1998). It was hypothesized that a personal support matrix, composed of multiple persons influencing the mother in various ways, may contribute to the infant feeding decision-making process. This influence may support continuing or discontinuing the chosen infant feeding method. The personal support matrix may have negative influences on the mother that may include feelings of being forced to choose a specific infant feeding method or

feelings of guilt for the chosen infant feeding method. A positive personal support matrix may be composed of persons who encourage, promote, and inspire the mother to persevere, even if difficult circumstances arise. The influence of a positive personal support matrix may affect the mother's perception of her ability to perform the type of feeding method she has chosen and may help her maintain it. A personal support matrix that was negative to breastfeeding may generate perceptions of inadequacy or inability to achieve a desired outcome, which may cause a change in the infant feeding method. However, a negative component in the support matrix may also have positive outcomes. A negative influence that challenges the mother's ability to achieve may be interpreted as an incentive to persevere through adversity.

Research indicates that infant feeding intentions develop and decisions are made prior to or early in pregnancy (Losch, Dungy, Russell & Dusdieker, 1995). Infant feeding intentions are developed based upon personal knowledge, opinions, attitudes, beliefs, and judgments and are influenced by multiple sources. Sources of information that can contribute to intentions include health care providers, significant others, partners, friends, family members, and co-workers. Educational programs, books, magazines, the media, and the Internet can also be sources of information that influence the mother. The cultural or ethnic group of the woman may also perceive infant feeding methods as traditional or unconventional, which contribute to the intention and decision-making process regarding infant feeding (Danner, 1991; Dennis, 2002b; Dix, 1991; Gill-Hopple, 2001; Libbus & Kolostov, 1994; Riordan & Gichia, 2000). Strongly held personal beliefs and the timing of the decision are major contributors to the infant feeding decision (Riordan & Gill-Hopple,

2002). Maintaining a positive attitude toward the practice of breastfeeding and seeing occasional difficulties as normal are considered paramount to the perception of success (Dennis, 2002b). However, in the intention and decision-making processes, the beliefs, experiences, knowledge and opinions of others in the personal support matrix may be additional, unrecognized factors that affect infant feeding choices and practices.

The Theory of Planned Behavior

The theoretical framework selected for investigating the effect of the support matrix on breastfeeding duration was the Theory of Planned Behavior, derived from the Theory of Reasoned Action posited by Fishbein and Ajzen in 1975 (Ajzen, 2002; Ajzen & Fishbein, 1980). The Theory of Reasoned Action describes the relationship between beliefs, attitudes, intentions, and resultant behavior. In 1986, Ajzen and Madden further refined this theory as the Theory of Planned Behavior and proposed that perceived behavioral control interacts with attitudes and subjective norms. The researchers found that perceived behavioral control strongly correlates to a person's belief in his or her ability to perform a behavior, which, in turn, leads to intention to perform the behavior and actual behavior performance. The theory assumes that most human behavior was under the person's volitional control and, therefore, could be predicted from intentions alone (Ajzen, 1991). The central factor in the Theory of Planned Behavior was the individual's intention to perform a specific behavior. Although motivation and intention are significant factors in this theory, availability of opportunities and resources are also factors that could influence the actual performance of the behavior (Ajzen, 1991). When applying the theory to the

breastfeeding mother, the support and encouragement of family members, friends, and co-workers are opportunities and resources that may affect infant feeding behavior.

In explaining human behavior, beliefs are factors that can determine many outcomes. Most behavior can be seen as a function of salient information or beliefs about a behavior. Ajzen and Madden (1986) reference Bandura and his associates (Bandura, Adams, Hardy, & Howell, 1980) in their work on the concept of self-efficacy and how behavior was strongly influenced by confidence and belief in the ability to perform a behavior (Ajzen & Madden, 1986). In the Theory of Planned Behavior, three specific types of salient beliefs are described: behavioral beliefs, normative beliefs, and control beliefs. Behavioral beliefs address the influence of attitude toward a behavior. Normative beliefs form the basis of the acceptance of the social norms regarding the behavior. Control beliefs will determine whether the person perceives internal or external control, regarding the performance of a behavior. These beliefs will develop one's attitude toward the behavior as to whether it was valued for its negative or positive consequences. As the beliefs develop over time and blend with past personal experiences and the influence of others, behavioral intentions are determined (Ajzen, 2002).

Three specific determinants are derived from the belief framework of the Theory of Planned Behavior. They include attitudes toward the behavior, subjective norms, and perceived behavioral controls. Attitudes toward the behavior are identified as a simple positive or negative appraisal of a behavior, influences of opinion toward that behavior, and the opinion of others on the performance of that behavior. Subjective norms refer to the behavior as being acceptable or unacceptable to perform within the societal context in

which the person exists. Perceived behavioral controls refer to the belief of the ease or difficulty in performing the behavior (Ajzen, 1991; Ajzen, 2002). Generally, the more positive the attitudes, the greater the perceived control, and the more positive the subjective norms, the more likely the person will have stronger intentions to perform the behavior (Ajzen, 1991; Ajzen, 2002).

The influence of normative beliefs and subjective norms on breastfeeding outcomes was of interest in this research study. The normative beliefs of the mother refer to the acceptance or disapproval of the persons within the mother's personal support matrix regarding sustained breastfeeding. The strength of the mother's normative beliefs regarding her breastfeeding decision was crucial to her perception of subjective norms, subsequent intention, and behavioral action. The subjective norms (i.e., the acceptability and expected mode of conduct for the mother by others) may play a role in the mother's decision to maintain breastfeeding over a period of time. The mother may perceive that within her societal or cultural group, breastfeeding was either accepted or rejected as an infant feeding method (Gichia, 2000; Riordan & Gill-Hopple, 2001). In her decision to continue to breastfeed, the mother may experience not only the societal and cultural group pressures but also her own sense of moral obligation to her infant, herself, or others (Ajzen, 1991). The mother's perception of the type of support offered by those in her personal support matrix may influence her resultant breastfeeding behavior.

Breastfeeding intention was established by the initiation of breastfeeding in the immediate postpartum period. The outcome behavior of breastfeeding duration was not immediately known during the immediate postpartum period. Breastfeeding duration may

be compromised if the support systems are inefficient, ineffective, or disorganized. Janke (1994) found that if the mother had less perceived behavioral control in her ability to breastfeed, she was more susceptible to negative influences from the personal and professional support systems.

A factor of interest that may be influential and impact the personal support matrix, subjective norms, and sustained breastfeeding was the income level of the mother. The typically constant factor of income may dictate the resources available to the mother and influence her infant feeding decisions. Previous data give evidence that lower income mothers sustain breastfeeding at lower rates and for shorter periods of time (VDH, 2004). Income level may also affect the strength of influence of the mother's personal support matrix. The personal support matrix of low income mothers may operate in ways not previously recognized. This difference may influence not only the mother's perception of the personal support matrix but also her subjective norms toward sustained breastfeeding. Figure 1 illustrates the theoretical model developed to examine the relationships between income level, the mother's personal support matrix, and breastfeeding outcomes.

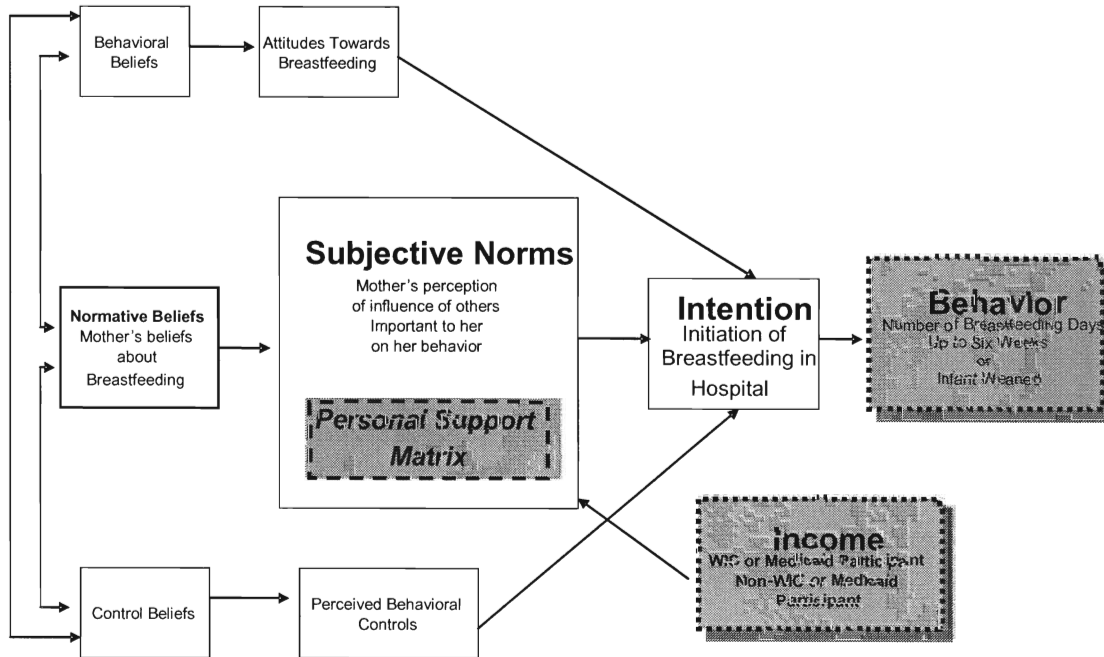


Figure 1. A Modification of the Theory of Planned Behavior Model (Ajzen, 2002).

The Significance of Human Milk

Research indicates that breastfeeding an infant provides an effective, efficient, and economical approach to reduce infant morbidity and childhood obesity, improve women's and children's health, and reduce health care costs (American Academy of Pediatrics, 1997, 2005; Kelleher, & Duggan, 1999; Labbock, 1999; Newton, 2004; Sciarti, Grummer-Strawn, & Fein, 1997). Human milk exhibits many properties that affect the immediate and long term physiological status of the infant and the mother (AAP, 1997, 2005; Institute of Medicine, 1991; Lawrence, 2000; Mortensen, Michaelsen, Sanders, & Reinisch, 2002). The species specificity of human milk meets the nutritional and rapid growth needs of human infants, while providing immunological protection against infection. The components of human milk - including fats, proteins, sugars, minerals, and microminerals - combine to provide highly efficient bioavailability of these elements for digestion and absorption. The proteins in human milk also support rapid growth and the blending of nutrients within the milk protects the infant against infection. The infant gut is also protected by the binding effects of lactoferrin which binds with iron and prevents *E. coli* proliferation (Davis, 2001). Furthermore, human milk has immunologic properties that protect the infant from various infections. Research indicates that human milk reduces the incidence of celiac disease (Ivarsson, Hernell, Stenlund, & Persson, 2002) and other chronic disease processes. Infants who ingest human breast milk for at least 4 months show evidence of a reduced incidence of asthma and eczema by 2 years of age (Hoppu, Kalliomäki, Laiho, & Isolauri, 2001; Stone, 2004). The significance of the lack of sustained breastfeeding cannot be overlooked. According to the DHHS (1999), childhood

obesity and related illnesses due to the lack of sustained breastfeeding decrease child health quality and increase the health care cost burden to the family, community, and nation.

The Importance of Breastfeeding and Its Promotion

Breastfeeding has been endorsed by the World Health Organization (1990), the Institute of Medicine (1991), the American Dietetic Association (1997), the American College of Obstetricians and Gynecologists (2002), the International Lactation Consultant Association (2000) and the American Academy of Pediatrics (2005). Each organization acknowledges breastfeeding as the preferred and most complete source of nutrition for infants. Additionally, these organizations consider the promotion of breastfeeding as a critical aspect of supporting and protecting the health of women and infants. The health benefits to mothers and infants include anti-infective properties, immunologic properties, allergy protective properties, optimal nutritional properties, species-specific properties, and the unique mother-infant interaction that takes place during feeding (AAP, 2005). The following review of the specific recommendations of the above organizations reveals that, based on their assessment of research, each organization has a slightly different perspective on the benefits of breastfeeding. However, none of them addresses the importance of the support from the woman's friends, family members, and co-workers and the potential influence of these persons on breastfeeding duration.

The World Health Organization's *Innocenti Declaration* (1990) recognizes breastfeeding as a contributory factor in the health of women, infants, families, and the

community. The declaration addresses the need for women to be personally encouraged and supported to initiate and continue breastfeeding. It recognizes specific areas that inhibit women in their choice to breastfeed, including negative influences, manipulative perceptions, and insensitive responses of others. The declaration claims these barriers should be confronted at all levels of society. Obstacles to breastfeeding (bias within the community, restrictive policies in the workplace, and health system policies that separate mothers and infants) should be removed. Additionally, the declaration encourages leaders in society to promote and advocate breastfeeding as a societal and cultural norm. The World Health Organization believes the importance of breastfeeding to the health of women and infants should be recognized. Furthermore, policies should be implemented to protect breastfeeding in private areas, public areas, and the workplace. As previously noted in the purpose of this study, potential persons of influence may include family members, friends, and co-workers. These persons should be incorporated in the World Health Organization's "levels of society" that need to be confronted for conveying possible negative influences, manipulative perceptions, and insensitive responses to the breastfeeding mother.

In the policy document, *Nutrition During Lactation*, the Institute of Medicine (1991) acknowledges human milk as the appropriate and superior nutritional source of intake for the healthy or compromised newborn. The institute also recognizes that human milk provides protection from disease, a benefit not matched by artificial milk-substitutes. Factors that were found to be influential regarding women choosing their infant feeding method included public attitudes towards breastfeeding, prenatal care, maternal leave and

employment issues, breastfeeding instructions, and other social aspects. The Institute of Medicine recommends measures that support of breastfeeding women and breastfeeding practices. Recommendations include prenatal education and the early management of lactation to establish adequate milk supply during the early postpartum period. The institute asserts that within the time frame of early lactation management, health care professionals should provide knowledgeable assistance to support the mother in achieving the desired breastfeeding outcomes. In addition, early breastfeeding practices should be encouraged to promote adequate milk supply.

The American Dietetic Association (1997) states that breastfeeding should be strongly promoted. The association also advocates the promotion of increased breastfeeding duration. Its rationale for the promotion of breastfeeding includes the psychological, nutritional, and immunological health benefits for the infant as well as the maternal health benefits of lactational amenorrhea, maternal weight loss, and protection against premenopausal breast and ovarian cancers. The American Dietetic Association also identifies breastfeeding as a factor in reducing infant obesity and morbidity, decreasing the incidence of gastrointestinal and respiratory illnesses, and reducing incidences of otitis media.

The American College of Obstetricians and Gynecologists (ACOG) (2002) endorses breastfeeding as the principal source of nutrition for infants. In the *Guidelines for Perinatal Care* (2002), developed in association with the American Academy of Pediatrics, ACOG notes that breastfeeding promotes immunologic development of the infant gastrointestinal tract and general psychological well-being. Additionally, breastfeeding

offers economical and environmental advantages for mother and baby. The guidelines encourage practitioners to support women in their choice to breastfeed as well as their choice to continue breastfeeding in the workplace and in public areas. However, despite acknowledging breastfeeding as the preferred method of feeding for newborns, the guidelines stop short of endorsing breastfeeding as the optimal method of infant feeding. Although ACOG (2002) views practitioners as a primary resource to the public and their patients regarding the benefits of breastfeeding, the organization offers no recommendations for practitioners to promote breastfeeding as the optimal method of infant feeding. In 2003, the organization reaffirmed their statement regarding breastfeeding support, benefits of breastfeeding, and breastfeeding as a preferred method of infant feeding; however, the organization did not recommend their members or women's health care providers promote breastfeeding as the optimal feeding method.

The International Lactation Consultants Association (2000) published its *Position Paper on Infant Feeding* stating that all infants should have the right to receive human milk. The paper also states that all people should work to protect not only the right of the infant to receive human milk but also the right of the mother to provide the milk. The position paper seeks to increase awareness of key research that documents findings that affect the breastfeeding woman, the infant, and address various lactation issues. Issues include breastfeeding initiation, duration, knowledge and attitudes, as well as milk composition, physical issues for mother and infant, effects of breast milk substitutes, and medication intake by the mother. The position paper also addresses the need to educate women regarding breastfeeding issues and to assist women in properly initiating and

continuing breastfeeding. Health professionals are advised to refer breastfeeding mothers to appropriate resources for lactation education and support. Health care institutions are also encouraged to accommodate breastfeeding patients and employees.

Recently the American Academy of Pediatrics (2005) reviewed research from 1995 through 2004 and issued a new policy statement, *Breastfeeding and the Use of Human Milk*. The statement's sections entitled "The Challenge" and "Recommendations on Breastfeeding for Healthy Term Infants" acknowledge multiple obstacles to successful initiation and continuation of breastfeeding. The obstacles include maternal employment, lack of family and broad societal support, media portrayal of bottle feeding as normative, television and magazine advertising, misinformation, and lack of guidance and encouragement from health care professionals. The AAP's recommendation on breastfeeding healthy term infants includes a statement that both parents should be included in breastfeeding education before and after delivery. The AAP considers educational reinforcement an essential component of successful breastfeeding for the mother. Furthermore, the AAP recognizes accurate information, positive support, and encouragement as essential components of a successful and satisfying breastfeeding experience for the mother, father, infant, and family.

The above statements and endorsements of professional organizations present a consensus that breastfeeding should be promoted and supported by women's health professional groups. However, until the recent AAP (2005) recommendation, no group had specifically acknowledged the significance of the non-professional or personal support system for breastfeeding mothers. In its 2005 recommendation the AAP recognized the

significance of support systems for breastfeeding mothers. It also acknowledged the importance of including the father in breastfeeding education as a means for sustaining breastfeeding beyond the immediate postpartum period. With the acknowledgement that the father needs to be included in breastfeeding education, further research was warranted to provide evidence that a broader group of influential persons (specifically friends, family members, and co-workers), may be additional sources of significant support to the mother. Similarly, they may have an effect on sustained breastfeeding. Persons in this extended support group typically have more opportunities to have access to and spend time with the mother than professionals do; thus, they may have more influence on the mother's decision to initiate and sustain breastfeeding than previously recognized.

The Status of the Healthy People 2010 Objectives on Breastfeeding

The current Healthy People 2010 Objectives (HP2010) (DHHS, 1999) provides a systematic approach to understanding and improving the health of the entire population of the United States. The two overarching goals of the HP 2010 document is to “increase the quality and years of healthy life and to eliminate health disparities” (DHHS, 1999, Vol.1, p.2). The specific goal of the Maternal, Infant, and Child Health section of the HP2010 document is to “improve the health and well-being of women, infants, children, and families” (HP2010, DHHS, 1999, Vol.2, p.16-10). As one of the ways to achieve this goal, Objective 19 proposes to “increase the proportion of mothers who breastfeed their babies” (HP2010, DHHS, 1999, Vol. 2, p. 16). Specifically, the objective is to increase the breastfeeding initiation rates to at least 75% of all mothers who breastfeed in the early

postpartum period (Objective 16-19a), increase to at least 50% those mothers who breastfeed 5 to 6 months (Objective 16-19b), and increase to 25% those mothers who breastfeed at 1 year (Objective 16-19c).

As discussed in the preceding review, national organizations of health care providers have published recommendations, statements, and position papers that encourage breastfeeding as the preferred nutritional source for infants, albeit with some differences in viewpoint. Within these recommendations, little acknowledgement has been devoted to the importance of the non-professional support system - including family, friends, and co-workers - for the breastfeeding mother. Additionally, no suggestions are offered as to how health care professionals should interact with members of this support system. Research has shown that during the first months of breastfeeding management, family members have an influence on breastfeeding outcomes; furthermore, a relationship exists between the encouragement of partners, sisters, and grandmothers on sustained breastfeeding (Humenick et al., 1997). These findings indicate that health care professionals should be more aware of the influence of this group of support persons on the breastfeeding mother and on breastfeeding duration. Exploring the degree of influence provided by this group of persons will help determine not only the extent of persuasion they have on the breastfeeding mother but also how sustained breastfeeding can be affected.

As previously stated, the Healthy People 2010 Objectives (DHHS, 1999) for breastfeeding recommends specific percentages of mothers to initiate and continue breastfeeding; however, low income mothers continue to fall behind the recommended duration of breastfeeding. Although professional organizations encourage sustained

breastfeeding, they only briefly acknowledge the influence of the daily support system on the mother's decision to continue breastfeeding. The literature presented here provides evidence that family members are influential in supporting the mother during the early postpartum period and beyond. By understanding the scope of influence of those in the extended support group, health care professionals may be able to develop interventions that address the mother's breastfeeding support during this period. In turn, the interventions may lead to a stronger support system for the mother and thus, longer sustained breastfeeding.

Infant feeding Practices and Low income Women

Infant feeding practices can vary from person to person and region to region. Typically researchers attempt to identify accepted infant feeding practices of women by examining barriers and attitudes toward breastfeeding and toward breastfeeding versus formula feeding. The perceived barriers to breastfeeding continue to pervade the overall concept of breastfeeding. The perceptions of having to change one's life style, fear of body exposure in public, lack of opportunities to breastfeed, and issues of time and personal freedom may be seen as prohibitive (Dick et al., 2002; Earle, 2000; Hauck & Irurita, 2003; Riordan & Gill-Hopple, 2001; Zimmerman & Guttman, 2001). With these perceptions and observations, mothers may choose formula feeding for convenience and freedom of lifestyle (Shepherd, Power, & Carter, 2000). Attitude toward infant feeding has far-reaching implications as to which type of infant feeding method will be chosen. The degree to which an individual holds a certain practice as positive or negative, favorable or

unfavorable, will influence his or her feelings or attitudes toward the behavior (Ajzen, 1991; Earle, 2002; Hauck & Irurita, 2003; Humphreys et al., 1998). Specifically, identifying the development of attitudes toward breastfeeding before pregnancy and early in pregnancy has been considered influential to breastfeeding duration. The significance of social supports, personal networks, the father's attitudes, health care providers' attitudes, and maternity ward policies are also identified as influential to breastfeeding duration (Earle, 2002; Hauck & Irurita, 2003; Humphreys et al., 1998; Losch et al., 1995).

