The Effect of Self-Regulation on Breastfeeding Duration in Primiparous Mothers

by

Deborah Lynn Pollard

B.S.N., West Liberty State College, 1981

M.S.N., West Virginia University, 1985

Submitted to the Graduate Faculty of

the School of Nursing in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

University of Pittsburgh

1998

DOCTORAL DISSERTATION COMMITTEE ACTION FORM

The dissertation of Deborah L. Pollard has been approved by the following committee of faculty of the University of Pittsburgh.

FACULTY MEMBER	SCHOOL
[redacted]	Nursing
Chairperson, Susan A. Albrecht, PhD, RN	
[redacted]	Nursing
Jacqueline Dunbar-Jacob, PhD, RN, FAAN	
[redacted]	Nursing
Susan M. Sereika, PhD	
[redacted]	Education
Karen K. Block, PhD	

13 July 1998
Date of Defense

SAO N:ddcafIII 6/93

EFFECT OF SELF-REGULATION ON BREASTFEEDING DURATION IN PRIMIPAROUS MOTHERS

Deborah Lynn Pollard, PhD, RNC, IBCLC

University of Pittsburgh, 1998

Eighty-six primiparous breastfeeding mothers were recruited from a community hospital in the northern panhandle of West Virginia. A randomized, controlled, two-group experimental design was used to examine the association between the self-regulation intervention, encompassing self-monitoring and reinforcement, and breastfeeding duration over 6 months. Subjects were randomized to their protocol assignment using a permuted block within strata randomization using mode of delivery and return to work/school as stratifying factors. Both the treatment and control groups received standardized education on breastfeeding and only the treatment group received the self-regulation intervention guided by social cognitive learning theory.

Survival analyses and Cox proportional hazards regression procedures were used for hypotheses testing.

Using the intention-to-treat approach, subjects in the treatment group did not breastfeed significantly longer than the control group. However, some subjects in the treatment group (n = 10) chose not to complete the self-monitoring component of the intervention and had a statistically significant shorter breastfeeding duration, tended to be lower income, enrolled in WIC, single, younger, and less educated. The mean duration of breastfeeding for the treatment group who completed the self-regulation intervention (n = 33), for the subjects in the treatment group who chose not to complete self-monitoring (n = 10), and the control group (n = 43), were 15.70, 4.52, and 12.12 weeks, respectively. Subjects who completed the self-regulation intervention as per protocol were more than three times as likely to breastfeed longer (Cox LR: .0082, p = .007, Hazard Ratio: 3.17). Perceived social support, returning to work/school, timing of the initial breastfeeding, and mode of delivery were not statistically significant predictors of breastfeeding duration. WIC enrollment, planned duration of breastfeeding, feeding frequency and length were statistically significant predictors of breastfeeding duration.

The self-regulation intervention received many positive accolades from the subjects and demonstrated that it may improve breastfeeding outcomes particularly in the breastfeeding mother who is older, higher-educated, higher-income, and who are more strongly motivated to succeed. This research emphasizes the need for individualizing nursing interventions based on clients' sociodemographic factors and for future research to evaluate alternative interventions for the low-income, single mother.

ACKNOWLEDGMENTS

My sincerest thanks and gratitude is extended to the many individuals who helped make this research possible. This research has given me the opportunity to learn so much, and yet makes me realize how much more I need to know and reinforces my belief that learning is a life-long process.

My thanks goes out to my wonderful dissertation committee who provided such expertise and guidance: Dr. Susan Albrecht (chair), Dr. Karen Block, Dr. Jackie Dunbar-Jacob, and Dr. Susan Sereika. Special thanks to Dr. Albrecht for all her kind patience and guidance, to Dr. Block for all of her insightful comments, to Dr. Dunbar-Jacob for her methodological expertise, and to Dr. Sereika for all of her statistical expertise. This committee provided invaluable guidance and direction to this endeavor. A special thanks to Jeff Rohay for his invaluable assistance with the data management procedures and John Whitehead for his editorial expertise.

A particular thanks to all of the mothers who participated in the research study for their willingness to

share their experiences with breastfeeding. Special thanks to all of the staff at Wheeling Hospital and to my colleagues at Wheeling Jesuit University for their support. encouragement, and thoughtful inquiries.

This endeavor would not be possible without the financial support of my pilot study by my chapter of Sigma Theta Tau, Omicron Mu, and for financial support of the full study by Medela, Inc. Special thanks to these two groups for supporting nursing research endeavors.

And last, but not least, a special thanks to my family. To my husband, John; to my daughter, Amanda; to my sister, Becky; and to my mother for their steadfast support and encouragement. A special thanks to my parents and family for instilling in me the belief that all things are possible. As Jesus said, "If you can believe, all things are possible to him who believes" (Mark 9:23).

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

Breastfeeding is the optimal feeding method for infants for the first five to six months following birth (American Academy of Pediatrics, 1982, 1997; American Dietetic Association, 1993, 1997). Although breastfeeding is recommended as the optimal feeding method for infants, the national percentages of breastfeeding initiation and duration are well below the targets set by the U.S. Surgeon General and the U.S. Department of Health and Human Services (Public Health Service, 1991). Healthy People 2000, a consortium report of the U.S. Public Health Service in conjunction with national and state health organizations, has set goals to increase breastfeeding among new mothers to a rate of 75% by hospital discharge and to increase the duration of breastfeeding to 50% at 5 to 6 months postpartum (Public Health Service, 1991).

Recent statistics reveal that the national and the West Virginia breastfeeding percentages are well below these projected targets. National statistics for 1995 reveal 59.7% of mothers are breastfeeding at hospital discharge,

and only 21.6% of mothers are continuing to breastfeed at 6 months postpartum (Ross, 1995). Breastfeeding statistics for West Virginia for 1996 reveal that 46.28% of mothers are breastfeeding at hospital discharge (M. Baker, personal communication, March 3, 1998). Breastfeeding duration rates for West Virginia mothers at 5 to 6 months postpartum was 13% in 1995 (Lutfiyya, Baker, Neuner, Legg, & Heitmeyer, 1997). These national and state statistics demonstrate that the duration of breastfeeding at 6 months postpartum is considerably below the 50% target of the Department of Health and Human Services.

Childbearing is a time when the family unit is confronted with many dynamic transitions. One of the transitions is developing the skill and competence to provide for the infant's nutritional needs. The mother who decides to breastfeed her infant embarks on a process of learning and developing a new skill and technique for effective feeding of her infant. The transition to breastfeeding, as well as other transitions, are characterized by a process that includes changes in health status, role relations, and abilities. This process includes incorporating new knowledge to eventually alter

one's behavior (Chick & Meleis, 1986; Schumacher & Meleis, 1994). The childbearing family may also encounter transitions, such