Perceived barriers to breastfeeding continue to be a substantial issue in the mother's choice of infant feeding method. Formula feeding continues to be the acceptable alternative especially if the mother feels she cannot reconcile barriers and benefits of breastfeeding (Shepherd et al., 2000). Conflicting expectations between what the mother expects of herself and what she perceives others expect of her can also be considered barriers to infant feeding choices (Hauck & Irurita, 2003). In a study conducted by Zimmerman and Guttman (2001) mothers in a low income group specifically identified the perception of friends' opinions regarding infant feeding methods as influential in their infant feeding choice. The researchers also found that another's opinion may be part of a greater perception of the overall influence of societal and cultural norms.

An example of infant feeding practices among a group of low income women was the introduction of solid foods to infants at an early age, which was considered an acceptable method of satiating an infant (Barton, 2001; Riordan & Gill-Hopple, 2001). Barton (2001) conducted a study in rural Kentucky that included a survey when the infants reached 1 to 2 months of age and at 4 to 6 months of age. Low income was defined as

meeting the requirements for participation in the state WIC program or the Aid to Dependent Children program in Kentucky. A particular aim of the descriptive study was to determine if infant feeding practices were linked to failure to thrive among infants in the area. Barton reported that 2% to 3% of all infant admissions to tertiary medical centers in the area were due to failure to thrive. The researcher proposed that feeding practices, as well as childhood obesity and poor growth and development, were linked to the infants' failure to thrive.

Barton's (2001) study recruitment began during the first month postpartum for 52 mothers. The group was recruited from the University of Kentucky Medical Center and from 23 rural county hospitals, clinics, and health departments. All mothers were White, ranged in age from 16 to 38 years, and had delivered a full term, healthy infant. The researcher used a 22-item questionnaire that was distributed at two points in time and included closed- and opened-ended items. The study's results showed that mothers with higher education ($p = 0.007$), higher income ($p = 0.02$), and several children ($p < 0.04$) breastfed more frequently. Mothers receiving WIC services bottle fed more frequently ($p < 0.006$).

In this study by Barton (2001), the two most frequently noted sources of support were the husband/boyfriend (38%) and the mother of the childbearing woman (38%). Other sources of support included health care professionals (14%), the family (7%), and the mother-in-law (3%). Some women reported that their pediatrician was helpful ($n = 14$) but 4 mothers reported that their pediatrician gave little or no information regarding feeding. Two mothers reported that nurses told them about feeding while 5

mothers sought information from sisters-in-law. Five mothers received a brochure from WIC personnel but no other information. Of the mothers who chose to breastfeed, (n = 25) ten stopped breastfeeding within the first month. The most common reason given was that the infant was irritable because of not getting enough to eat. Breast milk alone was not seen as an adequate source of sustenance to sustain an infant. Consequently, mothers introduced cereal to the infants as early as 2-months of age and they provided more solid foods as early as 4-months of age. The mothers believed that giving cereal would help the infant sleep all night. Atypical fluids (e.g., soda, Kool-Aid, tea and coffee) were also considered a method of satiating an infant. Kool-Aid, soda, tea, and coffee are considered atypical fluids because the AAP (2005) recommends only human breast milk or artificial breast-milk substitutes (formula) for infants up to 6 months of age, with complementary foods being introduced over the next 6 months of age until the infant is weaned.

In Barton's (2001) study the mean time for discontinuing breastfeeding was between 4 to 7.5 weeks postpartum. At 4 to 6 months, 20% of the infants were being breastfed, with 13% being exclusively breastfed. Sources of infant feeding information that were most frequently noted between the fourth and sixth month were the woman's own mother or her mother-in-law (42.3%, n = 22).

In Barton's (2001) study, the mother's noted that breastfeeding was discouraged by professionals, husbands/boyfriends, and their mothers. Discouraging statements included telling the mother that she could not determine how much milk the baby was getting and that the baby would not get enough to eat. Another reported comment from an obstetrician

was that the breasts would sag if the mother breastfed. One pediatrician was reported as stating that the baby would be more irritable if breastfed. Family members also contributed to discouraging mothers with comments about being confined to the home, experiencing breast pain, exposing the breast in public, and causing irritability of the baby. They advised that bottle feeding was easier than breastfeeding.

Barton's study (2001) demonstrates that family members had a greater influence on infant feeding practices in this sample than health care professionals. Family members' influence may also affect the duration of breastfeeding. The study's limitations included a lack of racial diversity and a relatively small sample size.

Researchers have also examined infant feeding practices by comparing mothers who had some breastfeeding experience to mothers who only formula fed their infants. Zimmerman and Guttman (2001) conducted a study to examine the infant feeding practices of low income women regarding their perceptions of breastfeeding versus formula feeding. The researchers interviewed a convenience sample of 154 women. Among the study participants, 94 had some breastfeeding experience, 60 had never breastfed, and all had experienced a second to fourth pregnancy. The participants' low income status was determined by their participation in the WIC program (87%) or their participation in a federally funded health care center. The face-to-face interviews were conducted over a 6-month period, using open- and closed-ended questions. The open-ended questions addressed the women's reasons and experiences with breastfeeding or bottle feeding. The closed-ended questions examined areas of health benefits to mother and baby, as well as the convenience of either breastfeeding or bottle feeding. All open- and closed-ended

questions were scored on a Likert-type scale with the choices being 1 = not at all, 2 = a little, 3 = some, 4 = a lot, and 5 = extremely.

Zimmerman and Guttman (2001) found significant differences ($p < .001$) in the ethnicity and age demographic of their study's sample. Three ethnic groups were recognized: Black/African American, Hispanic, and White, non-Hispanic. Table 1 illustrates the differences in ethnic group, age, and infant feeding experience between the groups.

*Table 1**Differences in Ethnic Groups, Age, and Infant feeding Practices of Low Income Women*

Group	n	Some Breastfeeding Experience	Exclusive Formula Feeding
Black/African American	25	32.9%	48.2%
Hispanic	32	42.1%	19.6%
White, Non-Hispanic	11	14.5%	23.2%
Other	8	9.5%	8.9%
Age 21 and Younger	12	16.9%	38.9%
Age 22 to 30	36	25.4%	23.7%
Age 31 and Older	23	32.3%	22.0%

Source: Adapted from Zimmerman & Guttman (2001)

In their study, Zimmerman and Guttman (2001) also examined support systems for bottle feeding or breastfeeding mothers. Both groups perceived that the community support for breastfeeding was higher than for bottle feeding; however, community opinion mattered little to the infant feeding decision. When questioned about family opinion or family support for infant feeding method, both groups felt they had the support of their family members. Also, each group perceived that friends approved of their infant feeding method. In the formula-feeding group, 57% believed their friends supported exclusive bottle feeding, 17% believed their friends supported breastfeeding, and 19% believed their friends supported either method. In the breastfeeding group, 41% felt their friends supported breastfeeding, 20% felt their friends supported bottle feeding, 24% felt their friends supported either method, and 14% did not know what their friends thought of infant feeding methods ($p < 0.01$). An additional finding was that of among all the participants who responded to the interviews, 68% of the bottle feeding group and 44% of the breastfeeding group reported that they did not seek information regarding infant feeding methods.

Zimmerman and Guttman's (2001) study among women from a predominately low income population presents a contrast between the infant feeding practices of bottle feeding mothers and breastfeeding mothers. Mothers in the study agreed with the superiority of breastfeeding over bottle feeding; however, perceived barriers to breastfeeding continued to be an issue for women who subsequently choose to bottle feed. The lack of information seeking may have been a factor in the degree of influence of families supporting the chosen method of infant feeding. The strong perception of the

friend's opinion regarding infant feeding methods continues to be an issue for both breastfeeding mothers and bottle feeding mothers. Several limitations existed in the study. None of the participants were first-time mothers, and women who were not breastfeeding their current infants were included. Additionally, the researchers did not define previous breastfeeding experience, whether by time or number of children.

Infant feeding practices associated with having a healthy infant can originate in customary and cultural practices (Higgins, 2000; Riordan & Gill-Hopple, 2001). In previous studies, when breastfeeding mothers weaned their infants, they returned to the style of infant feeding that was acceptable to their family, friends, and social group, usually formula feeding (Higgins, 2000; Riordan & Gill-Hopple, 2001). To examine infant feeding styles, Corbett (2000) conducted an ethnographic field study using unstructured interviews with ten low income Black women. The study was based upon the inter-relationships between the cultural environment and each woman's individual infant feeding style. Infant feeding style was characterized as a combination of behaviors. The behaviors included actions that resulted from deliberate choices and from the meaning of the behaviors. Internal and external factors were also found to contribute to accepted infant feeding behaviors. The factors included the relationships of individuals and social groups and their influence on infant feeding styles. Infant feeding style also included the individual's attitudes, beliefs, and values, as well as the individual and the influence of the social group that was reflected in the woman's resulting behaviors. In this study, low income was defined as participating in the state's WIC program.

In this ethnographic field study, Corbett (2000) used in-depth interviews to learn from the informants the meaning they attached to their behaviors, knowledge, rituals, and other lifestyle aspects. The ten mothers ranged in age from 18 to 27 years and had delivered a healthy term infant. Among the participants, five were first-time mothers, seven were single mothers, eight were high school graduates, and all were enrolled in the state's WIC program. The researcher conducted frequent interviews to assist the mothers with feeding and decision-making recall. The interviews took place throughout the infant's first year of life. The initial interview was conducted at 2 weeks postpartum, and subsequent interviews continued each month for the first 6 months. To complete the process, two additional interviews were conducted when the infant reached 9 and 12 months of age, respectively. Each interview took place in the mother's home. Data saturation was considered reached when no new themes were identified during the interviews. The researcher presented a grand question, "How are you feeding your baby?" The mother was allowed to initiate additional topics. Although the interviews were unstructured, the researcher used topical areas to provide focus. The topical areas included lifestyle choices (e.g., work or other household responsibilities that affected the feeding method), sources of infant feeding knowledge, current and past infant feeding practices, and the definition of a healthy baby.

Each woman in Corbett's study was unmarried and living in her nuclear household. Each woman also reported that family members were non-supportive of breastfeeding. Most of the women said family members used negative or derogatory language about breastfeeding and the woman's choice to breastfeed. Only one woman reported knowing

someone who had breastfed. Study participants described friends visiting and asking to observe the mother because they had never seen a woman breastfeed an infant before.

The findings in this study by Corbett (2000) show patterns of breastfeeding among the five women who initially reported the intention to breastfeed their infant. At 2 weeks postpartum, two participants were exclusively breastfeeding, two combined breastfeeding with formula feeding, and 1 mother never breastfed. The two participants who began with exclusive breastfeeding did so for a longer period of time than those who combined bottle feeding and breastfeeding. Of the mothers who exclusively breastfed, one did so for 11 months.

Participants in Corbett's study identified family members and friends as a more significant source of information regarding infant feeding practices than health care professionals. Most of the participants were in close proximity to aunts, grandmothers, sisters, and cousins. They considered this close, social network an appropriate system for accurate infant feeding information. The father of the baby, including his family and social network, were also involved with the care of the infant. The opinions and values of this individual and social network also influenced the mothers in infant feeding choices and practices. One mother who continued to breastfeed received subtle messages from the paternal grandmother - gifts of baby food and cereal - when she took the infant for care at the home of the baby's father. Additionally, some individuals in this social network made comments to the mother that indicated negative opinions of the chosen infant feeding method. Examples of comments included "Girl that thing will hurt," "You are not going to like that," and "Go in the bathroom and do that."

In Corbett's study (2001) infant crying was a specific consequence of infant feeding that distressed the mothers and their support systems. Participants associated crying with being "spoiled." Advice from the family and social network was based on the belief that babies are spoiled if they are picked up every time they cry. Frequent feeding was considered a way to stop crying and was not regarded as a method of spoiling the child. Breastfed infants typically require frequent feedings due to the ease of digestion of human milk. However, among the study participants and their family and social network, breast milk was not seen as an adequate source of nutrition to sustain an infant for the first 6 months of life. Instead, solid foods and atypical fluids such as soda, Kool-Aid, tea and coffee were considered an appropriate method of calming a crying infant. As previously noted in the study by Barton (2000), these fluids are considered atypical fluids as defined by the AAP Standards of Care (2005). Many of the mothers introduced cereal as early as 2 months of age to control infant crying and to encourage the baby to sleep for longer intervals at night. Most of these infant feeding practices described by mothers in Corbett's study were considered learned behaviors originating from family members and friends who were important to the mother.

In another study, researchers investigated prenatal feeding intentions of low-income women in relation to maternal demographics, social support, and previous breastfeeding experience (Humphreys et al., 1998). For their study, Humphreys and colleagues used a cross-sectional, convenience sampling method to recruit 1001 low income women in a public hospital. Low income status was identified as participation in the state's WIC program. The women were asked to answer a 6 page questionnaire about

breastfeeding intentions, previous breastfeeding experience, and social support. Logistic regression analysis compared the relationships between support and previous experiences with breastfeeding intentions.

In this study, Humphreys and colleagues (1998) found that breastfeeding was positively correlated not only to constructive social contacts that supported breastfeeding but also to women hearing about breastfeeding benefits from family members ($p < 0.01$). Women with previous breastfeeding experience were more likely to initiate or continue breastfeeding than those without experience. In addition, evidence indicated that persons important to the woman were influential in her infant feeding decisions. The researchers identified the need for persons of influence to be included in prenatal education classes so they can learn new information and correct faulty knowledge. A limitation of the study was the inclusion of women without previous breastfeeding experience. Women without breastfeeding experience had no first hand knowledge upon which to base their intention; rather, they only had predetermined assumptions, knowledge from educational programs or written materials, and the opinion of others within their support systems.

Cultural and economic factors have been linked to infant feeding practices that vary greatly from the AAP's infant feeding recommendations (1997, 2005). In Wisconsin, Underwood et al. (1998) found that social services and health care providers were unfamiliar with the infant feeding practices of the community they served. It was determined that these service providers needed a better understanding of the influences of culture and economics on current infant feeding practices. For their study, Underwood and colleagues recruited 35 low income African-American women from a community center.

They used purposeful sampling in their attempt to ascertain infant feeding practices that were common to this group. The women were identified as low income due to their income level being below the federal poverty level. Women ranged in age from 26 to 78 years (mean age 49.5, $SD = 15.9$). These women were either caretakers of other women's children or mothers of their own children (from 1 to 10 children). Six women had no children of their own but were caretakers of other women's children. The majority of the women were single (34.3%) with the remaining women being married (5.7%), separated (14.3%), divorced (8.6%), or widowed (22.9%). The investigators believed that by including mothers and caretakers of infants, they would observe a more comprehensive picture of infant feeding practices.

In this study, Underwood et al. (1998) used focus groups to gather data on infant feeding practices in their study sample. They analyzed the narratives using coded and interpretive analysis. Findings from their analysis showed that most women agreed that breastfeeding was the optimal feeding method but they usually chose to bottle feed their infants. Their contradictory behavior was also found in the preparation of formula. The women reported using more than the recommended amount of formula powder to prepare a bottle. Their action was due to the belief that the infant needed "stronger" milk to develop into a healthy baby. Cereals and solid foods were introduced at a much earlier age than recommended by the AAP (1997, 2005). Whether the infant was breastfed or receiving formula, most women gave the infant cereal by 2 weeks of age to encourage sleeping for long intervals at night. Additionally, crying was associated with hunger and cereal was given to prevent hunger and crying. Most of the women in the study reported relying on

information from family members or from community members they considered knowledgeable. Economics also influenced infant feeding. The women stated that if they could not afford cereal, they softened a slice of bread with water until it was a paste or they rotated feedings with cereal, water, and formula.

This study by Underwood et al. (1998) gives evidence of the impact of culture, economics, and acceptable infant feeding practices in a group of low income women. Evidence also suggests that multiple sources of influence exist within a community. Infant feeding practices and infant health may be affected by the accuracy or inaccuracy of knowledge within this community group.

From the literature, evidence suggests that infant feeding beliefs, knowledge, and practices of low income women and persons in their extended support system can contribute to low rates of breastfeeding initiation and continuation in this population. Beliefs and practices of infant feeding and infant satiation may also affect breastfeeding practices (Barton, 2001; Corbett, 2000; Higgins, 2000; Riordan & Gill-Hopple, 2001). Furthermore, evidence suggests that the premature introduction of solid foods and atypical fluids may contribute to early weaning from breastfeeding. Infant feeding practices are acknowledged as learned behaviors and are used in defining the characteristics of a growing, healthy infant. Little evidence was given that specifically identifies the infant feeding practices of members in the mother's extended support matrix (family, friends, and co-workers) and how their practices may influence the breastfeeding behaviors of others. For a comparison of selected studies regarding low income women and infant feeding practices see Appendix B, Table 1.

Sources of Influence on Low income Women Regarding Breastfeeding

An individual can have multiple sources of influence on their behavior. The breastfeeding mother may experience these sources as barriers or support. Sources that may affect infant feeding outcomes and breastfeeding duration include the mother herself, significant others, the health care system, and the employment environment outside the home.

The mother may be considered a source of influence on her own breastfeeding behavior. Attitudes toward a behavior are defined as one's feelings, thoughts, or viewpoints in relation to a behavior (Ajzen, 1991). The more positive an attitude toward a behavior, the more likely a person will perform that behavior. If a mother has had constructive interaction with breastfeeding, whether from personal experience or from exposure to affirming breastfeeding influences, her attitude toward breastfeeding will most likely be positive. Perceived behavioral controls are defined as one's perception of the ease or difficulty in performing a certain behavior (Ajzen, 1991). Most behaviors are under the person's volitional control; however, if a mother perceives that breastfeeding is difficult, she will most likely form a negative attitude toward the behavior. She may also feel that she does not have the resources or opportunity to breastfeed her infant. An agreement usually exists between a person's perception of control over the behavior, actual control over the behavior, and subsequent performance of the behavior (Ajzen, 1991). Perceptions regarding the ease or difficulty of breastfeeding can be related to confidence in performing the behavior. Research indicates that feeding intention, confidence in personal ability, and attitudes toward bottle feeding predict later breastfeeding behaviors and outcomes

(Humenick et al., 1997). The more confident the woman feels about her ability to overcome perceived breastfeeding difficulties, the longer her breastfeeding experience will most likely be (Lawson & Tulloch, 1995). Subjective norms are defined as a person's perception of social pressure or influence to perform or not perform a particular behavior (Ajzen, 1991). Subjective norms address the influence of others who are important to a breastfeeding mother and how their influences affect breastfeeding duration. The following selected studies describe various sources of influence on breastfeeding mothers and how those factors may affect breastfeeding duration.

Meyerink and Marquis (2002) conducted a descriptive study to investigate various factors that influence breastfeeding initiation and duration rates among low income women living in Alabama. Low income status was determined by participation in the state's WIC program, participation in federal assistance programs (Food Stamps Program or Temporary Assistance for Needy Families), or participation in the Medicaid program. Project staff members administered a survey to a group of 150 mothers who were randomly selected to participate in the study. The survey included sociodemographic information, maternal obstetric and breastfeeding history, the mothers' exposure to other breastfeeding women, and the mothers' views on the breastfeeding practices of others. Breastfeeding variables included whether the mother was breastfed as an infant, had any friends or relatives who breastfed, and had ever seen a woman breastfeed an infant. The mean age was 22.7 years (± 5.6 years). Among the 150 women in the study, 139 were African-American, all but two of the mothers participated in WIC, 38 of the mothers were living with a spouse or partner, and 26 had never seen a woman breastfeed an infant and did not have a close relative or

friend who had breastfed. A considerable number of mothers (86.7%) reported receiving infant feeding information which was not specified as either bottle feeding or breastfeeding information. Only 40.7% of the mothers chose to initiate breastfeeding. Of the group who chose to breastfeed, 31.3% breastfed for 1 week or more and 8.3% breastfed for 3 months or more. By the fourth week postpartum half of the mothers in the breastfeeding group had discontinued breastfeeding.

In this study by Meyerink and Marquis (2002), three variables predicted breastfeeding initiation in the logistic regression model. The variables included breastfeeding a previous infant (increased the probability of breastfeeding an infant by 11), delivering an infant prematurely (decreased the probability of breastfeeding by 10), and the mother being breastfed as an infant (increased the probability of breastfeeding by 7). In the second, linear logistic regression model, among the women who initiated breastfeeding ($n = 60$), 59% continued breastfeeding for at least one month. There was a positive association found with women who had a close relative who breastfed in that these women were more likely to breastfeed at least one month. There was also a positive association with increased age ($p = .006$). In the multiple linear regression model, two variables were shown to predict breastfeeding beyond one month. The variable that the mother had previously breastfed a child increased the probability of breastfeeding duration to 7 weeks. The variable that the mother reported having been breastfed as an infant increased the probability of breastfeeding duration to 6 weeks.

Beliefs and attitudes have been identified by researchers as factors that influence infant-feeding decisions. Access to care issues and lack of cultural sensitivity in

information dissemination also contribute to the infant feeding decision. Sharps, El-Mohandes, El-Khorazaty, Kiely, and Walker (2003) conducted a case-controlled study to describe the breastfeeding practices of low income African-American women who experienced inadequate prenatal care. A sample of 210 women from four, large, urban hospitals in Washington, DC was recruited for the study. Criteria for participation included being 18 years of age or older and having no or inadequate prenatal care. The variable of inadequate prenatal care was defined as having begun prenatal care after 24 weeks gestation and having less than five prenatal care visits prior to delivery. Additional criteria for each woman included having no history of mental illness and having experienced a live birth of at least 34 weeks gestation.

For this study, Sharps et al. (2003) assembled demographic information and used multiple tools for collecting other data. The Adult-Adolescent Parenting Inventory was used to examine parental knowledge, child-rearing practices of adolescents and adults, attitudes related to appropriateness of developmental outcomes, empathy towards the child and use of corporal punishment. The Maternal Health Beliefs Questionnaire was used to examine perceived childhood susceptibility to illnesses and the severity of these diseases, perceived ability of the health care system to prevent illness, and perceived barriers to health care. The researchers also used the Parenting Daily Hassles Questionnaire to examine the intensity and frequency of daily stressors during routine childcare. The Carolina Parent Support Scale was used to examine perceived helpfulness of formal and informal support systems. Additionally, with the author's permission, the Carolina Parent Support Scale was modified to delete questions regarding infants with disabilities. All

questionnaires were completed during the hospitalization period, except for the Parenting Daily Hassles questionnaire, which was completed at one month postpartum either by telephone or in person. Breastfeeding information was collected at a 4-month follow-up interview. After collecting all of the information, the researchers used logistic regression and *t*-tests to simultaneously compare the impact of social support, parenting practices, health beliefs and demographics on breastfeeding practices.

Sharps et al. (2003) then divided their study participants into three groups; women who never breastfed, breastfeeding women, and women who continued breastfeeding (for longer than 8 weeks). Within the group of 210 women, 27% ($n = 56$) decided to breastfeed, averaging a time frame of 11.6 (± 12.5) weeks. Among the women who chose to breastfeed beyond 8 weeks, the time frame was 21.6 (± 12) weeks. This finding showed a higher number than typically found among high-risk mothers who choose to breastfeed. The group that declined to breastfeed was comparable to the breastfeeding group in the variables of age, racial background, medical insurance, and income level. Major differences were found between the groups in the variables of education, number of living children, employment during pregnancy, marital status, and postpartum use of contraceptives. A statistically significant factor was that the higher the number of children the woman had, the less likely she was to breastfeed the current infant ($p = 0.04$). The highest percentages of breastfeeding were found among women experiencing their first or second birth (31.58% and 32.3% respectively). Comparisons between the breastfeeding, not-breastfeeding, and breastfeeding-beyond 8-weeks groups regarding formal or informal social support did not reveal a statistical significance.

In Sharps and colleagues' study (2003) findings from the Carolina Parent Support Scale showed that women who scored the lowest on the social support scale actually breastfed for a longer period of time. Women who ever breastfed scored 18.5 ± 5.0 on the formal support scale (possible 0 to 32) and 11.1 ± 4.8 on the informal support scale (possible 0 to 28). Women who breastfed longer than 8 weeks scored 15.9 ± 3.7 on the formal support scale and 9.5 ± 5.1 on the informal support scale. Maternal self-motivation was identified as the factor that appeared to surpass the perception of existing formal or informal support systems. The researchers determined that this was an uncommon finding because other noted studies show partners and family members as stronger sources of support and subsequent higher breastfeeding rates. Additionally, findings from this study revealed that the mother-infant relationship played a more significant role than the mother's rank at the lower end of the socioeconomic level. Sharps and colleagues' (2003) findings should be considered when analyzing outcomes regarding the influence of the self-motivation factor on women who choose to breastfeed. Mothers exhibiting strong confidence and belief in their ability to breastfeed typically continue breastfeeding for longer periods of time (Blyth, Creedy, Dennis, Moyle, Pratt, & DeVries, 2002; Hill & Humenick, 1996; Raisler, 2000).

Researchers have recognized the significant other as a source of influence on breastfeeding behaviors (Mitra et al, 2003; Schmidt & Sigman-Grant, 1999; Stremler & Lovera, 2004; Wolfberg et al., 2004). A "significant other" is defined as the person whose opinion regarding the infant feeding decision matters the most to the woman (Humenick et al., 1997). In the previously noted study by Humphreys and colleagues (1998), the opinion

and influence of a significant other was strongly and positively correlated to the breastfeeding decision and to the initiation and continuation of breastfeeding. For example, a grandmother stated she would not provide childcare for a breastfeeding infant, and as a result, she instructed the mother to stop breastfeeding. This statement forced the mother to choose between work and breastfeeding her infant and she chose her work for economic reasons.

The father of the baby has been identified as a crucial “significant other” in influencing mothers in their infant feeding decisions. Schmidt and Sigman-Grant (1999) investigated the influence of fathers on the breastfeeding decision in a group of rural, low income couples. Low income status was defined as participating in the state’s WIC program. The researchers determined a qualitative methodology would best determine how these low income fathers obtained information regarding breastfeeding and how they processed the information. The researchers solicited the assistance of the WIC program in five rural counties in a large eastern state to recruit participants. In order to decrease the potential for discomfort and reluctance in taking part in the study, male participants were asked to assist in developing a videotape designed specifically for fathers of breastfeeding infants. A total of 17 couples (n = 34) participated in the study with little racial diversity (88% were Caucasian).

Schmidt and Sigman-Grant (1999) separated the mothers from the fathers and simultaneously conducted discussion sessions for both groups. The sessions were moderated by a male for the fathers and a female for the mothers. The mothers were encouraged to answer the questions as they thought the father would answer. All questions

were the same for each group. Discussion topics for both groups were positive and negative opinions toward breastfeeding, the father's role in the breastfeeding decision, and issues that participants considered unimportant. Participants were also asked to respond as though they were nonsupporters of breastfeeding. Their responses were used to develop the videotape to correct misinformation.

The findings from this study by Schmidt and Sigman-Grant (1999) confirm previously documented concerns of fathers of breastfeeding infants, such as the mother breastfeeding in public with possible exposure of the breast and paternal attachment to the infant. Mothers were found to be the main source of information dissemination to the fathers. They provided the expectant father with filtered information that came from other family members, health professionals, and themselves. The study sample viewed the mother-to-father channel of information as a possible cultural or acceptable means for information dissemination regarding health care issues. The researchers also determined that fathers should be involved early in the pregnancy with educational programs to help promote breastfeeding support and knowledge.

The health care system is a distinctive source of influence on health care behaviors. Clients usually access the health care system but they do not generally access the system on a daily basis (Bernaix, 2000; Gill, 2001; Hagemann & Mattson, 2003; Lu, Lange, Slusser, Hamilton, & Halfon, 2001; Raisler, 2000). Mothers who plan to breastfeed and experience personal contact from a health care provider - whether prenatally, during hospitalization, or postpartum - may see this exchange as either informative or indifferent (Bernaix, 2000; Gill, 2001; Hagemann & Mattson, 2003; Lu et al, 2001; Raisler, 2000).

Also, post-discharge contact with health care providers may be minimal, and low income mothers may have limited contact with hospital nurses, clinic staff, or lactation specialists regarding breastfeeding information or support (Lewallen et al., 2006; Raisler, 2000).

Furthermore, women accessing health care providers who are unprepared to assist with breastfeeding problems may inadvertently be influenced to make a decision for early weaning (Taveras et al., 2004).

Raisler (2000) conducted a qualitative study with low income mothers to examine their experiences with breastfeeding care within and outside the health care system. A specific aim of this study was to develop culturally sensitive and more effective interventions to increase breastfeeding rates among the community's low income population. The researchers conducted interviews with groups of low income women who were successfully breastfeeding in a community where nursing mothers were uncommon. The study included seven focus groups consisting of a convenience sample of 42 mothers. Twenty-three of the participants were first-time mothers. The participants ranged in age from 16 to 39 years. Among the 42 mothers, 22 mothers were Black, 14 were White, and six stated they were multiracial. The duration of breastfeeding in the sample was from 1 week to 9 months. Group discussions were audiotaped and moderated by the researcher who used a semistructured question guide to facilitate each discussion. Areas of interest for this study were the experiences of the women during the prenatal period, hospitalization, and the postpartum period. Additional interests were the influences of the WIC program, and the effect of the breastfeeding peer counselor. Areas of interest outside the health care

system included experiences with moving on with life, the physical bond of breastfeeding, modesty and physical exposure, and returning to work or school.

In this study by Raisler (2000) the participant's breastfeeding experiences within the health care system varied. The prenatal period experience was influenced by positive contact from midwives, nurses, or physicians who encouraged breastfeeding and informed the women in a personal manner. Written materials were made available or given to the women prenatally, but the mothers found the personal contact with health care professionals much more informative and encouraging. Negative influence was demonstrated by the health care providers' nonchalant attitudes and assumption of knowledge of the women by health care providers when discussing breastfeeding practices. The participants described their hospital experience as either positive or negative, based on the behavior of staff, midwives, lactation consultants, and nurses. Mothers were encouraged with positive comments or reassuring activities such as weighing the baby after feeding. Examples of negative experiences included infants receiving formula without consulting the mother, mothers being given inaccurate information, and some mothers feeling their care was distant and nonnurturing.

The postpartum experiences and contacts with health care providers were minimal after discharge from the hospital facility. During this time, the negative influences of health care providers outweighed the positive. These influences included orders to stop breastfeeding due to the mother taking medication. The introduction of cereal at 2 months of age was also seen as a negative influence because this recommendation significantly decreased breastfeeding duration and the mother's milk production. Another factor of

negative influence was the absence of contacts from hospital nurses, clinic staff, or lactation specialists regarding any breastfeeding information or support after discharge.

The mothers in this study by Raisler (2000) reported that the WIC program presented mixed messages regarding infant feeding choices, possibly due to the availability of and payment for formula. Most of the mothers felt the WIC staff members were non-judgmental regarding their infant feeding choices; however, the mothers voiced concern that WIC's availability of formula influenced breastfeeding duration. The WIC peer counselors received the greatest number of positive responses to the question of support and encouragement given to the mothers. The counselors provided health talks, prenatal home visits and education, and in-hospital postpartum visits. The information, the emotional support, and the technical assistance provided by the peer counselors during home visits and phone calls were instrumental in assisting the mothers to continue breastfeeding. Mothers stated that the peer counselors had the greatest influence in establishing a trusting relationship. Throughout the study the mothers repeatedly said they would initially contact WIC peer counselors for breastfeeding questions, concerns, and problem resolution. The highest recurring theme regarding peer counselors was their individualized quality of the care, including the amount of time they spent devoted to answering mothers' questions.

When mothers discussed life beyond the hospital and health care system, several themes emerged. Mothers had positive responses to the physical bond of breastfeeding their infant; however, some felt restricted by the need to be physically present to breastfeed. These mothers believed that they had to continue to put their life on hold until

they or the baby decided to stop breastfeeding. A potentially restrictive aspect of this physical bond was the reluctance of significant others to care for the baby while the mother was absent.

Modesty and the potential for breast exposure were identified as additional ways in which others influenced the breastfeeding experience (Raisler, 2000). Mothers made highly variable distinctions between public and private breastfeeding as some felt breastfeeding at home was similar to public breastfeeding due to the number of people in the home. These family members or friends increased the mother's stress level with their comments or actions. Some were hostile to the mother about breastfeeding in front of them or their male friends. Other family members addressed the act of breastfeeding as openly acceptable in the home, or they told the mother to leave the family area and go to a bedroom or corner to breastfeed her infant.

Breastfeeding in public was described as taking place in the mall or other types of public domains. Mothers sometimes coped with the emotional discomfort of breastfeeding in public by feeding the baby formula instead of breastfeeding. These women reported negative facial expressions or derogatory comments made by strangers if they breastfed in public. To prevent additional stress and emotional discomfort, mothers stated they would retreat to a public restroom, which was typically soiled and provided no place to sit other than the toilet seat (Raisler, 2000).

Raisler (2000) demonstrated that prenatal health care professional support and WIC support was effective in assisting mothers to initiate breastfeeding. Barriers to breastfeeding such as negative contact with hospital nurses, formula availability at the

WIC office, and modesty issues were addressed. Limitations of this study were that the interviews for the focus groups were conducted in the WIC office which could have influenced the responses of the mothers. Also, the potential for group effect could have influenced the responses. Furthermore, the researcher identified herself as a nurse midwife and the presence of a professional could have influenced responses. Sustained breastfeeding or duration of breastfeeding in this group was not addressed in this study. The influence and availability of the WIC peer counselors was presented but there was very little information regarding the persons of potential influence in the mothers' personal support matrices. This study demonstrates that the WIC peer counselors were effective in breastfeeding support. However, other health care professionals were recognized as being either a barrier or being a support to the breastfeeding mother.

The issue of returning to work continues to challenge breastfeeding mothers. Frequently, mothers are employed at businesses or companies that do not allow adequate break times that provide enough time to pump breast milk. Consequently, breastfeeding mothers are physically uncomfortable, experience leaking issues, and have diminished milk supplies. Research demonstrates that employers display mixed attitudes regarding breastfeeding in the workplace (Meek, 2001; Rojjanasrirat, 2004). Some employers are willing to facilitate breastfeeding in the work environment; however, breastfeeding promotion was not valued as an employee incentive for increased productivity, reduced absenteeism, and recruitment (Libbus & Bullock, 2002). If breastfeeding mothers are able to manage or change their schedule in order to pump while at work, they are typically dismissed to public restrooms. Additionally, other barriers to breastfeeding exist in the

workplace. Generally the lack of on-site child care, inflexible scheduling, the employers' lack of knowledge regarding lactation, and maternal-role overload all contribute to the challenge of maintaining lactation and employment for breastfeeding working mothers (Brown, Poag, & Kasprzycki, 2001; Dodgson, Chee, & Yap, 2004; Meek, 2001).

Research findings suggest that employed breastfeeding mothers develop coping mechanisms specifically to maintain both their lactation status and their employment status. A study conducted by Rojjanasrirat (2004) focused specifically on working women's experiences with breastfeeding and their ability to develop coping mechanisms to maintain their lactation status. Criteria for participants were primipara status, at least 18 years of age, and plans to breastfeed and return to work. Fifty participants responded to a 4-item, open-ended questionnaire at 16 weeks postpartum. The questions addressed topics on (1) factors that enhance breastfeeding in the workplace, (2) activities to maintain lactation while working, (3) factors that hinder breastfeeding in the workplace, and (4) suggestions for helping mothers prepare to successfully combine breastfeeding and employment. All of the study's participants were Caucasian; thus, the study had no racial diversity. Moderate diversity was found in the variables of income level (\$24,000 to > \$50,000) and age range (24 to 41 years). The researcher used two types of content analysis to categorize the data; semantic content analysis (frequency of words occurring in the data) and inferred/latent content analysis (coding a latent feeling or tone of the data to infer meaning from the statement).

Four categories emerged from the data in Rojjanasrirat's (2004) study; (1) support, (2) attitude, (3) strategic plan, and (4) psychological distress. Support was defined in three

ways; however, the researcher did not identify who was responsible for the support. Emotional support was described as acceptance, empathy, and value of breastfeeding. Instrumental support was described as specific assistance given to breastfeeding women during times of need. Informational support was described as sources of information that could be used to assist the employed breastfeeding mother adjust to situations in the workplace. Additional areas of support included space considerations, an accepting environment, adequate time, and modeling. The second category, attitude, was specifically defined from the woman's perspective. Attitude highlighted assertiveness, commitment, and determination to continue breastfeeding despite difficulties encountered in the workplace. The strategic plan category identified the specific method the working mother developed to cope with breastfeeding barriers and difficulties in the workplace. Psychological distress addressed the woman's personal feelings of guilt, stress, and having to make sacrifices in order to continue breastfeeding while maintaining employment.

Findings from this study by Rojjanasrirat (2004) demonstrate the need for health care professionals to provide accurate information to women who choose to return to work and continue breastfeeding. This instruction should include information regarding quality breast pumps, pumping techniques, milk storage, and safety in transporting milk. Women with plans to return to the workplace need assistance with identifying personal breastfeeding goals and potential barriers upon their return to full- or part-time status. In Rojjanasrirat's study, the woman's occupation also had a major impact in her choice to continue breastfeeding. Women who are employed in service or technical positions may not have access to breast pumps, or refrigeration facilities, or they may not be allowed the

time needed to pump adequately. These restrictions may more seriously impact mothers in lower paying occupations and may influence breastfeeding duration (Rojjanasrirat, 2004).

The literature examined above provides evidence that multiple sources influence women regarding infant feeding decisions. These sources include the mothers' own self-motivation and confidence, interactions with health care professionals, peer counselor support, information dissemination, significant others, and the workplace environment. Evidence in the literature suggests that health care professionals often do not take into consideration the influence of others on infant feeding decisions. Additionally, health care professionals may not recognize how those in the support system of the mother are an integral part of the daily care of the mother and newborn in the initial postpartum period and beyond. The selected research studies also provide evidence that the lack of familial acceptance of breastfeeding or exposure to other breastfeeding women influences the decision to initiate breastfeeding or to discontinue breastfeeding at an early infant age. Additionally, the need to return to the workplace was recognized as an influential factor when deciding to continue breastfeeding beyond the early postpartum period; however, minimal research currently exists regarding low income women, breastfeeding, and employment issues. For a comparison of sources of influence on low income women regarding breastfeeding see Appendix B, Table 2.

Interventions Involving Sources of Influence and Support

Developing interventions that increase breastfeeding initiation rates in the United States has become a national, state, regional, and community goal (DHHS, 1999; Khoury et al., 2002; Shealy, Li, Benton-Davis, & Grummer-Strawn, 2005; Schmidt & Sigman-

Grant, 1999; U.S. Department of Agriculture, Food, and Nutrition Services, 1996).

Interventions typically focus on the mother and few interventions focus on the father of the baby or any other person in the extended support matrix. Previous research has shown that others in the mother's extended support matrix are identifiable sources of support and should be included in the educational process (AAP, 2005; Barton, 2001; Humenick et al., 1997; Zimmerman & Guttman, 2001).

Breastfeeding interventions take on various forms and focus mainly on the pregnant woman; however, some of these interventions occasionally include others (Khoury et al., 2002; Mitra et al., 2003). Interventions can utilize videos, classroom-type educational programs, and a team approach to support and encourage breastfeeding mothers. The usual goals of these programs are to increase breastfeeding initiation, enhance knowledge regarding breastfeeding issues, and increase community awareness of the benefits of breastfeeding. Additionally, these programs usually discuss barriers to breastfeeding, encourage the support of the father of the baby, and correct misinformation. Interventions aimed at low income populations occasionally attempt to engage the father of the baby, but few programs involve the father or persons in the personal support matrix. Although many of these interventions emphasize breastfeeding benefits and initiation techniques, few interventions discuss how to maintain breastfeeding longer than the immediate postpartum period or involve persons other than the mother in the educational sessions (Mitra et al., 2003; Schmidt & Sigman-Grant, 1999; Stremmer & Lovera, 2004; Wolfberg et al., 2004).

Khoury et al. (2002) developed and evaluated a video project that addressed three breastfeeding barriers identified by women in low income populations. This project was

designed to be a companion to the “Loving Support Makes Breastfeeding Work” program developed in Mississippi in 1998-1999. Part of the purpose in developing the video project was for other WIC programs in the United States to have access to the video to promote breastfeeding in similar populations. A defining aspect of the Mississippi video project was that a diverse population of WIC participants, their families, and friends were involved in the project. A statewide evaluation was conducted to determine the effectiveness of the video in addressing breastfeeding barriers.

The barriers to breastfeeding identified and addressed in the video were (1) all mothers can successfully breastfeed their infants, whether they work or go to school (2) breastfeeding is not embarrassing and (3) families and friends can be very supportive. The diverse video group included an African-American full-time employed mother, an African-American teenaged mother living at home with her parents, and an African-American mother, who breastfed all four of her children. Also included were an older Caucasian mother working full time and a Caucasian mother who bottle fed her first child and decided to breastfeed her second child.

Khoury and colleagues’ (2002) video was effective in achieving the goals of overcoming the stated breastfeeding barriers. Nine intervention counties and nine matched counties were selected from the county health departments for inclusion in the evaluation of the video. Criteria for participation included being eligible for WIC programs, being able to read and understand English, and not having any prenatal breastfeeding counseling from WIC staff. Participants received a pretest questionnaire and were informed that a follow-up phone call would be conducted two weeks after their visit. The intervention

group received the video to keep and view during those two weeks and after the follow-up phone call. At two weeks, all participants received a phone call with the follow-up, posttest questionnaire. Those not reached by phone were mailed the posttest questionnaire. The questionnaire included four items each on the three identified barriers to breastfeeding for a total of 12 items. The researchers provided the staff with an interviewer guide in order to standardize the follow-up methodology, consistency, and continuity.

A total of 514 women participated in the evaluation of the video program. The comparison group ($n = 204$) and the intervention group ($n = 310$) shared similar demographic data. After watching the video, more women in the intervention group (62%) than the comparison group (48%) felt the baby's father encouraged breastfeeding ($p = .001$). The participants considered this encouragement significant. Repeated measures analysis indicated a significant difference in the groups by time for the interaction of the variables of embarrassment ($p < .001$) and social barriers ($p = .027$). No interaction was shown for the lack of a social support barrier.

Intervention group participants perceived a low level of support or encouragement from family members including the baby's father, the baby's grandmother, or other female relatives prior to viewing the video. After viewing the video, the participants felt there was a significant impact on the feelings that the baby's father encouraged breastfeeding, but there was no such improvement in their perception of support from the grandmother, other female relatives, or friends.

Khoury et al. (2002) demonstrated that a video intervention using a diverse group of women addressing barriers to breastfeeding was effective in increasing positive

perceptions about breastfeeding in a low income group. There were several limitations with this study. While the researchers were successful at addressing barriers to breastfeeding, they did not address breastfeeding initiation or duration. Also, the study included mothers with previous breastfeeding experience. Furthermore, participants had received other breastfeeding information prior to viewing this video. The researchers did comment that they did not adequately address support from female relatives. This would indicate that they were aware of the potential support from the personal support matrix of these mothers. The video program used in this study did increase positive breastfeeding sentiment; however, breastfeeding initiation rates after viewing the video were not evaluated. Adding this factor to the video program would have strengthened the outcome variable of the effectiveness of this intervention.

A pilot study of a community-based program with multiple contacts postpartum was shown to be effective in increasing breastfeeding duration (Pugh, Milligan, & Brown, 2001). Subsequently, Pugh et al. (2002) conducted a randomized clinical trial to assess the effectiveness of a community health nurse or peer counselor intervention. The purpose of this intervention was to increase the duration of breastfeeding in a low- income, predominately African-American population. Furthermore, the study's goal was to determine the impact of the intervention on overall health care costs.

For their study, Pugh et al. (2002) recruited 41 women during the postpartum hospitalization period. After obtaining informed consent, the researchers used sealed envelopes to randomly assign participants to the intervention group or the usual care group. Low income status was defined as being enrolled in the state's WIC program. The

usual care for breastfeeding support included telephone consults postpartum, support from hospital nurses, one lactation consultant visit during hospitalization, and the use of a “warm line” (a telephone call-in service for questions and support). Participants in the intervention group received the usual care for breastfeeding support. In addition, they also received the following: daily visits from a community health nurse or peer counselor during hospitalization: visits in the home at one, two, and four weeks postpartum: telephone support twice weekly during the first eight weeks postpartum: and weekly telephone support from the second month through the sixth month postpartum. The researchers gathered additional data that assessed health care cost savings. These cost savings were evaluated using the mother’s occupational or student status, time spent breastfeeding, formula quality, infant hospitalizations and health care provider and emergency room visits during the first six months of life. The researchers used extensive data analysis to calculate costs of the intervention. For the community health nurses and peer counselors, costs were determined by time spent with the mother (whether at the hospital or at home), travel time, wages, and education costs. Additionally, time for feeding the infant was translated into costs of wages for the mother or whoever fed the infant, costs for infant formula, and health care services costs.

Findings in this study by Pugh et al. (2002) showed that mothers in the intervention group breastfed their infants for a longer period of time than the mothers who merely received usual care (see Table 2). Infants in the intervention group had fewer incidents of sickness or emergency room visits. However, the overall estimated costs of the intervention were higher than the costs for the usual care group. A complete estimation of

the actual costs was difficult to assess due to assigning a monetary value to time or education and other variables not taken into account in this study. The study's findings present evidence that continued support through the sixth month postpartum significantly affected breastfeeding duration in this group. Although the researchers did not specifically address the influence of family, friends, and co-workers, they observed that continued support of breastfeeding mothers affected the duration of breastfeeding.

*Table 2**Intervention Versus Usual Care Group by Breastfeeding Duration*

	<u>Intervention Group</u>	<u>Usual Care Group</u>
Breastfeeding at 3 Months	45%	24%
<u>Breastfeeding at 6 Months</u>	<u>30%</u>	<u>15%</u>

Source: Adapted from Pugh et al. (2002)

Pugh et al. (2002) demonstrated that a multi-resource community support team increased breastfeeding duration rates. Breastfeeding rates in the intervention group remained higher than the usual care group at both time intervals. The cost effectiveness of the program was a debatable limitation of the study. The total costs for the intervention group were actually higher than the usual care group; however, when comparing costs as related to the use of essential health care services, the cost savings were considered adequate. Furthermore, indirect costs for this study were underestimated. The researchers felt that a strength of this study was the repeated contacts with the mother during the first six months post partum increased the breastfeeding duration rates in the intervention group. Repeated contacts are the underpinning of the influence of the personal support matrix. Persons in this matrix may have more frequent contact with the mother and longer periods of contact that would be prohibitive for a health care professional. Although the costs effectiveness for this study was debatable, the overall strength of repeated contacts was considered a positive aspect in assisting mothers to sustain breastfeeding for a longer period of time.

Interventions can also be developed as educational programs, ranging from prenatal classes in offices or hospitals to organized national programs that promote breastfeeding (Shealy et al., 2005). An example of a community education program is the Best Start Program, which was designed to promote breastfeeding in low income populations. During the development of the program, researchers recognized the breastfeeding needs, concerns, and perceived barriers to breastfeeding specifically identified by women in low income populations. Identified barriers included physical discomfort and inconvenience, modesty

and embarrassment, and restrictions on lifestyle (Corbett, 2000; Dick et al., 2002; Earle, 2000; Hauck & Irurita, 2003; Riordan & Gill-Hopple, 2001; Shepherd et al., 2000; Zimmerman & Guttman, 2001). Another area of concern was that the mother would not be able to produce enough milk to satisfy the infant (Barton, 2001; Riordan & Gill-Hopple, 2001). The Best Start program was designed to obtain client reactions regarding breastfeeding and then to educate the mother about the benefits of breastfeeding. Included in this educational program are written materials, counseling, and videos addressing common barriers to breastfeeding (Ryser, 2004).

Ryser (2004) developed a study to determine the effectiveness of the Best Start program. The researcher developed a repeated measures design with between (experimental vs. control group) and within factors (pretest vs. posttest). A sample of 54 subjects was randomly assigned to the two groups. Effects of this program were measured using the Breastfeeding Attrition Prediction Tool developed by Janke in 1994. This tool addresses positive and negative breastfeeding sentiment, social and professional support, and breastfeeding control.

In the initial stages of this study by Ryser (2004), 68% of the sample was undecided in their infant feeding method and 30% of the sample had planned to use formula. At pretest, positive breastfeeding sentiment was not significant between the two groups ($p = .51$); however, statistically significant results occurred at posttest ($p < .01$). Negative breastfeeding sentiment at pretest was high in both groups. At posttest, the experimental group had lower negative sentiment, and the control group had higher negative sentiment. In addition, the breastfeeding initiation rates were higher in the

experimental group (60.9%) and lower in the control group (22.2%). The evaluation of this intervention showed that increased, positive breastfeeding sentiment increased initiation of breastfeeding; however, duration of breastfeeding was not addressed. Also, the researcher found that more women in the experimental group had previous breastfeeding experience than those in the control group, which could be a confounding factor in the findings of this study.

Ryser (2004) demonstrated that an intervention that focused on improving attitudes and addressing barriers was able to promote positive breastfeeding sentiment and breastfeeding initiation. The Best Start program was developed after the analysis of research that attempted to identify the unique concerns, needs, and perceived barriers to breastfeeding in low income populations across the United States. This intervention was successful in promoting breastfeeding initiation; however, there were several limitations to this study. More women in the intervention group of this study had previous breastfeeding experience than those in the usual care group which could have influenced the findings. Also, this intervention was directed only toward the mother and did not include any other persons that may have been influential in infant feeding decisions. Furthermore, breastfeeding duration was not addressed. The intervention accomplished the goal of increasing breastfeeding initiation but did not demonstrate any influence on breastfeeding duration.

Evidence presented in the literature continues to demonstrate that prenatal educational programs increase understanding of breastfeeding issues and may contribute to initiation rates. There is little evidence however, that shows educational programs increase

duration rates (Coreil, Bryant, Westover, Bailey, 1995; Izatt, 1997; Loiselle, Semenic, Côté, Lapointe, & Gendron, 2001; Ryser, 2004; Sciacca, Dube, Phipps, & Ratliff, 1995).

Recently, the Centers for Disease Control and Prevention (CDC) published *The CDC Guide to Breastfeeding Interventions* developed by Shealy et al. (2005). This compilation of current intervention programs provides information on the effectiveness of programs using an evidence-based medicine approach to breastfeeding interventions. The evaluation of a program's effectiveness was based upon research findings and the conclusions of an expert panel. The two categories of effectiveness were defined as either "significant" or "limited" (Shealy et al., 2005, p. ii). The interventions were evaluated and divided into six areas for consideration; Maternity Care Practices, Peer Support, Professional Support, Support for Breastfeeding in the Workplace, Educating Mothers, and Media and Social Marketing. The interventions highlighted in the Educating Mothers section of the guide addresses changing attitudes toward breastfeeding, as well as increasing initiation and duration of breastfeeding. Many of these interventions acknowledge that information from family members and others may be inaccurate and inconsistent and may cause more difficulties than support. Interventions in the Support for Breastfeeding in the Workplace section address the high percentage of mothers who return to work and have children younger than three years old. Multiple issues are related to breastfeeding policy, services, and support for women returning to the workplace. In the CDC guide, vital aspects of support for the employed breastfeeding mother included teaching employees about breastfeeding and the needs of breastfeeding mothers, providing clean and private areas for pumping, and providing breastfeeding support services.

The final section of the CDC guide (Shealy et al., 2005) addresses interventions that have not been established as effective in improving breastfeeding initiation or duration rates. These areas include Countermarketing and the WHO International Code, Professional Education, Public Acceptance, and Hotlines and Other Information Resources. In evaluating the available literature in the Cochrane Review, the researchers found no evidence that these areas had a significant impact on breastfeeding outcomes. Many of these areas, however, had not been adequately researched as to their effectiveness in influencing breastfeeding outcomes.

The research on selected breastfeeding interventions provides evidence that some programs increase the breastfeeding initiation rates. The most successful interventions include the partner (typically the father of the baby), a video project that addresses perceived barriers identified by low income women, and the organization of a breastfeeding support team manned by professionals or trained peer counselors to assist mothers. Educational programs such as Best Start provide evidence for improving breastfeeding initiation rates in low income populations (Ryser, 2004); however, the influence on breastfeeding duration rates in this group was not thoroughly investigated. *The CDC Guide to Breastfeeding Interventions* (Shealy et al., 2005) can be used as a tool for professionals to provide strategies that may increase breastfeeding rates in most groups.

Although these interventions provide evidence for improving breastfeeding initiation rates, they offer little evidence for including family members other than the father of the infant or for improving breastfeeding duration. Persons who are perceived by the mother as supportive are typically in the company of the mother on a day-to-day basis.

These persons provide their own infant feeding experience, opinions, knowledge, and beliefs that can influence the mother's feeding decisions. The AAP (2005) recognizes and acknowledges the importance of the father's participation in lactation education. In acknowledging the significance of this single source of support, it is imperative to understand the extent of influence of other sources in daily contact with the mother. By understanding this influence, interventions can be developed that address the mother's breastfeeding goals. For a comparison of selected studies regarding interventions involving sources of influence and support see Appendix B, Table 3.

Summary and Basis for Further Research

The literature presented identifies the importance placed upon health care professionals by various organizations for encouraging and supporting breastfeeding in the population of the United States. The Healthy People 2010 Objectives (DHHS, 1999) recognize that health care professionals should effectively provide support for women who initiate breastfeeding and for those who continue breastfeeding. Low income women have been identified as having low breastfeeding initiation rates, and even lower duration rates. Furthermore, this population continues to fall behind the goals of the Healthy People 2010 Objectives. The literature also provides evidence of accepted infant feeding practices and the influence of these practices on breastfeeding duration. Additionally, evidence suggests that multiple persons of influence impact infant feeding practices yet these persons are not typically involved in infant feeding education. Research findings also reveal that breastfeeding interventions typically involve the mother of the infant and infrequently involve the father of the baby or others within the mother's personal support matrix. The

influence of persons in this support matrix may be sources of information, opinions, and experience that may either positively or negatively affect the mother and her choices. The personal support matrix may also have an effect on breastfeeding practices and sustained breastfeeding. From the above literature review, one may logically conclude that a gap exists in research regarding the daily influence of family members, friends, and co-workers (the personal support matrix) on mothers and sustained breastfeeding.

CHAPTER 3 PILOT STUDY

A pilot study titled “The Moderating Effects of Income Level on the Relationship Between Support Density and Sustained Breastfeeding” was developed in early 2004. It was conducted in the fall of 2004 to determine the feasibility of carrying out this dissertation study. Objectives of the pilot study were to establish whether the proposed outcome measures were reasonable and to determine if the participants were able to respond to the questionnaire. The hypotheses of the pilot study were: (1) There is a difference in support density between low income women and women not of low income who initiate breastfeeding during hospitalization for childbirth and (2) There is an income-level difference between the relationship of support density and breastfeeding outcomes.

Background and Significance

The specific area addressed by the pilot study was the Healthy People 2010 Objectives to increase the number of women initiating and sustaining breastfeeding in the United States (DHHS, 1999). The background and significance were approximately the same as described in Chapters 1 and 2 of this dissertation.

Methods

The pilot study was conducted at mid-Atlantic, not-for-profit regional health care system with a 587-bed capacity. This site is a regional health system that includes health

care for vaginal and cesarean deliveries, high-risk pregnancy care, and a regional neonatal intensive care unit for compromised infants. A total of 2,250 live births occurred in 2004, with various ethnic and racial groups represented. This facility was chosen for the accessibility to the researcher and for the availability of a moderately diverse population. Permission to conduct the pilot study was obtained from the facility's senior vice president. A letter of support was obtained for submission to the Virginia Commonwealth University Institutional Review Board (IRB). After receiving approval by the Virginia Commonwealth University IRB and the facility IRB, the researcher met with the hospital's director of Women and Children's Services, the staff of the Mother/Baby Unit, and the staff of the Lactation Education Department. Explanatory seminars, meetings, and posters on the Mother/Baby Unit were used to describe the purposes of the pilot study. The Mother/Baby Unit staff was encouraged to assist in recruiting pilot study participants.

Recruitment and Human Subject Protection

Over a two week period, the researcher recruited a convenience sample of 24 participants who met inclusion criteria. Inclusion criteria included the following: (1) between 18 and 45 years of age: (2) had delivered a live, singleton, term infant (≥ 37 weeks and ≥ 2500 g) within the past 24 to 48 hours: (3) neither mother nor infant had complications during labor or delivery: (4) had initiated breastfeeding after delivery: and (5) was able to read and speak English fluently. Women of all minority and ethnic backgrounds were included.

No children or females under the age of 18 years were recruited. Teenagers from 12 to 17 years old were not included in participant recruitment due to the questions for the

pilot study had not been tested on populations under the age of 18 years. Additionally, young women of this age group may use different strategies when considering infant feeding decisions.

Flyers were placed in each room, inviting the mother to participate in a brief survey for research purposes. Staff nurses and lactation educators were encouraged to provide the mother with a brief explanation of the pilot study using the invitation flyer and information they had received in the staff seminars and meetings. Their explanation included topics such as time requirements, confidentiality, and assurance that the researcher was a nurse. If the mother expressed interest in participating in the pilot study, the staff nurse or lactation educator contacted the researcher. The researcher then approached each potential participant individually in the privacy of the hospital room. The participant's income level was not known prior to the introductory meeting. Recruitment continued until the researcher enlisted an equal number of women who qualified as low income and women who did not qualify as low income. Low income status was defined as being eligible for or enrolled in WIC or Medicaid programs. After obtaining consent, the researcher administered the pilot study questions, collected demographic data, and contact information. Participants were reassured of the confidentiality of their data. Data were stored in a secured, locked location. Identifying information was kept in a separate, secured, and locked location. At the six week postpartum follow-up phone call, the researcher maintained data confidentiality. The follow-up phone call was conducted in a private office with a lock and privacy sign on the door to prevent inadvertent interruptions and possible data exposure. Immediately after completing the phone call, the researcher

separated the mother's name, study ID number, and phone number from the follow-up data and returned the information to the locked cabinet. All data were analysis using SPSS version 11.0. Data were analyzed for group characteristics as well as characteristics between groups.

There were no known major risks from participating in this pilot study. Participants may have been inconvenienced by the time it took to participate in the survey. Also, the researcher did not answer the mother's questions pertaining to breastfeeding.

Consequently, the participants may have felt frustration that the researcher did not give extensive answers to their breastfeeding questions. The researcher's lack of response was an intended approach; answers could have constituted an intervention that in turn could have interfered with the pilot study outcomes. If the participants asked breastfeeding questions, the researcher notified the lactation education staff of the patient's need for support. Lastly, the participants did not receive any health benefits for taking part in the pilot study.

Pilot Study Survey

The questions for the pilot study were developed from a study conducted by Humenick, Hill, Thompson et al. (1998) in which a secondary analysis was performed on data from 340 subjects in a prospective, longitudinal, primary study of insufficient milk supply. In the primary study, approximately 50% of the breastfeeding mothers approached had agreed to participate in the study. One specific item asked of hospitalized, breastfeeding women was to estimate the number of friends, family, and co-workers who had breastfed their infants in the past 3 years. Possible response choices were "most,"

“many,” “few,” and “none.” This item was operationally defined as *support density*.

Women answering “few” or “none” were considered at risk for early, unintended weaning. Further analysis of the responses showed that levels of low support density predicted poor breastfeeding outcomes among these subjects ($\chi^2 = 34.8, p = .000$ at 4 weeks, $\chi^2 = 21.7, p = .000$ at 8 weeks, and $\chi^2 = 34.8, p = .000$ at 12 weeks). Specific results of this study by Humenick et al. showed that breastfeeding at four, eight, and 12 weeks demonstrated significant differences among women in the high-risk support density risk category versus those women in the no-risk support density category. For example, 82.2% ($n = 45$) were breastfeeding in the low/no-risk category and 15.4% ($n = 13$) were breastfeeding in the high-risk category at week 8. Humenick et al. found that nursing interventions (not specifically identified in this report) in a random sample of the high-risk groups resulted in significantly more breastfeeding and less weaning. Humenick et al.’s study findings demonstrate the potential for nurses to more effectively and efficiently direct their support efforts by identifying mothers who are at-risk for early or unintentional weaning. The survey elements used for this pilot study are described below including brief definitions.

- (1) *Demographic Data Form*: The Demographic Data Form was designed to collect sociodemographic information from study participants. This 13-item instrument was administered at the first data collection period only. It required approximately five minutes to administer verbally. Items included age, parity, number of children breastfed, race, marital status, employment status prior to delivery, and education level. Additional items included infant information such as due date, birth date, sex, and birth weight. Income level was determined by asking the mother if she

participated in WIC, was eligible for WIC, or was Medicaid eligible. Specific income-level information was not requested.

- (2) *Support Density Questions*: Mothers were asked the following questions in order to define their nonprofessional support and support density: (a) How many of your friends, family, and co-workers breastfed their infants in the past 3 years? (b) How many of your friends, family, and co-workers encouraged you to breastfeed? (c) How many of your friends, family, and co-workers discouraged you from breastfeeding? (d) How many of your friends, family, and co-workers would you feel comfortable contacting if you have a breastfeeding question? Each of these questions had the response choices of “most,” “many,” “few,” or “none.”
- (3) *Questions at 6 Weeks Postpartum Follow Up*: In the researcher’s six week postpartum follow up phone call mothers were asked “Are you breastfeeding your baby?” The response choice was “yes” or “no.” If the response was “yes,” the mothers were asked to approximate the percentage of total breast-milk-only feedings. Response choices were “25%,” “50%,” “75%,” or “100%” based upon the estimated number of times each day the baby was fed breast milk. If the response to the question was “no,” the mother was asked when she completely weaned her infant, the date noted, and the number of breastfeeding weeks from the infant’s birth date to the weaning date. The researcher’s final question to all mothers during the six week follow up phone call was “As you look back over the past six weeks, who was the most influential person in the decision you have made regarding your infant-feeding choice and what did that person do or say that

influenced you the most?" This question was open ended in order for the mother to express herself more fully, if she desired.

Findings

A total of 24 mothers participated in the initial hospital interview for this pilot study. Eleven mothers identified themselves as either eligible for or participating in WIC programs: one mother in this group was lost to follow up due to telephone number blocking. Thirteen mothers identified themselves as not being eligible for or not participating in WIC programs: one mother in this group was lost to follow up due to telephone disconnection. The findings and reported summary are from a total of 22 complete data sets.

WIC Participating Mothers

Initially, 11 mothers reported being eligible for or participating in WIC programs. The age range for this group was 19 to 27 years, with two (18.2%) identifying themselves as African American and nine (81.8%) identifying themselves as Caucasian. Six mothers (54.5%) stated they were employed prior to delivery and five (45.4%) stated they were unemployed prior to delivery. The number of hours per week of employment was not identified. Five (45.4%) of the mothers stated they had attended college, five (45.4%) had completed high school, and one mother (9%) had not completed high school. An interesting contrast in demographic results showed that nine (81.8%) of the WIC group reported being first-time mothers versus the non-WIC group that had four (31%) first time mothers. At 6 weeks, seven (70%) of the WIC mothers were still breastfeeding and five of the seven identified themselves as exclusively breastfeeding. This finding was unexpected

due to previous studies' usual findings of younger, first-time mothers with little support, typically weaned their infants within the first few weeks of breastfeeding (Corbett, 2000; Loiselle et al., 2001; Meyerink & Marquis, 2002; Mitra et al., 2003; Raisler, 2000; Riordan & Gill-Hopple, 2000).

On the support density question in the initial interview, six (54.5%) of the mothers in the WIC group reported "low" and three (27.2%) reported "none." These mothers would be considered "at risk" for early or unintentional weaning prior to six weeks. In the six week postpartum follow-up contact, ten of the eleven initial mothers participated. Of these ten mothers, nine (90%) had reported "low" or "none" on the support density question. However, seven (70%) of these mothers were breastfeeding at six weeks postpartum with five (50%) exclusively breastfeeding their infant (only mother's milk, no other fluids of any type). Responses to the final follow-up question were varied among the mothers. Six (60%) of the mothers identified "myself" as the most influential person in their infant-feeding decisions. One mother identified "my mother," "a sister," "a friend," and "a co-worker" as the most influential in their infant-feeding decisions. Because of the unexpected finding of the higher number of first-time WIC participating mothers still breastfeeding at six weeks, the researcher attempted to determine a basis for this outcome. The WIC breastfeeding peer counselor at the city Health Department was contacted for an interview. She was a young, single, African-American woman with an 18-month old son whom she had breastfed for over a year. During the interview, she stated she had heard many WIC participants make comments about their expectations when dealing with a WIC peer counselor. Many had stated they expected an "old white woman telling me what to do" and

were more comfortable talking with the peer counselor. They also frequently reported their perception of being assisted to make an informed infant-feeding choice instead of being told what infant feeding choice to make (C. Clark, personal communication, December 10, 2004).

The WIC peer counselor conducts monthly breastfeeding classes at the city Health Department. The classes are held in an informal setting with refreshments provided. Mothers are encouraged to bring their children and/or partner (if available) to the class. The peer counselor invites the mothers to participate in class and share their experiences and feelings with other mothers. Class members play games that teach breastfeeding terms and techniques; the winner receives a prize of a bib, medicine spoon, or other small gift. Occasionally, winners receive a baby sling or breastfeeding pillow that has been donated to the class as an additional incentive for attendance. All attendees who do not win a prize receive a small gift at the end of the class. The mothers also watch a breastfeeding video near the end of class and after the presentation mothers are encouraged to express comments and opinions. An aspect of the class that the peer counselor considers beneficial and invaluable is the interaction between the participants. Mothers who have breastfed previous children are liberal with advice, encouragement, and opinions about dealing with breastfeeding issues.

The peer counselor's additional duties included conducting home visits, making multiple phone calls, and providing one-on-one counseling for WIC participants. The peer counselor was also responsible for contacting and supporting breastfeeding mothers in the four adjoining counties (C. Clark, personal communication, December 10, 2004). Because

of the peer counselor's multiple contacts during the prenatal and postpartum period, the pilot study's WIC participants could have been influenced to continue breastfeeding due to this type of support and encouragement. In order to avoid influencing the pilot study's findings, the researcher did not ask the mothers if they had any specific classes, phone calls, home visits, or counseling.

Mothers Not Participating In or Eligible For WIC

Thirteen mothers reported not participating in or being eligible for WIC programs. The age range for this group was 26 to 39 years and 100% identified themselves as Caucasian. Ten mothers (76.9%) stated they were employed prior to delivery and three mothers (23.1%) stated they were unemployed prior to delivery. The number of hours per week of employment was not identified. Eleven (84.6%) mothers stated they had attended college, and two mothers (15.3%) stated they had completed high school. Only four (30.7%) of the mothers reported being first-time mothers.

On the support density question in the initial interview, six (46.1%) of the thirteen mothers reported "low" and no mothers reported "none." Four (30.7%) of the initial thirteen mothers were first-time mothers. At the six week follow-up contact, twelve of the thirteen mothers participated. Among those twelve participants, four (33.3%) were first-time mothers. Seven (58.3%) of the twelve mothers reported breastfeeding at six weeks and five (41.6%) of the seven mothers reporting exclusive breastfeeding during the six week period (only mother's milk, no other fluids of any type). This finding showed a slightly lower breastfeeding rate in this group at six weeks than in the WIC eligible or participating group. In response to the final follow-up question, the mothers in this group

identified only three persons of influence. Seven (58.3%) of the mothers identified “myself” as the most influential in their infant-feeding decision. Three mothers (25%) identified “my mother” and 2 mothers (16.6%) identified “a friend” as the most influential in their infant-feeding decisions. Table 3 presents the pilot study demographic data and breastfeeding outcome data.

Table 3

Pilot Study Demographic and Breastfeeding Outcome Findings

	Low Income Group	Not-Low Income Group
Age Range	19 – 27 years	26 – 39 years
Race	9 (81.8%) Caucasian 2 (18.2%) African American	13 (100%) Caucasian
First-Time Mother	9 (81.8%)	4 (30.7%)
Employment Prior to Delivery	6 (54.5%) Employed 5 (45.4%) Not Employed	10 (76.9%) Employed 3 (23.1%) Not
Employed		
Education		
Did not complete High School	1 (9%)	--0--
Completed High School	5 (45.5%)	2 (15.3%)
Completed College	5 (45.5%)	11 (84.6%)
	Low Income Group at six weeks postpartum n = 10	Not-Low Income Group at six weeks postpartum n = 12
Breastfeeding at six weeks	7 (70%)	7 (58.3%)
Breastfeeding exclusive at six weeks	5 (50%)	5 (41.6%)
Most Influential in feeding decisions	Myself 6 (60%) My Mother 1 (10%) Sister 1 (10%) Friend 1 (10%) Co-Worker 1 (10%)	Myself 7 (58.3%) My Mother 3 (25%) Sister --0-- Friend 2 (16.6%) Co-Worker --0--

Implications and Limitations

One of the limitations of this pilot study was reflected in the total sample's limited racial diversity. Only two mothers identified themselves as African Americans, while the remaining mothers identified themselves as Caucasian. Additionally, the number of participants in this pilot study did not generate significant statistical results; however, trends between the two groups could be differentiated. The general characteristics of the two groups showed that the WIC mothers were generally younger, had less higher education, and had a lower employment percentage prior to delivery than the mothers who did not participate in WIC programs. Compared to the WIC mothers, the mothers not participating in WIC reported higher initial support density but had slightly lower sustained breastfeeding rates at six weeks. This finding did not support Hypothesis 2, which states that an income-level difference existed between the relationship of support density and breastfeeding outcomes. However, the pilot study's findings did confirm Hypothesis 1, which stated that a difference existed in support density between low income women and women not of low income who initiate breastfeeding during hospitalization for childbirth.

Other limitations of this pilot study were that prenatal education, information, and contacts were not controlled for statistically or through inclusion criteria. The two groups were not balanced between primiparous mothers and multiparous mothers in the inclusion criteria. Additionally, prior experiences in breastfeeding or parenting were not in the inclusion criteria or controlled for statistically. Each of these limitations could have influenced the findings of this pilot study.

Implications for the Dissertation Study

The goals of this pilot study were stated as follows: (1) to determine if the outcome measures were reasonable, (2) to determine if the participants were able to answer the study questions, and (3) to determine the feasibility and approximate time frame for conducting a larger study. The goals and objectives of conducting the pilot study were met and allowed experience in the exercise of conducting research.

The unexpected finding of the WIC mothers reporting “low” or “none” more often on the support density question but breastfeeding for a longer period of time suggests that the influence of the WIC counselors’ multiple contacts during the prenatal and postpartum periods may have influenced the observed outcomes. This finding demonstrates that consideration should be given to prenatal breastfeeding education and information. Furthermore, previous breastfeeding and parenting experiences should be controlled for statistically or eliminated by inclusion criteria. Other issues that should be considered include determining additional outcome measures to more adequately ascertain if support density does in fact influence sustained breastfeeding. Findings from these outcome measures may further elucidate the support density concept and its relationship to sustained breastfeeding as affected by income.

CHAPTER 4 RESEARCH DESIGN AND METHODOLOGY

This chapter describes the research design and methods that were used to answer the following research questions:

1. To what extent does income level influence the continuation of breastfeeding through the first 6 weeks postpartum?
2. To what extent does the mother's personal support matrix influence the continuation of breastfeeding through the first 6 weeks postpartum?
3. To what extent does the personal support matrix score change from the initial postpartum survey to the 6-week postpartum survey or when breastfeeding is discontinued?

Design

This research study was descriptive, using a longitudinal design to assess the response variable of breastfeeding at six weeks postpartum (yes/no) and the predictor variables of the Personal Support Matrix (PSM) Score 1 (the initial interview score, Time1) and Score 2 (at the six week final follow-up or when breastfeeding had been discontinued, Time2), participation (yes or no) in WIC or Medicaid programs, and breastfeeding at six weeks postpartum (yes or no). A sample of $n = 66$ mothers (a minimum of $n = 33$ per income level group) was targeted to be surveyed during hospitalization for childbirth.

During the hospital interview demographic data were collected and the PSM questionnaire administered. The in-hospital interview method was chosen due to the researcher's previous success in using this method during the pilot study. Survey tools are commonly used to gather information and the data collected are based upon valid self-reporting of the respondent's perceptions (Pedhazur & Schmelkin, 1991; Stommel & Wills, 2004). Additionally, face-to-face interviews typically perform well as a data collection method; the presence of a living, skilled interviewer typically often achieves better response rates than paper-and-pencil surveys as described by Fowler (cited in Stommel & Wills, 2004).

Weekly breastfeeding data were collected by phone to record the status of breastfeeding (continuing to breastfeed or discontinuing breastfeeding) and the person that the mother identified as the most supportive that week. This method of contact facilitated the telephone interview responses as the interviewer had previous contact with the participants (Stommel & Wills, 2004). This weekly data characterized the personal support matrix and identified any changes in the matrix. In the final interview at either six weeks or when breastfeeding was discontinued, mothers were asked to identify the person or resource they considered to be the most influential in infant feeding decisions, encouragement, and assistance. The final question of the interview was if the mother would like to share any additional information regarding her experience. During these questions, the researcher repeated the statements made by the mother to ensure that the statements were accurately recorded.

Description of Variables

The definitions for the study variables of “Breastfeeding,” “Income Level,” “Personal Support Matrix,” the response variables, and the predictor variables have been previously described and reported in Chapter 1 of this dissertation.

Sample

Participant Characteristics

The convenience sample consisted of first-time mothers, hospitalized for childbirth, who initiated breastfeeding during the early postpartum period. The variable of income level was unknown by the researcher until the demographic data were collected. The definition of income status has been previously described in this dissertation. Recruitment continued until at least 33 participants in each income level group had been recruited and had participated.

Inclusion Criteria

Participants were first-time mothers who were between 18 and 45 years of age and had experienced a live, singleton, term-infant birth (≥ 37 weeks and ≥ 2500 g) within the previous 8 to 48 hours. Each mother had initiated breastfeeding in the immediate postpartum period. Each participant was required to be able to speak English fluently, and have the ability to give fully informed consent.

Exclusion Criteria

No females younger than 18 years of age or older than 45 years of age were recruited for this study.

Setting

Participant recruitment took place at the Mother/Baby Unit of a regional, mid-Atlantic, not-for-profit health care system.

Subject Recruitment

Data were collected after the researcher obtained approval from the IRBs of Virginia Commonwealth University in Richmond, Virginia and from the facility where the research was conducted. A letter of support from facility was submitted to the Virginia Commonwealth University IRB. After receiving approval from both IRBs, the researcher met with the director of Women and Children's Services, the staff of the Mother/Baby Unit, and the staff of the Lactation Education Department to describe the procedures for the study. Colorful flyers, inviting the mother to participate in a breastfeeding research study, were placed in each Mother/Baby Unit room, posted on Mother/Baby Unit bulletin boards, and displayed during the hospital's monthly prenatal breastfeeding classes. All mother/baby staff were encouraged to invite mothers to participate in the research study. Participant criteria were posted in the chart wall-a-roo (a chart receptacle built into the wall that can be locked, and designed for ease of access to chart systems for nursing personnel) to assist nurses in knowing which mothers were eligible for participation.

Data Collection Procedures

The researcher approached each participant individually during hospitalization for postpartum care only after the nurses had informed the researcher that the mother wished to participate in the study. After explaining the study and obtaining consent, the researcher verbally administered the study questions. The responses were recorded on the data

collection sheet. Participants were assured of the confidentiality of the data obtained from them. At the completion of the in-hospital interview, participants received a copy of the consent form and a thank-you gift for their time and participation.

Data Protection

Data were maintained in a secured, locked location. Identifying information was stored in a separate, secured, and locked location. Study information was available only to the researcher. The weekly data collection phone calls were conducted in a private office with a lock and privacy sign on the door to prevent inadvertent interruptions and possible data exposure. Immediately after the phone calls were completed, the researcher separated the mother's name, study ID number, and phone number from the data and returned the identifying information to the locked cabinet. All data were analyzed for group characteristics as well as characteristics between groups using JMP version 6.

Questionnaire

The questionnaire for this study was developed from the pilot study work conducted previously by the author that was based in part upon previous work by Humenick, Hill, Thompson, et al. (1998) described previously in this document. For the purposes of this study, support density was expanded and redefined to the Personal Support Matrix (PSM). The 16-item PSM questionnaire was administered during the initial interview and designated as PSM Time 1. The PSM was designed to identify the mother's perception of persons who are either supportive or unsupportive of her infant-feeding choices (PSM quality). Mothers were asked about family members, friends, co-workers, and health care professionals and their perception of encouragement and discouragement

from these four potential support groups. The final question with each group was if the mother feels that she can ask breastfeeding specific questions of persons in each potential support group (PSM environment). The response choices were “most,” “some,” or “none” and were coded as most = 2, some = 1, and none = 0. The questions regarding discouragement of breastfeeding were reversed scored.

The weekly breastfeeding data were designed to determine the status of breastfeeding (continuing breastfeeding or discontinuing breastfeeding) and who the mother identified as the most supportive person for that week. The questions were “Are you continuing to breastfeed your baby?” with response choices of “yes” or “no” and “Who has been the most supportive to you this week?” If the response to the continued breastfeeding question was “yes,” the mothers were informed that they would be called the next week (up to six weeks or until breastfeeding had been discontinued). If the mother responded “no” to the continued breastfeeding question, the PSM questionnaire was administered (designated as PSM Time 2) and the mother was not called again.

Two additional questions were posed to all mothers at the six week interview or when breastfeeding was discontinued; the first question was “As you look back over the past 6 weeks (or the length of time breastfeeding continued), can you identify a person or resource that has been the most influential and supportive in the decisions you have made regarding your infant-feeding choice and what did that person or resource do or say that influenced you the most?” and the second question was “Is there anything else you would like to share with me about your experience?” These questions could elicit a single response or a narrative response, depending on the experiences of the mother and were

open ended for the mother to express herself more fully. Responses were written as the mother expressed herself and then repeated back to the mother to confirm accuracy of the response. Selected responses are reported in Chapter 5.

Demographic Data

After completing the in-hospital survey interview, the researcher requested demographic data that included: (1) age, (2) participation in WIC or Medicaid programs, (3) racial or ethnic group, (4) living with or not living with a partner/significant other, (5) education level achieved, (6) employment status prior to delivery, and (7) plan to return to work in six weeks. These demographic data provide typical indices of breastfeeding initiation and duration rates and are important in assessing the differences between the two groups (Dennis, 2002a).

Data Analysis

The following description provides a brief overview of the data analysis that was used for this research study. Data were examined using JMP version 6. Initial analysis examined descriptive statistics of the two groups including distributions, means, and frequencies. The group demographic data was examined using descriptive statistics, t-tests for continuous data, and Fisher's Exact test for categorical data to compare the two groups. The significance level (alpha) for all statistical analysis was 0.05. The statistical assumptions of representativeness and independence were met in this statistical analysis. Each participant initiated breastfeeding in the hospital and each participant's experience was independent from the other participants' experiences.

Statistical analysis was addressed in the following manner. Research Question 1 and Question 2 were analyzed using logistic regression. Logistic regression is used to predict an outcome by using a dichotomous variable (Vogt, 1999). The dichotomous variable (Yes = breastfeeding through the first 6 weeks postpartum or No = when breastfeeding was discontinued) served as the response variable. The following predictor variables were included in the analysis: the PSM score (12 to 30), participation (yes or no) in WIC or Medicaid programs, and the interaction of WIC or Medicaid participation by PSM score.

Research Question 3 was analyzed using a simple repeated measures model to determine any change in the PSM score from the initial contact to the 6-week follow-up contact or when breastfeeding was discontinued. ANOVA assumptions were confirmed, including homoscedasticity of error variance and normality of the residuals. The initial contact was designated as “Time 1” and the 6-week follow-up contact or when breastfeeding was discontinued was designated as “Time 2.” The predictor variables in the model included participation in WIC or Medicaid programs, time (Time 1 and Time 2), and the interaction of time by WIC or Medicaid participation.

Summary

This chapter defined the purpose, research design, and methodology used in this study to examine the research questions posited. The sample characteristics, inclusion and exclusion criteria, and demographics are explained. The setting in which subject recruitment and protection, as well as data collection procedures and protection occurred

was described. The measurement instrument used in this study was also described, and the statistical analysis plans were presented.

CHAPTER 5 RESULTS

In this chapter, data analysis findings are presented. Results of the initial data analysis, using descriptive statistics, characterize the sample and the two groups and illustrate a comparison of the two groups. Research questions 1 and 2 were examined using logistic regression. Research question 3 was examined using a simple repeated measures analysis. The closing section of the chapter reports the qualitative data from weekly contacts and the final two questions of the six week postpartum interview or when breastfeeding was discontinued.

Descriptive Statistics

Description of the Sample

A convenience sample of 88 first-time mothers who initiated breastfeeding in the immediate post-partum period were recruited from the Mother/Baby Unit of a mid-Atlantic, not-for-profit regional health care system. Initial interview data were completed during the postpartum hospitalization of all participants. At the end of data collection, 85 of the initial 88 participants had complete data sets.

Demographics of the Sample and the Groups

The initial 88 participants were characterized by age, race, education level achieved, partner or significant other, prenatal employment status, and anticipated return to employment at 6 weeks postpartum. Income level was determined by the self report of the

mother as to her participation or eligibility of the state WIC or Medicaid program (See Table 4).

The sample ranged in age from 18 to 43 years with a mean of 25.77 (*SD* 5.50). The low income group ranged in age from 18 to 29 years with a mean of 21.52 years (*SD* 3.01) depicting a younger age group as well as a shorter range of years (11 years). The not-low income group ranged in age from 20 to 43 years with a mean of 28.44 years (*SD* 5.01) and a greater range of years (23 years) than the low income group. The mean age between the two groups was statistically significantly different using a two-sided, two group *t*-test with $p < 0.001$.

Racial diversity was minimal in this sample with 9 (10.2%) participants identifying themselves as African American, 1 (1.1%) self-identified as Asian, 1 (1.1%) self-identified as Hispanic, 1 (1.1%) self-identified as Native American, and 76 (86.3%) self-identified as Caucasian. The not-low income group had minimal diversity with 4 (7.4%) participants self-identified as African American, 1 (1.8%) self-identified as Asian, 1 (1.8%) self-identified as Hispanic, and 48 (88.8%) self-identified as Caucasian. Racial diversity in the low income group had 5 (14.7%) participants identifying themselves as African American, 1 (2.9%) self-identified as Native American, and 28 (82.3%) self-identified as Caucasian. The race variable was dichotomized into Caucasian and Other in order to statistically compare the two groups. Using a Fisher's Exact test, the race variable was not statistically significantly different with $p = 0.520$.

Completed education levels of the sample ranged from 10th grade to twelve years of post high school education with a mean of 15.24 years (*SD* 2.34). Over half of the low

income group ($n = 20$) had completed some post high school education with a range from 10th grade high school to 6 years of post high school education and a mean of 13.52 years ($SD 1.81$). Most ($n = 52$) of the not-low income group had completed some post high school education with a range from high school to twelve years of post high school education and a mean of 16.32 years ($SD 1.97$). The education variable was dichotomized into high school and post high school in order to statistically compare the two groups. Using a Fisher's Exact test, the education variable was found to be statistically significantly different with $p < 0.001$.

The significant other or partner identified by the mothers in the sample included one (1.1%) great grandmother (grandmother of the new mother), twenty (23.2%) grandmothers (mother of the new mother), one (1.1%) aunt, one (1.1%) sister, one (1.1%) friend, and 61 (69.3%) significant males. Three (3.4%) mothers identified themselves as their most significant person. There was a noteworthy difference in the persons identified as most significant between the two groups. In the not-low income group, the most frequently identified support person was the significant male (85.2%) with the grandmother a distant second (12.9%). One (1.8%) mother identified herself as her most significant person. In the low income group there was a greater diversity in the identified most significant person. These persons included one great grandmother (2.9%), 13 (38.2%) grandmothers, one aunt (2.9%), one sister (2.9%), one female friend (2.9%), and 15 (44.1%) significant males. Two (5.8%) mothers identified themselves as their most significant person. The significant other variable was dichotomized into the male significant other and other in order to statistically compare the two groups. Using a

Fisher's Exact test, the significant other variable was statistically significantly different with $p < 0.0031$.

Seventy-nine (90%) mothers in the sample were employed prior to delivery, and nine (10%) mothers were unemployed. Thirty-eight (43%) mothers planned to return to work at six weeks post partum while 50 (57%) planned not to return to work at six weeks post partum. Returning to employment has been recognized as a risk factor that may reduce the probability of sustained breastfeeding and be a factor in early weaning (Brown, Poag, & Kasprzycki, 2001; Hauck & Irurita, 2003; Libbus & Bullock, 2002). In the low income group, 30 (88.2%) mothers were employed prior to delivery, and 4 (11.7%) mothers were unemployed. Eighteen (52.9%) mothers planned to return to work at six weeks post partum while 16 (47%) planned not to return to work at six weeks post partum. In the not-low income group, 49 (90.7%) mothers were employed prior to delivery, and 5 (9.2%) mothers were unemployed. Twenty (37%) mothers planned to return to work at six weeks post partum while 34 (62.9%) planned not to return to work at six weeks post partum. There was a difference between the two groups in the number of mothers that planned to return to their employment at six weeks with a greater number of low income mothers planning to return to work. This factor may have influenced whether these mothers were able to sustain or maintain breastfeeding. The employment and plan to return to employment variables were dichotomized into a yes/no response in order to statistically compare the two groups. Using a Fisher's Exact test, the employment and plan to return to employment variables were not statistically significantly different with $p = 0.718$ and $p = 0.119$, respectively.

Overall, there were several demographic differences between the two groups. The initial number of participants in the low income group was $n = 34$ while there were $n = 54$ in the not-low income group. Additionally, the low income group was younger, had achieved a lower educational level, had identified a more diverse group of support persons, and more mothers were planning to return to work at six weeks postpartum. These differences may have been factors that influence sustained breastfeeding in this group.

Table 4 illustrates the demographic differences between the two groups.

Table 4

Dissertation Study Demographics

	Low Income n = 34	Not-Low Income n = 54
Age **	18 – 29 years Mean 21.52 (SD 5.01)	20 – 43 years Mean 28.44 (SD 3.01)
Race		
Non-Caucasian	6 (17.6%)	6 (11.0%)
Caucasian	28 (82.3%)	48 (88.8%)
Education **		
High School	14 (41.1%)	2 (3.7%)
Post High School (1- 12 years)	20 (58.8%)	52 (96.2%)
Significant Support Person *		
Male Significant Other	15 (44.1%)	46 (85.2%)
Mother, Myself (other females)	19 (55.6%)	8 (14.7%)
Employment Prior to Delivery	30 (88.2%) Yes 4 (11.7%) No	49 (90.7%) Yes 5 (9.2%) No
Plan for return to Employment	18 (52.9%) Yes 16 (47%) No	20 (37%) Yes 34 (62.9%) No
	Low Income n = 31	Not-Low Income n = 54
Most Influential in Feeding Decisions*		
Male Significant Other	15 (48.3%)	46 (85.2%)
Mother, Myself (other females)	16 (51.6%)	9 (14.8%)

* denotes a statistically significant difference of $p < 0.003$

** denotes a statistically significant difference of $p < 0.001$

Breastfeeding Results

Number of breastfeeding days for the sample ranged from 2 days (2%) to 42 days (67.8%) with a mean of 32.47 days (*SD* 15.06). The number of breastfeeding days for the low income group ranged from 2 days (3%) after hospital discharge to 42 days (44%) with a mean of 25.12 days (*SD* 17.16) with 33 mothers reporting. The number of breastfeeding days for the not-low income group ranged from 4 days (4%) after hospital discharge to 42 days (81%) with a mean of 37 days (*SD* 11.66) with 54 mothers reporting. Table 5 illustrates the description of the predictor and response variables.

Data Cleaning and Recoding

Data were recorded manually on the data collection sheets during the initial interview, and then entered into the JMP version 6 statistical program. Qualitative data were recorded on the data collection sheets and subsequently entered into a Word file. At the completion of data collection, all data were reviewed for accuracy, and any discrepancies with the original data were corrected. The negatively worded questions on the Personal Support Matrix questionnaire (3, 7, 11, and 15) were reversed scored before any data analysis was performed.

Logistic Regression and Repeated Measures Analysis

The statistical analyses chosen to answer the research questions for this study included logistic regression and repeated measures analysis. Logistic regression analysis is a statistical method used to predict the occurrence of an event. For this type of analysis, the dependent variable was breastfeeding through the sixth week postpartum (yes or no). The assumptions of logistic regression analysis are less restrictive than some other types of

analysis and allow for the calculation of the odds ratio. Logistic regression allows the researcher to find the probability of an event for any individual in the sample of interest. The statistical test used for logistic regression is the chi-square test which provided the researcher with evidence of the importance of income level or PSM in predicting breastfeeding outcomes.

Repeated measures analysis was used to examine Research Question 3. Assumptions of repeated measures analysis are that observations across subjects are independent of one another and that the data are normally distributed (Dawson & Trapp, 2004). Repeated measures analysis determines if a statistically significant change has occurred from one time period to another. In this study, the participants were queried at two separate time frames regarding the independent variable Personal Support Matrix. The PSM was administered at the initial hospital interview (Time 1) and at the six week postpartum interview or when breastfeeding was discontinued (Time 2). A score was recorded for each time frame, and the repeated measures analysis was performed to determine if a statistically significant change in the scores occurred.

Research Questions

Research Questions 1 and 2

Research Question 1 was “To what extent does income level influence the continuation of breastfeeding through the first 6 weeks postpartum?” Research Question 2 was “To what extent does the mother’s personal support matrix influence the continuation of breastfeeding through the first 6 weeks postpartum?”

The logistic regression analysis results for Research Questions 1 and 2 appear in Table 6. The data analysis showed a significant relationship between income level, PSM scores, and continuation of breastfeeding for this sample ($X^2 = 36.58052, p < .0001$). Additionally, by exponentiating the parameter estimates, the odds ratio for continued breastfeeding to the sixth week postpartum by income level can be approximated. The odds ratio for income [$\exp(1.52421384) = 4.59$] shows that a not-low income mother is 4.59 times more likely to breastfeed to the sixth week postpartum compared to a low income mother. Also, for a one unit change in personal support matrix score, the odds ratio is [$\exp(0.35808216) = 1.43$], which means that a mother with a one unit increase in the personal support matrix is 1.43 times more likely to be breastfeeding at the sixth week postpartum than the not-low income mother. Furthermore, a change of 5 units [$\exp(0.35808216 \times 5) = \exp(1.7904108) = 5.99$] in the personal support matrix score increases the likelihood to 5.99 times that a mother will be breastfeeding at the sixth week postpartum. The results from this analysis suggest that the higher income level and a larger PSM increase the probability of breastfeeding to the sixth week postpartum.

Table 5

Logistic Regression Results

Term	Estimate	Std Error	Chi-Square	Prob >ChiSq
Intercept	-8.0517241	2.0960694	14.76	< .0001*
Income 0/1	1.46867867	0.6430525	5.22	0.0224*
PSM2	0.36261704	0.0907306	15.97	< .0001*
(Income 0/1-0.63529)*(PSM2-23.0471)	-0.0644679	0.2004958	0.10	0.7478

*indicates statistically significant finding

Term	Estimate	Std Error	Chi Square	Prob>ChiSq	Unit Odds Ratio	UO Low	UO Up
Intercept	-7.9644822	2.0414809	15.22	<.0001*			
Income 0/1	1.52421384	0.6228734	5.99	0.0144*	4.59153246	1.40007236	16.865088
PSM2	0.35808216	0.0883391	16.43	<.0001*	1.43058316	1.22593032	1.7441778

*indicates statistically significant finding

Trends in Predicting Probabilities of Breastfeeding at Six Weeks by Income

This statistical model provided a predictive trend. This trend demonstrated the ability of the PSM score by income level to predict the probability of the mother sustaining breastfeeding to the sixth week postpartum. The PSM scores ranged from 12 to 30. Figure 2 shows the overlay plot of changes in PSM score by income and the probability of breastfeeding at six weeks postpartum. For example, in the low income group a PSM score of 12 produced the probability of breastfeeding at six weeks to 0.024, a PSM score of 21 produced the probability of breastfeeding at six weeks to 0.390, and a PSM score of 30 produced the probability of breastfeeding at six weeks to 0.941. In contrast, a PSM score of 12 in the not-low income group produced a probability of breastfeeding at six weeks to 0.104, a PSM score of 21 produced the probability of breastfeeding at six weeks to 0.746, and a PSM score of 30 produced the probability of breastfeeding at six weeks to 0.986. Figure 2 also illustrates the relationship between the PSM score and the probability of breastfeeding at six weeks for both low income and not-low income groups. Thus, the odds ratio of not breastfeeding through the first six weeks postpartum was predicted by the PSM scores and income level. This predictive ability does not imply validity or reliability of the questionnaire but trends can be extracted from this analysis and can serve as a foundation for future research.

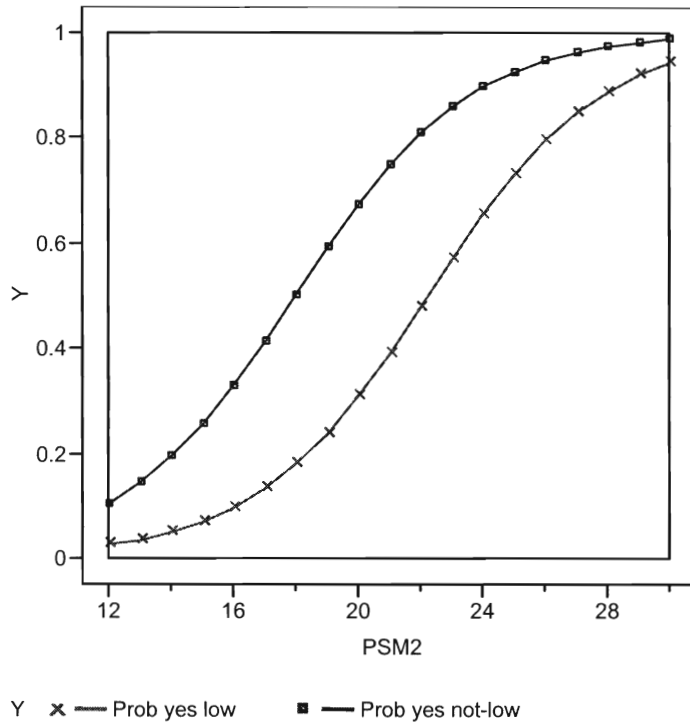


Figure 2

Overlay Plot of Probability of Breastfeeding at Six Weeks by Income

Research Question 3

Research Question 3 was “To what extent does the personal support matrix score change from the initial postpartum survey to the 6-week postpartum survey?”

The PSM scores from Time 1 and Time 2 were analyzed using simple repeated measures analysis. The initial scores during hospitalization (Time 1) showed a difference between the two groups. The low income group had a lower PSM score than the not-low income group. These difference were statistically significant ($F(1, 83), df = 1, p = 0.0128$). These differences give evidence that a support system that is in place for a low income mother may operate differently than for a mother who is not-low income. These differences are also seen the in the variety of persons identified by the mothers in the low income group compared to the not-low income group.

The PSM scores at Time 2 did not show a statistically significant change by time or income group ($F(1, 83), df = 1, p = 0.7155$). This finding provides evidence that the support matrix in place at the time of delivery appeared to continue to the same degree after discharge from the hospital. Additionally, this finding provides evidence that the mothers’ perceptions of their support matrices changed very little over time. This evidence of the PSM tool predictability may provide a method of evaluation of the support system of the mother prior to discharge from the hospital.

Table 6

Description of Predictor Variables

Predictor	n	Mean	SD	CI
PSM Time 1 (low income)	31	21.91	3.72	20.61, 23.20
PSM Time 1 (not-low income)	54	23.72	3.88	22.66, 24.78
Totals for sample	85	23.02	3.90	22.19, 23.84
PSM Time 2 (low income)	31	21.58	4.24	20.02, 23.13
PSM Time 2 (not-low income)	54	23.88	4.48	22.66, 25.11
Totals for sample	85	23.04	4.51	22.07, 24.02

	Value	Exact F	NumDF	DenDF	Prob >F
Income 1/0	0.0780594	6.4789	1	83	0.0128*
Time	0.0017684	0.1468	1	83	0.7026
Time/Income 1/0	0.0016114	0.1337	1	83	0.7155

* indicates statistically significant finding

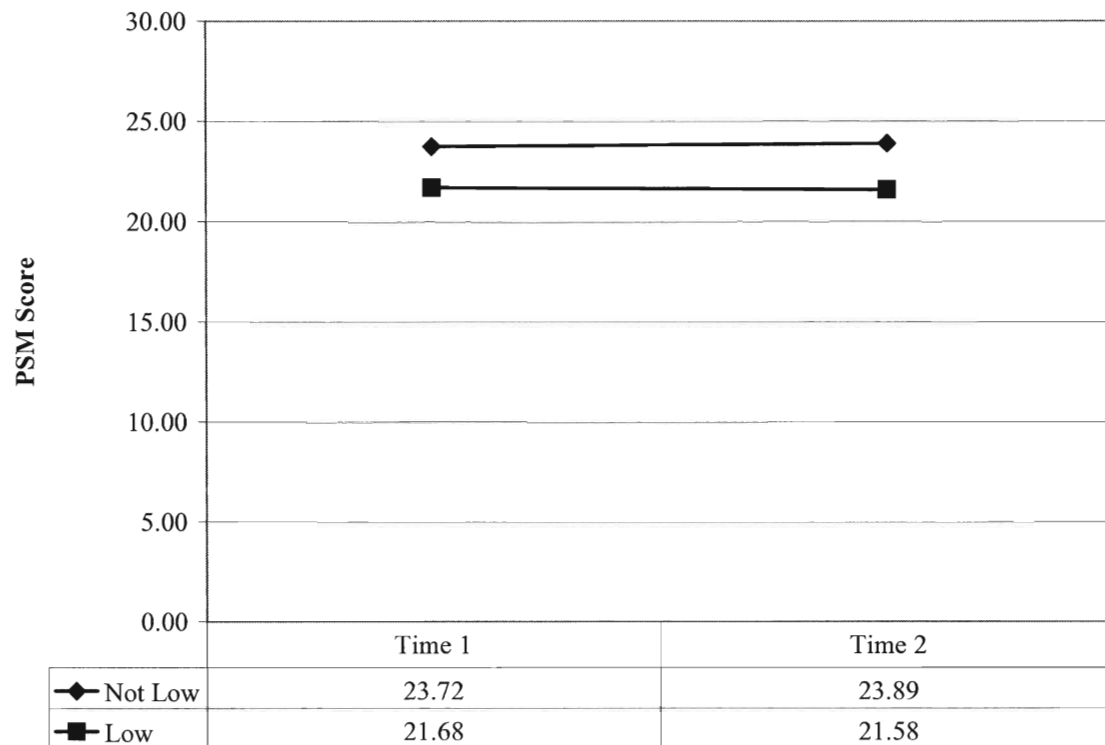


Figure 3

Line Graph of PSM Score Repeated Measures Results

Weekly Breastfeeding Status and Support Data Report

Weekly data were collected to record the status of breastfeeding (continuing to breastfeed or discontinuing breastfeeding) and the person that the mother identified as the most supportive that week. These data characterized the personal support matrix and identified weekly changes in the matrix (PSM quality and environment). These data did not answer the research questions directly but provided trends as to the changes in the support system during the initial postpartum weeks. In the final interview, mothers were asked to identify the person or resource they considered to be the most influential in infant feeding decisions, encouragement, and assistance during the first six weeks postpartum or when breastfeeding was discontinued. The final question of the interview asked the mother if she would like to share any additional information regarding her experience. During these questions, the researcher repeated statements made by the mother to ensure that the statements were accurate.

Low Income Mothers and Weekly Identified Support Person

The mothers in the low income group identified nine different persons who were influential in their infant feeding decisions during the six week postpartum period or when breastfeeding was discontinued. Figure 4 illustrates weekly changes in the support system and the number of mothers who discontinued breastfeeding each week.

The most frequently identified support person was the grandmother (48%). The next most supportive person was the husband/male significant other (42%) with a great-grandmother (3%), a female friend (3%), and an aunt (3%) as the additionally identified

support persons. Week 2 showed a notable shift in the identified support of the low income mothers. Not only had a significant number of mothers discontinued breastfeeding (27.2%), but the support system had also shifted to others within the personal support matrix. At the end of week two, 24 mothers were included in the weekly data collection. The most frequently identified support person was the grandmother (31.2%). A much lower number of husband/male significant others (15.6%) was identified, and two mothers identified a sister (6.2%) as the most supportive for the week. Additional persons identified were a great-grandmother (3%), an aunt (3%), and one mother identified her baby (3%) as her most supportive person. During this week, one mother consulted a Certified Lactation Consultant (3%) for difficulties. At the end of week 2, four (12.9%) infants were weaned, and their mothers were no longer included in the weekly data collection.

With the decreasing number of mothers continuing to breastfeed, Week 3 exhibited a return to the grandmother (25%) and husband/male significant other (21.8%) as the most frequently identified support person. At the end of Week 3, eighteen mothers were included in the weekly data collection. Additional support persons for Week 3 included a great-grandmother (3.1%), a female friend (3.1%), and the mother herself (3.1%). These additional support persons were the same support persons identified by the mothers of Week 2. One infant (3.2%) was weaned at the end of Week 3, and the mother was no longer included in the weekly data collection.

There was a minor change in support for Week 4 with seventeen mothers included in the weekly data collection. The husband/male significant other (25%) and the grandmother (21.8%) changed slightly with the great-grandmother (3.1%) remaining

constant and the mother herself increasing by one mother (6.2%). At the end of this week, one infant (3.2%) was weaned, and the mother was no longer included in the weekly data collection.

A decrease in husband/male significant other support (from 35% to 18.7%) characterized Week 5 with minimal change in other support persons. At the end of this week, fifteen mothers were included in the weekly data collection. The grandmother (21.8%), the great-grandmother support (3.1%), and the mother herself (6.2%) remained constant during this week with only a sister (3.1%) as a change. At the end of this week, 2 infants (6.4%) were weaned, and the mothers were no longer included in the weekly data collection.

The final week, Week 6, illustrated a considerable shift in the grandmother support from 21.8% to 12.5%. The support of the husband/male significant other (18.7%), the great-grandmother (3.1%), and the mother herself (6.2%) remained constant for this week. Additionally, a sister (3.1%) and a friend (3.1%) were identified for this week. No infants were weaned this week, and the fifteen remaining mothers were included in the weekly data collection.

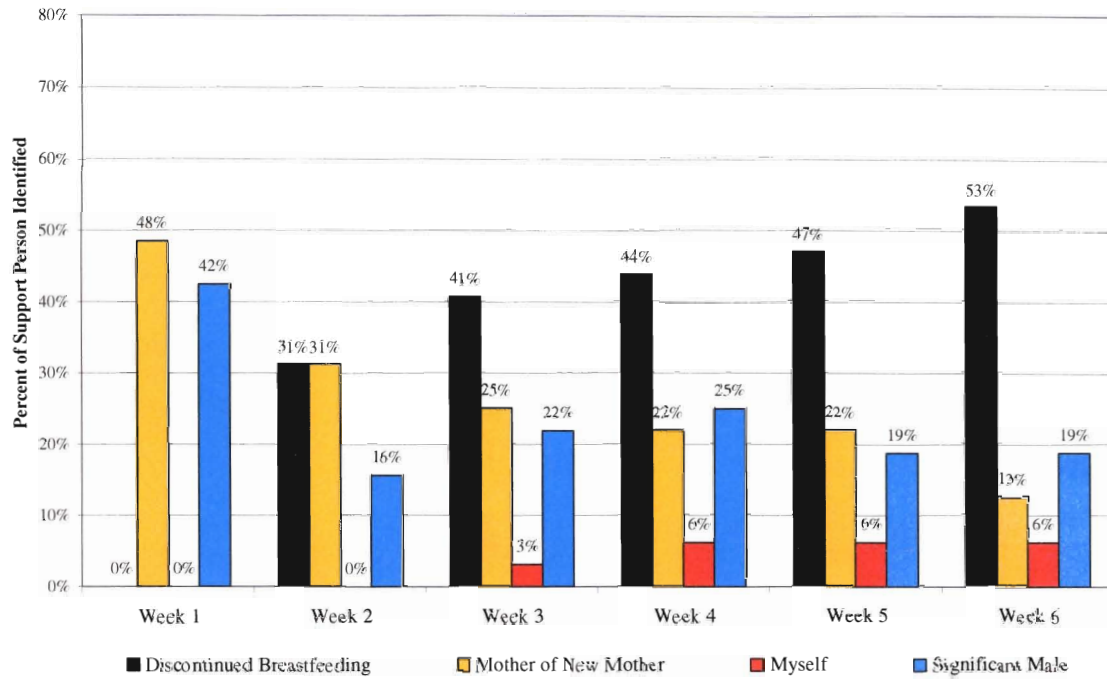


Figure 4

Identified Weekly Support Person and Number Discontinuing Breastfeeding – Low Income Group

Not-Low Income Mothers and Weekly Identified Support Person

The mothers in the not-low income group identified seven different persons who were influential in their infant feeding decisions during the six week postpartum period or when breastfeeding was discontinued. Figure 5 illustrates weekly changes in the support system and the number of mothers that discontinued breastfeeding each week.

At the end of the first week, all 54 mothers were included in the weekly data collection. The most frequently identified support person was the husband/male significant other (72.2%) with the grandmother (20.3%) as the second most identified support person. Additional support persons included a sister (5.5%) and a Certified Lactation Consultant (1.8%). Four infants (7.4%) were weaned at the end of the first week, and their mothers were no longer included in the weekly data collection.

Week 2 showed a variation in the identified support persons of the mothers. With a small number of mothers weaning their infants, the support system shifted with a decrease in the husband/ male significant other (72.2% down to 59.2%) and a slight shift from the grandmother (20.3% down to 18.5%). More mothers identified a female friend (7.4%) and one mother identified herself (1.1%) as her most supportive person. Three mothers (5.5%) identified a Certified Lactation Consultant as their most supportive person. At the end of Week 2, fifty mothers were included in the weekly data collection, and three (5.5%) infants were weaned.

Week 3 was characterized by a shift back to the husband/male significant other from 59.2% to 64.8%. The support from the grandmother continued to decline with a change from 18.5% down to 14.8%. The additional support persons identified included a

female friend (1.8%), a Certified Lactation Consultant (1.8%), and two mothers identifying themselves (3.7%) as their most supportive person. At the end of Week 3, forty-seven mothers were included in the weekly data collection, and no infants were weaned.

Another shift in the support system occurred at Week 4 with an increase in the husband/male significant other (68.5%) and friend (5.5%) support person. The support of the grandmother had the greatest decline from 14.8% to 9.2%. The mothers also identified a Certified Lactation Consultant (1.8%) and the mother herself (1.8%) as the most supportive person. At the end of Week 4, forty-five mothers were included in the weekly data collection, and 2 (3.7%) infants were weaned.

An additional shift in the support system occurred at Week 5 with an increase in the grandmother support (14.8%) and a previously not identified support person, a pediatrician (1.8%). The husband/male significant other (61.1%) and the friend (3.7%) declined and the mother herself (1.8%) remained the same. At the end of Week 5, forty-five mothers were included in the weekly data collection, and no infants were weaned this week.

The sixth week of support data showed a slight increase in the husband/male significant other support (62.9%) and the mother herself (3.7%). There was a slight decrease in the grandmother support (12.9%) and the friend support (3.7%) remained the same. At the end of Week 6, forty-four mothers were included in the weekly data collection, and one infant was weaned.

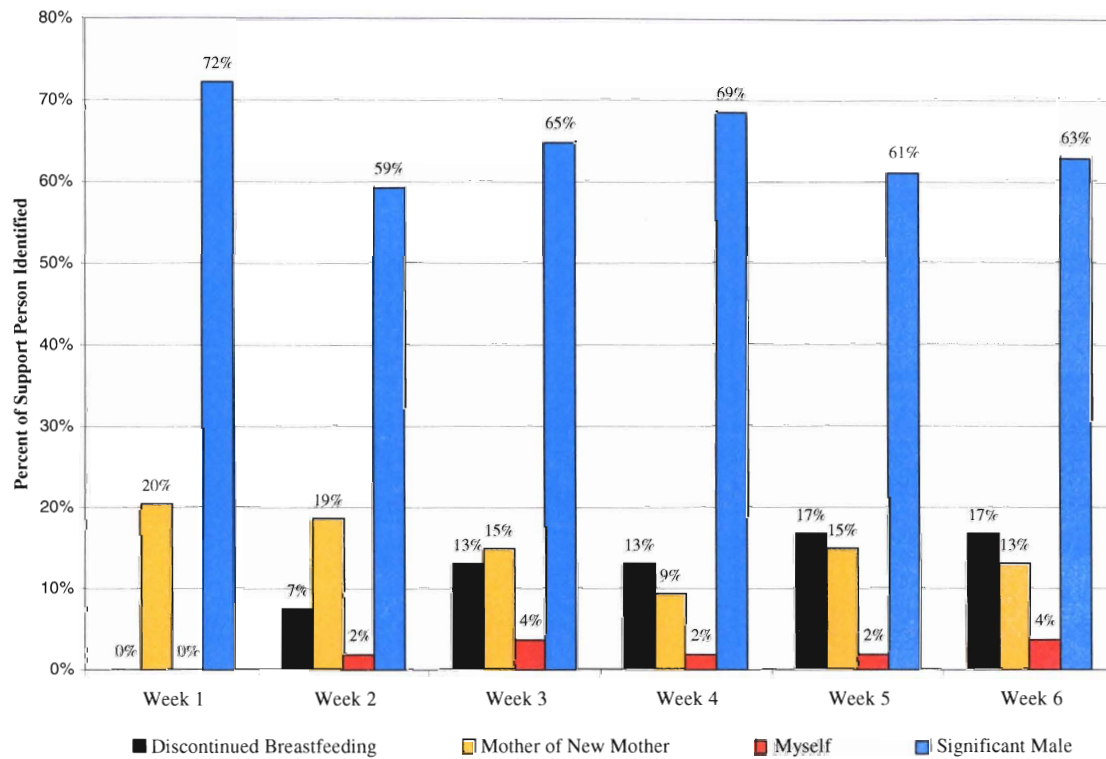


Figure 5

Identified Weekly Support Person and Number Discontinuing Breastfeeding – Not-Low Income Group

Most Influential Person with Infant Feeding Decisions

The final questions for this study requested that the mother identify the person or resource they considered to be the most influential in their infant feeding decisions and to describe the influence of that person or resource. Mothers were asked these questions whether the infant had been weaned or breastfeeding was continuing at six weeks postpartum. Some mothers expressed themselves quite readily while others gave short and direct answers. Finally, mothers were asked to share any additional information they wished to reveal about their experience.

Low Income Mothers Most Influential Person and Comments

All mothers contacted during the postpartum period were asked to identify the person or resource considered to be the most influential in their infant feeding decisions. Whether the infant was weaned prior to six weeks or the infant was continuing to breastfeed at six weeks, each of the mothers was asked these questions. The two most influential persons for this group were the grandmother (43.3%) and the male significant other (50%). At the end of the six week postpartum period, 15 of the initial 34 mothers were continuing to breastfeed (48.5%) and 17 (51.5%) mothers were no longer breastfeeding.

Selected positive comments from the mothers are noted. Comments recorded here are from mothers that continued to breastfeed through the first six weeks postpartum.

“My mom and sister were very supportive, but I would say my mom was the most supportive.”

“My fiancé was wonderful with support and encouragement.”

“My family was supportive, but I was the most strong for me and my baby.”

“My mom was terrific – I could not have done it without her.”

“My aunt was the best – she was really helpful and encouraging. I could not have done it without my grandmother either. Most of the old people around me were the most encouraging. Nobody my age seemed to really care as long as I was doing what I wanted to do.”

“My husband – he was really great and encouraged me when I was down.”

Selected negative comments from the mothers are noted. All negative comments are from mothers who weaned their infants prior to the end of the first six weeks postpartum.

“I quit breastfeeding. It was just too difficult, and my husband was not helpful at all. He was actually critical of me. It was just too much.”

“My boyfriend said it was better that I give the baby a bottle since she wasn’t sleeping real good, and she seemed hungry all the time.”

“I just didn’t have enough milk. My husband said I should quit so I did.”

“The baby just wasn’t gainin’ weight quick enough, so the doctor said I needed to switch to the bottle. I don’t think I was making enough milk.”

“My boyfriend was supportive, but I just switched to the bottle because it was easier. I didn’t talk to nobody about switching.”

“The baby wasn’t latching on real good, and the Nurse Practitioner wasn’t helpful at all. She didn’t seem to know anything about breastfeeding, or how to help me with the problems I was having.”

Not-Low Income Mothers Most Influential Person and Comments

All mothers contacted during the postpartum period were asked to identify the person or resource considered to be the most influential in their infant feeding decisions. Whether the infant was weaned prior to six weeks or the infant was continuing to breastfeed at six weeks, each of the mothers was asked these questions. The two most influential persons in this group were the male significant other (85.1%) and the grandmother (12.9%). At the end of the six week postpartum period, 44 of the initial 54 mothers were continuing to breastfeed (81.5%) and 10 (18.5%) mothers were no longer breastfeeding.

Selected positive comments from the mothers are noted. Comments recorded here are from mothers that continued to breastfeed through the first six weeks postpartum.

“My husband was the most supportive, but after a while my entire family bought into my breastfeeding the baby, and they all got more supportive.”

“My husband was the best. He was really supportive and encouraging. The lactation consultant was great helping me to get the latch-on technique perfected.”

“My husband was very supportive. Even my mom and grandmom were great.”

“I had so much encouragement from so many people. It’s hard for me to pick just one person, but I guess I would put my husband at the top. He was so good to me.”

“The baby’s father was the most supportive of my breastfeeding, but all of my family and friends were great and very positive. Most of the negative stuff was about bottle feeding.”

“My husband was my biggest supporter, but my sister really helped me out when things got a little rough in the second week. My

family wanted to keep the baby and were disappointed that I was breastfeeding, but now they are ok with it. It just seems so natural now. I can't imagine doing anything else."

Selected negative comments from the mothers are noted. All negative comments are from mothers that weaned their infants prior to the end of the first six weeks postpartum.

"The baby just seemed not to be getting enough to eat and was not latching on very good. The pediatrician just said to go ahead and stop, so I did."

"I decided to go back to work, so I quit for the convenience of the babysitter."

"I just didn't have enough milk to satisfy the baby, so I just quit. I didn't ask anybody about it."

"I developed severe headaches and just could not deal with the breastfeeding. The pediatrician recommended that I quit."

"I wasn't really making enough milk for him, so I started adding cereal to the milk. It was getting too hard with my mom keeping him. Formula was just easier for my mom, so I quit."

"I just wasn't making enough milk to satisfy the baby, so my pediatrician told me to just switch to the bottle. The baby is sleeping better now and seems more satisfied."

Summary

In this chapter, results from the data analysis were presented. Descriptive statistics characterized the sample and the two groups and illustrated a comparison of the two groups. Research questions 1 and 2 were examined using logistic regression with a finding that income level did affect the relationship between the personal support matrix and

sustained breastfeeding. Research question 3 was examined using a simple repeated measures analysis with a finding that between subjects, income level did have an effect on the personal support matrix score. However, there was no statistically significant difference between subjects for the interaction of time and income. The weekly support data characterize the personal support matrix over time and identified changes in the system. While these data did not answer the research questions directly, they provided trends as to the changes in the support system during the initial postpartum weeks for both groups of mothers.

CHAPTER 6 DISCUSSION AND CONCLUSION

The results of this study showed that income level had an effect on the relationship between the personal support matrix and sustained breastfeeding. The logistic regression analysis of Research Questions 1 and 2 revealed that there was a statistically significant difference by income in number of breastfeeding days and the personal support matrix scores. The repeated measures analysis for Research Question 3 showed a statistically significant difference between the groups in the personal support matrix scores; however, the analysis did not show a statistically significant difference between the participants from Time 1 of the personal support matrix score and Time 2.

Discussion

Characteristics of the Sample

The sample of women in this study was restricted to mothers who were experiencing their first delivery of a term infant and had made a prenatal decision to breastfeed their infants. These mothers confirmed their breastfeeding decision by initiating breastfeeding within the first eight hours postpartum. Minimal racial diversity was in the sample with most mothers identifying themselves as Caucasian. This lack of diversity may simply reflect the demographic of the area and demonstrate that a lower number of non-Caucasian women were experiencing their first term pregnancy and delivery. The age range for the sample was from 18 to 43 years. Education levels of the sample were diverse.

These levels ranged from a 10th grade high school education to twelve years of post high school education. Most of the mothers were employed prior to delivery but plans for the mothers' return to employment at six weeks postpartum varied between individuals. The low income group had a high percentage of mothers planning to return to employment while the not-low income group had a higher percentage of mothers not planning to return to employment. The significant support person in the immediate postpartum period was typically the male significant other, and the grandmother (mother of the new mother) was the second most frequently named support person. When the final interview was conducted, whether at six weeks or when breastfeeding was discontinued, the significant support person had changed moderately. In the low income group, the male significant other was still the most named support person but the grandmother was more frequently named than at the initial interview. Additionally, other significant females were named more frequently in the low income group than in the not-low income group. In the not-low income group, the male significant other remained the most frequently named support person at the initial interview as well as the six week interview or when breastfeeding was discontinued. These sample characteristics provide evidence of the demographic differences between the two groups and confirm prior research that income level, age, education level, and returning to employment all have been implicated as factors for discontinuing breastfeeding prior to six weeks postpartum (AAP, 2005; Barton, 2001; Bentley et al, 1999; Dennis 2002a; DHHS, 1999; Lewallen et al, 2006; Li et al, 2005; Loiselle et al, 2001; Pugh, Milligan, & Brown, 2001; Shepherd, Power, & Carter, 2000).

Research Question Findings

The Personal Support Matrix (PSM) questionnaire was used to answer Research Questions 1 and 2 and logistic regression was used to analyze the findings. The purpose of the PSM was to attempt to predict the continuation of breastfeeding up to 42 days and the personal support matrix score by income level. Income level was shown to be a factor in the continuation of breastfeeding through the first six weeks of life. After the second week contact a third of the low income mothers had weaned their infants, and only four of the not-low income mothers had weaned their infants. At the end of the study, over half of the low income infants had been weaned and less than a fourth of the not-low income infants had been weaned. Differences also existed by income in the personal support matrix scores. The initial scores were typically lower for the low income mothers. These results demonstrated that low income mothers had a different perception of the support of their support matrix, and this perception could have influenced their breastfeeding goals and subsequent breastfeeding outcomes.

The PSM questionnaire was developed to describe and quantify the support system that was in place at the beginning of the breastfeeding experience. The PSM score attempted to determine the perception of the breastfeeding environment as either supportive or discouraging for the breastfeeding mother. The PSM score was used to answer Research Question 3 to determine if changes occurred in the PSM score from the initial interview to the six week interview or when breastfeeding was discontinued. This factor was also delineated by income level and a difference was found in the scores between the two groups. The initial scores were typically lower for the low income

mothers. This result may indicate that the perception of the mother of her support system being negative toward breastfeeding. Furthermore, the results from the analysis of the data demonstrated that the personal support matrix score did not change significantly from the initial interview until either the six week interview or when breastfeeding was discontinued. This result may indicate that the support system that is in place at delivery is not likely to change significantly over time and may be another factor in early weaning.

Qualitative Data Report

Qualitative data were collected from the mothers at the six week postpartum interview or when breastfeeding was discontinued. Mothers reported both supportive and discouraging comments from members of their support systems. Positive and encouraging comments from those in the support matrix were typically affirming of the mother, of her efforts to continue breastfeeding through difficulties, and pride in her ability to provide excellent nutrition to the infant. Positive and encouraging comments from those in the support matrix could have indicated an understanding of the benefits of breastfeeding to the mother and child. The positive comments also may indicate a desire to those in the support matrix to assist the mother in accomplishing her breastfeeding goals. Most of the mothers reporting positive comments were continuing to breastfeeding at 42 days.

Negative or discouraging comments also were experienced by mothers in this sample. These comments were typically negative toward the act of breastfeeding or the capability of the mother to maintain breastfeeding. Negative or discouraging comments may have been an expression of a lack of understanding of the needs of a breastfeeding mother, a lack of knowledge, or an expression of stress regarding the transition to

parenthood. Typically these comments were experienced by mothers who weaned their infants before 42 days. The qualitative data demonstrated trends in verbal expressions of support or discouragement that mothers experienced during the study period.

Pilot Study and Dissertation Study Comparison

A review of the pilot study results showed trends that income level did not affect sustained breastfeeding for the sample. A further inquiry into this trend showed that at the time the WIC breastfeeding peer counselor had a significant role in the promotion and support of breastfeeding to the low income women presenting for services at the city health department. This role of promotion and support was extended to the surrounding four counties. The pilot study provided evidence that the WIC breastfeeding peer counselor had a positive influence on the promotion and maintenance of sustained breastfeeding with women utilizing the WIC services in the area.

At the beginning of data collection for the dissertation study, the researcher met with the WIC breastfeeding peer counselor to inquire about any changes in the WIC services. The service hours were decreased to about half of what they had been for the pilot study, but the geographical area to be traversed remained the same. No additional breastfeeding peer counselors were appointed to compensate for the change in hours (C. Clark, personal communication, September 14, 2006). When the analysis of the data from the study was completed, the researcher met again with the peer counselor to share the findings. The peer counselor stated that she was “not surprised” at the high number of low income mothers that had discontinued breastfeeding. She expressed disappointment that promotion and support of breastfeeding for low income women was diminished. She also

stated that that more persons in the support matrix needed to be included in prenatal and postpartum breastfeeding education to possibly reverse the trend of early termination of breastfeeding in this population (C. Clark, personal communication, December 10, 2006).

Another aspect for comparison between the pilot study and the dissertation study was the difference in the services of the lactation education group at the hospital facility. During the pilot study, lactation educators and lactation consultants were available eight hours a day, Monday through Friday, and six hours on Saturday and Sunday. Each breastfeeding mother would be visited during her postpartum stay, regardless of her experience with breastfeeding, and lactation issues would be discussed. Also, mothers were offered the service of post discharge consultations for any difficulties that were encountered. Additionally, all mothers were called by the third day after discharge to discuss breastfeeding status and to address any problems or difficulties. Mothers with difficulties were referred to either their health care providers, a community lactation consultant, or were invited to return to the hospital for a consultation.

Before the dissertation study data collection began, there was a change in the lactation services offered to the mothers. Lactation educators and lactation consultants were limited to four hours a day Monday through Friday, and mothers who delivered on weekend days did not have lactation services from the lactation group. The responsibility for lactation education and assistance became the duty of the mother/baby nurse. Follow up calls by the third day after discharge continued as well as postpartum consultations except on weekend days. The changes in the WIC services and the lactation services at the hospital may have been factors in the findings from the dissertation study; however, during

the data collection an overwhelming majority of mothers stated that most professionals were supportive of breastfeeding.

Study Limitations

This research study had several limitations. Prior to the commencement of the study, it was recognized that the tool used to examine the PSM was not shown to be valid or reliable. Additionally, there was no assumption that the results from this study would provide validity or reliability of the PSM questionnaire. However, in the statistical analysis, the PSM score gave evidence of statistical significance in the logistic regression model for Research Question 1 and 2. The repeated measures analyses for Research Question 3 did provide evidence that the PSM questionnaire was able to predict breastfeeding outcomes. There was a statistically significant difference between the groups by income level; however, additional results from the analysis did not show a statistically significant difference between the subjects for the interaction of time and income. Furthermore, the results from the analysis of the data demonstrated that the personal support matrix score could predict by income level the probability of a mother continuing to breastfeed up to the sixth week postpartum. Although the support density question in the Humenick et al. (1998) study demonstrated good reliability and validity in predicting breastfeeding outcomes, one question is not a scale. Examining the ability of additional questions to function as a scale and to determine if income level may affect the outcome of sustained breastfeeding was useful in providing a basis for future research. Another limitation of this study was that the study inclusion criteria of ≥ 37 weeks for the infant were set prior to the recent research findings regarding potential near term infant

compromise (Wang, Dorer, Fleming, & Catlin, 2004; Engle, 2006; Raju, 2006; . It is acknowledged that this criterion would be considered and adjusted in any future research studies.

Longitudinal studies have numerous potential limitations. The length of time required to carry out the research can lead to limitations, including subject attrition, possible potential changes in the meaning of the measures used, history, information diffusion, and potential problems of internal and external validity (Pedhazur & Schmelkin, 1991). In this study, subject attrition only occurred in the low income group. No subject attrition existed in the not-low income participants. Also, this study had very minimal racial diversity in the sample. The lack of racial diversity limits the generalizability of the study to other populations. Furthermore, most participants readily answered the weekly data collection questions, but few gave long explanations or shared extensive additional information about their breastfeeding experiences. Additionally, some of the participants voiced concerns about breastfeeding issues, and the researcher recommended other sources of answers to these questions. Consequently, a few participants inquired as to why the researcher could not answer their questions and voiced some frustration over the researcher's lack of extensive answers to their breastfeeding questions.

Implications for Nursing Practice

The American Academy of Pediatrics (2005) has stated, "Peripartum policies and practices that optimize breastfeeding initiation and maintenance should be encouraged. Education of both parents before and after delivery of the infant is an essential component of successful breastfeeding. Support and encouragement by the father can greatly assist the

mother during the initiation process and during subsequent periods when problems arise” (AAP, 2005, p. 498). This statement by the Academy acknowledges that the support and encouragement of the father of the baby is crucial to the maintenance of breastfeeding. The statement also implies that prenatal support extends to the postpartum period and can be essential to the initiation and maintenance of breastfeeding.

Implications for nurses caring for mothers and newborns include several issues. When mothers who have planned to breastfeed present at the hospital for delivery, they may or may not have a support system in place. Some mothers may have a unique support system that functions in ways that not typically recognized. Nurses and health care professionals may assume that a support system is in place and not consider evaluating the mother unless there is cause for concern. The postpartum period is a time of great transition for the mother, her infant, and her surrounding support system. If members of the support system have not been involved with prenatal education or pregnancy care, there is little opportunity to intervene with educational sessions or teachable moments.

Nurses assessing the support system of breastfeeding mothers with the PSM questionnaire can design a more comprehensive follow-up program if the support system scores are low. This plan could include consulting with lactation professionals, home visits, or making arrangements for peer counselor visits. The weekly phone calls made during this research study were considered as a possible cause of the Hawthorne effect on the results of this study. The Hawthorne effect is the tendency of the participants of a study to change their behavior merely because they are in a research study (Vogt, 1999). The Hawthorne effect could have influenced the breastfeeding continuation responses of the

mothers; however, if this effect had been strong, it would be logical to presume that a higher percentage of mothers would have reported breastfeeding the entire 42 days of the study. Almost half of the sample reported breastfeeding continuing through 42 days. Thus, the Hawthorne effect most likely had a minimal impact on the study outcomes.

An additional implication for nursing should be to enhance the support system of the mother by encouraging the inclusion of the significant other in the prenatal education and consultation sessions regarding breastfeeding. Nurses are frequently identified as knowledgeable health care professionals and providing accurate and understandable information to the mother and her support person is expected. By including the support person in the prenatal education of the mother, the understanding of the process of breastfeeding would be increased for both. This understanding would most likely increase the encouragement from the support person toward the mother. All types of support resources can be recommended to the mother if nursing personnel have knowledge of the resources available in the community. Nurses are respected as agents of health care knowledge and are frequently called upon to recommend reliable health care resources. Nurses that are involved in maternal/newborn care should be aware of the variety of support resources offered in their communities to assist and support breastfeeding mothers.

Implications for Future Research

Breastfeeding initiation rates in the United States continue to gradually increase, but sustained breastfeeding has not shown the same improvement. The initial findings of the predictability of the personal support matrix questionnaire were useful in providing a basis for future research. The reliability and validity of the questionnaire would need to be

tested on multiple groups. Additionally, the questionnaire would need to be tested for reproducibility in various populations to confirm reliability. Furthermore, the questionnaire needs to be tested on groups with greater racial diversity. By developing a brief, in-hospital postpartum predictive breastfeeding support tool, practitioners would be able to assess the strength and type of support system that may or may not already be in place for the mother.

Conclusion

First time mothers may have many concerns regarding their possible success with breastfeeding. Having persons surrounding them that are supportive of their breastfeeding goals is crucial to not only the initiation of breastfeeding but also to the sustaining of breastfeeding. The life long health benefits to mothers and infants cannot be overlooked and nurses and other health care providers can play a vital role in supporting and encouraging new mothers. If nurses are able to evaluate the support system of the breastfeeding mother prior to discharge from the hospital, they may be able to assist the mother and her support person with breastfeeding education and identify available community breastfeeding resources. Nurses can also be proactive in the community by encouraging workplace support for breastfeeding mothers and participating in educational campaigns that clarify the needs of working breastfeeding mothers. Nurses who care for mothers and infants are in excellent positions to assist these mothers and infants in achieving a lifetime of health benefits from sustained breastfeeding. In conclusion, nurses continue to be respected members of the medical community who are in the best position to share accurate information with individuals, groups, and communities regarding the

benefits of breastfeeding and to communicate how mothers can sustain breastfeeding for longer periods of time.

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APPENDIX A

Income Guideline for Virginia WIC and Medicaid

Virginia WIC Income Guidelines April 18, 2005 to June 30, 2006

Economic Unit*	Annual Income
1	17,705
2	23,736
3	29,767
4	35,798

*Economic Unit – The family unit or economic unit may consist of a husband and wife and their minor children, a single individual with his/her minor dependents, or an individual with no minor dependents.

<http://www.vhd.virginia/CHS/documents/guidancedocuments-09-02-04.doc>

Eligibility Requirements for Medicaid participation:

Medicaid eligibility requirements by Annual Income and Federal Poverty Levels, 2005, are \$24,135 for a pregnant woman and a family income of \$21,400 for a family with an infant. Additional Medicaid Eligibility Requirements: Current card or notice of eligibility, the person is listed on the Medicaid printout, or by a documented call to the Audio Response System (ARS) or other automated Medicaid verification systems. A copy of the card shall be made at the time of the eligibility determination or the information on the card may be documented in the applicant's record. Similarly, information obtained from the Medicaid printout or verification system may be documented in the applicant's record. Babies born to mothers on Medicaid do not receive automatic eligibility. Although the applicant may be covered by Medicaid, the remaining family members do not receive automatic eligibility status.

Appendix B

Research Study Comparison Tables

Table 1. A Comparison of Selected Studies of Low Income Women and Infant Feeding Practices

	Study 1	Study 2	Study 3
Authors	Corbett (2000)	Zimmerman & Guttman (2001)	Barton (2001)
Design	Ethnographic	Descriptive	Descriptive/Exploratory
Sample	n = 10	n = 154	n = 52
Measures	Field Study/In-Depth Interviews	Survey	Questionnaire
Low Income Definition	All participants met criteria for, and were participating in, WIC and/or Medicaid	Student's t-test, paired t-test and Chi Square analysis	Student's t-test, Chi Square analysis
Sustained Breastfeeding	All participants met criteria for, and were participating in WIC or Aid to Families with Dependent Children	87% met criteria for, and were participating in, WIC and/or Medicaid	All participants met criteria for participation in WIC or Aid to Families with Dependent Children
Findings	One infant was exclusively breastfed All other infants were formula fed	67 breastfed infants (43%) 31 had weaned by Week 13 Longest BF duration was 34 weeks (1 mother)	25 (48%) BF at Birth 15 (29%) BF for one month 9 (17%) BF 4 to 6 months
Limitations	Infant feeding practices were learned from other relatives or from caring for younger siblings Friends and family were more important sources of health information than health care providers Family systems were not supportive of breastfeeding	Reasons for discontinuing breastfeeding: Lack of opportunity to breastfeed No time or privacy Mother felt tied down Lifestyle issues No infant feeding information seeking activity prior to birth of baby Others not able to help Younger and African American mothers more likely to formula feed	Reasons for discontinuing breastfeeding: Baby always hungry Not enough milk No privacy to BF Too much trouble Mother embarrassed about breast appearance Advice from grandmother or mother-in-law
Recommendations	Small sample size Limited generalizability Health care providers should assist mothers who decide to breastfeed with more comprehensive support	Included mothers not breastfeeding current infant Most mothers made decisions based on misinformation Need for encouraging information seeking activities	Participants included teen mothers (age 16-18) and advanced maternal age mothers (35-38) Nurses need awareness of infant feeding practices of population served and educational programs tailored to address concerns

Table 2. A Comparison of Selected Studies on Sources of Influence on Low Income Women Regarding Breastfeeding

	Study 1	Study 2	Study 3	Study 4
Author(s)	Schmidt & Sigman-Grant (1999)	Raisler (2000)	Meyerink & Marquis (2002)	Sharps et al. (2003)
Design	Qualitative/Focus Groups	Qualitative/Focus Groups	Descriptive - Survey	Case-Control
Sample	n = 34	n = 42	n = 150	n = 210
Measures	Content Analysis	Content analysis Coding, themes, group ideas, and counting of recurring themes	Logistic linear regression, Chi square, Multiple linear regression	Logistic regression analysis and t-tests
Low income Definition	Participation in WIC	Participation in WIC	Participation in WIC, Food Stamp Program, Temporary Assistance for Needy Families, or Medicaid	No or inadequate prenatal care (less than 5 prenatal visits or care after 24 weeks gestation)
Sustained Breastfeeding Findings	Not evaluated Breastfeeding information dissemination mechanisms informal Channels of information include mother of infant, family members and health care providers Major barriers to breastfeeding identified by the father -- mother breastfeeding in public and limited bonding with infant Mother of infant defined as the major channel of breastfeeding information and information from "others" added to that information	No report on specific duration of breastfeeding Prenatal professional contact typically positive Hospital professional contact supportive/negative Postpartum professional contact minimal WIC supportive peer counselors effective and supportive Formula readily available from WIC Modesty issues important Returning to work prohibitive of continued breastfeeding	Mean duration of breastfeeding 3.5 weeks Low initiation rates n = 61 Low duration beyond 4 weeks n = 36 Three variables found significant to breastfeeding initiation: Previous familial exposure to breastfeeding Previous breastfeeding experience Premature birth of infant Family support found to be significant to duration	BF longer than 8 weeks n = 36 Maternal self-motivation seems to surpass informal or formal support systems Lack of entry to prenatal care may address conflicting issues related to limited resources Mother-infant relationship may play a more significant role in breastfeeding duration Longer duration of breastfeeding was correlated with stronger beliefs in disease prevention and health promotion
Limitations	Low response rate/limited racial diversity Disparity between maternal/paternal commitment to breastfeeding	Focus groups conducted in WIC offices, Researcher identified as a midwife, Group effect could influence responses	Influence of spouse/partner not clarified Mothers without previous experience not differentiated	Lack of racial diversity
Recommendations	Programs needed that will involve fathers earlier in pregnancy	Methods needed to improve personal contact with mothers in the postpartum period	Inclusion of family members in prenatal educational programs	High risk populations need collaborative support to increase breastfeeding initiation

Table 3. A Comparison of Studies on Interventions Involving Sources of Influence and Support

	Study 1	Study 2	Study 3
Author(s)	Khoury, Mitra, Hinton, Carothers, & Sheil (2002)	Pugh, Milligan, Frick, Spatz, & Bronner (2002)	Ryser (2004)
Design	Evaluative	Experimental	Experimental
Sample	n = 514	n = 41	n = 54
Measures	Univariate frequencies, t-tests, Chi square, RM ANOVA	Descriptive Statistics Cost Analysis	Descriptive/Inferential Statistics RM ANOVA, Chi Square
Low income Definition	Participation in WIC	Receiving Federal Medical Financial Assistance/Support	Medicaid eligible
Sustained Breastfeeding	Not evaluated	Increased breastfeeding duration in intervention group	Increased breastfeeding intention in intervention group
Findings	Video included diverse group of women and addressed barriers to breastfeeding 88% of intervention women watched the video alone in their homes Groups similar in perceptions of breastfeeding barriers prior to video intervention Major barriers identified were embarrassment, time constraints and lack of support Intervention participants demonstrated a more positive perception toward barriers	Support of community health nurse/peer counselor increased breastfeeding duration Breastfeeding at 3 months 45% of intervention group 24% of control group Breastfeeding at 6 months 30% of intervention group 15% of control group Higher monetary cost of intervention Cost effectiveness of program seen when related to use of essential health care services	Initially 68% of group undecided on infant feeding method At pretest both groups had high negative attitudes toward breastfeeding At posttest, intervention group had high positive attitudes toward breastfeeding and control group had high negative attitudes Significant increase in positive breastfeeding attitude was seen in the intervention group.
Limitations	Study included mothers with previous breastfeeding experience Participants had received other breastfeeding information	Total costs of intervention high compared to control group Indirect costs were underestimated	Intervention for mother only Small sample size More women in intervention group had previous breastfeeding experience
Recommendations	Interventions that target social barriers to breastfeeding may increase breastfeeding rates	Intervention to provide culturally sensitive support increased breastfeeding duration	Best Start program increased breastfeeding intention in the intervention group

Appendix C

Data Collection Forms

The Effect of Income Level on the Relationship Between the
Personal Support Matrix and Sustained Breastfeeding
Data Collection Forms

Initial Statement: I am going to ask you questions about how much support you feel that you have from friends, family members, co-workers, and professionals about your decision to breastfeed. The answer choices are most, some, or none.

PSM Questions	MOST 2	SOME 1	NONE 0
How many of your family members breastfed their children?			
How many of your family members encouraged you to breastfeed?			
*How many of your family members discouraged you to breastfeed?			
How many of your family members would you feel comfortable contacting if you have a breastfeeding question?			
How many of your friends breastfed their children?			
How many of your friends encouraged you to breastfeed?			
*How many of your friends discouraged you to breastfeed?			
How many of your friends would you feel comfortable contacting if you have a breastfeeding question?			
How many of your co-workers breastfed their children?			
How many of your co-workers encouraged you to breastfeed?			
*How many of your co-workers discouraged you to breastfeed?			
How many of your co-workers would you feel comfortable contacting if you have a breastfeeding question?			
How many doctors, nurses, or peer counselors do you know that breastfed their children?			
How many doctors, nurses, or peer counselors encouraged you to breastfeed?			
*How many doctors, nurses, or peer counselors discouraged you to breastfeed?			
How many doctors, nurses, or peer counselors would you feel comfortable contacting if you have a breastfeeding question?			

* **reverse scoring**

Demographic Data Form

Name:		
What is your age?		in years
Do you participate in WIC or Medicaid?	Yes	No
How do you describe your race or ethnic group?		
Hispanic	Yes	
African American	Yes	
Caucasian	Yes	
White, non-Hispanic	Yes	
Black, non-Hispanic	Yes	
Asian		
Are you living with a partner or significant other?	Yes	No
How many years of school have you completed?	#	
Were you employed prior to delivery?	Yes	No
Do you plan to return to employment after six weeks?	Yes	No
Could you please give me up to three phone numbers where I may reach you to follow up?		
Name of contact and phone #		
Name of contact and phone #		
Name of contact and phone #		
Others?		

Weekly Breastfeeding Questions

Statement: I am going to ask you questions about your breastfeeding and who was most supportive of your breastfeeding this week.

Week	Question	Yes**	No*	Support Person	# BF Days
Week 1 Date: _____	Are you breastfeeding your baby? Who would you say was the most supportive of your breastfeeding this week?				
Week 2 Date: _____	Are you breastfeeding your baby? Who would you say was the most supportive of your breastfeeding this week?				
Week 3 Date: _____	Are you breastfeeding your baby? Who would you say was the most supportive of your breastfeeding this week?				
Week 4 Date: _____	Are you breastfeeding your baby? Who would you say was the most supportive of your breastfeeding this week?				
Week 5 Date: _____	Are you breastfeeding your baby? Who would you say was the most supportive of your breastfeeding this week?				
Week 6 Date: _____	Are you breastfeeding your baby? Who would you say was the most supportive of your breastfeeding this week?				

**Yes – a response of “yes” will indicate that the infant is receiving breastmilk at least once a day either by suckling at the breast or breastmilk that has been pumped and given by bottle.

*No—a response of “no” indicates that the infant is not receiving any breastmilk

Six Weeks Follow-Up or whenever they stop breastfeeding

PSM Questions	MOST 2	SOME 1	NONE 0
How many of your family members breastfed their children?			
How many of your family members encouraged you to breastfeed?			
*How many of your family members discouraged you to breastfeed?			
How many of your family members would you feel comfortable contacting if you have a breastfeeding question?			
How many of your friends breastfed their children?			
How many of your friends encouraged you to breastfeed?			
*How many of your friends discouraged you to breastfeed?			
How many of your friends would you feel comfortable contacting if you have a breastfeeding question?			
How many of your co-workers breastfed their children?			
How many of your co-workers encouraged you to breastfeed?			
*How many of your co-workers discouraged you to breastfeed?			
How many of your co-workers would you feel comfortable contacting if you have a breastfeeding question?			
How many doctors, nurses, or peer counselors do you know that breastfed their children?			
How many doctors, nurses, or peer counselors encouraged you to breastfeed?			
*How many doctors, nurses, or peer counselors discouraged you to breastfeed?			
How many doctors, nurses, or peer counselors would you feel comfortable contacting if you have a breastfeeding question?			

- reverse scoring

Additional questions for final interview

1. As you look back over the past 6 weeks, can you identify a person or resource that has been the most influential in the decisions you have made regarding your infant-feeding choice and what did that person or resource do or say that influenced you the most?

2. Is there anything else you would like to share with me about your experience?

Appendix D

Letters of Approval



DATE: July 31, 2006

TO: Martha W. Moon, RN, PhD, MPH
Integrative Systems
Box 980567

FROM: Ann Nichols-Casebolt, PhD .
Chairperson, VCU IRB Panel B
Box 980568

RE: **VCU IRB #: HM10412**
Title: The Effect of Income Level on the Relationship Between the Personal Support Matrix and Sustained Breastfeeding

Office of Research

Office of Research Subjects
Protection

BioTech Research Park Building One
800 East Leigh Street, Suite 114
P.O. Box 980568
Richmond, Virginia 23298-0568

804 828-0868
Fax: 804 827-1448
TDD: 1-800-828-1120

On July 27, 2006, the following research study was approved by expedited review according to 45 CFR 46.110 Category 7. This approval reflects the revisions received in the Office of Research Subjects Protection on July 25, 2006. This approval includes the following items reviewed by this Panel:

RESEARCH APPLICATION/PROPOSAL: NONE

PROTOCOL: The Effect of Income Level on the Relationship Between the Personal Support Matrix and Sustained Breastfeeding, Version July 24, 2006 (received 07/25/06)

- Appendix: Instruments (received 07/07/06)

CONSENT/ASSENT:

- Research Subject Information and Consent Form – A Study of Support for First-Time Mothers and Breastfeeding, Version July 24, 2006 (received 07/25/06, 3 pages)

ADDITIONAL DOCUMENTS:

- Flyer – “Congratulations” (received 07/25/06)

This approval expires on June 30, 2007. Federal Regulations/VCU Policy and Procedures require continuing review prior to continuation of approval past that date. Continuing Review report forms will be mailed to you prior to the scheduled review.

This Institutional Review Board is in compliance with good clinical practices (GCP) as defined under the U.S. Food and Drug Administration (FDA) regulations and the International Conference on Harmonization (ICH) guidelines. Virginia Commonwealth University is approved by DHHS to conduct human subjects research under a Federal Wide Assurance #FWA00005287. **All correspondence related to this research study must include the IRB protocol number and the investigator's name(s) to assist us in locating your file. Please note that the CCHR number is no longer valid, if applicable.**

The Primary Reviewer assigned to your research study is Emily Rossiter. If you have any questions, please contact Mrs. Rossiter at [redacted]; or you may contact Dana Andrews, IRB Coordinator, VCU Office of Research Subjects Protection, at [redacted].

Attachment – Conditions of Approval

Centra Health
Virginia Baptist Hospital

3300 Rivermont Ave., Lynchburg, VA 24503-2053
(434) 947-4000

July 21, 2006

Sandra M. Gossler, PhD (c), RN, IBCLC

Dear Ms. Gossler:

This letter is to give you expedited approval of the Centra Health IRB review of VCU IRB#HM10412 "The Effect of Income Level on the Relationship Between the Personal Support Matrix and Sustained Breastfeeding" for your completion of the dissertation research study here at Virginia Baptist Hospital.

Please let us know if we can be of further help.

Sincerely,

Thomas C. Jividen
IRB Chairman

TCJ/bb

Cc: Martha W. Moon and Amanda Hutchinson; Office of Research Subjects
Protection – MCV Campus; Virginia Commonwealth University; 800 E.
Leigh Street, Suite 114; P. O. Box 980568; Richmond, VA 23298-0568

Conditions of Approval:

1. Conduct the research as described in and required by the Protocol.
2. Obtain informed consent from all subjects without coercion or undue influence, and provide the potential subject sufficient opportunity to consider whether or not to participate (unless Waiver of Consent is specifically approved or research is exempt).
3. Document informed consent using only the most recently dated consent form bearing the VCU IRB "APPROVED" stamp (unless Waiver of Consent or Waiver of Documentation of Consent is specifically approved).
4. Provide non-English speaking patients with a translation of the approved Consent Form in the patient's first language. The Panel must approve the translated version.
5. Obtain prior approval from VCU IRB before implementing any changes whatsoever in the approved protocol or consent form, unless such changes are necessary to protect the safety of human research participants. Any departure from these approved documents must be reported to the VCU IRB immediately as an Unanticipated Problem (see #7).
6. Monitor all problems (anticipated and unanticipated) associated with risk to research participants or others.
7. **Report Unanticipated Problems (UPs)** following the VCU IRB requirements and timelines detailed in the VCU IRB Written Policies & Procedures available at http://www.research.vcu.edu/irb/wpp/flash/wpp_guide.htm#VIII-7.htm
8. Obtain prior approval from the VCU IRB before use of any advertisement or other material for recruitment of study subjects.
9. Promptly report and/or respond to all inquiries by the VCU IRB concerning the conduct of the approved research when so requested.
10. All protocols that administer acute medical treatment to human research subjects must have an emergency preparedness plan. Please refer to VCU guidance on Emergency Preparedness Plans available at <http://www.research.vcu.edu/irb/guidance.htm>.
11. The VCU IRBs operate under the regulatory authorities as described within:
 - a) U.S. Department of Health and Human Services Title 45 CFR 46, Subparts A, B, C, and D (for all research, regardless of source of funding) and related guidance documents.
 - b) U.S. Food and Drug Administration Chapter I of Title 21 CFR 50 and 56 (for FDA regulated research only) and related guidance documents.
 - c) Commonwealth of Virginia Code of Virginia 32.1 Chapter 5.1 Human Research (for all research).

VITAE

Sandra Mann Gossler was born 50 years ago in Virginia, United States. She earned a diploma from the Lynchburg General-Marshall Lodge School of Professional Nursing in 1978, a Bachelor of Science in Nursing from Liberty University in 1997, and a Master of Science in Nursing from the University of Virginia in 2001. While attending the University of Virginia, she was a recipient of the Theresa A. Thomas Nursing Fellowship Award. In 2001, she was certified by the American Nurses Credentialing Center as a Clinical Specialist in Community Health Nursing (APRN, BC). In 2002, she became an International Board Certified Lactation Consultant from the International Board of Lactation Examiners and became certified as a Certified Professional Childbirth Educator from the Council of Childbirth Education Specialists, Inc. In 2004, she was invited to membership in the Gamma Omega Chapter of Sigma Theta Tau International. She has published a review of Marsha Clarks' book *Selling Out Mothers and Babies* in the *Journal of Perinatal Education*. Over the past 29 years, Sandra has worked in Maternal/Child nursing and has been involved in community health education at the local hospital and in the community. She has had educational and teaching experiences in Nepal, Australia, and Thailand. She presented a lecture on *Nursing Issues: An International Perspective* at the University of Ballarat, Victoria, Australia and lectures on *Smoking and Medications: Implications for the Lactating Client* and *Smoking: Implications for the Lactating Woman* for Virginia Commonwealth University, Richmond, Virginia.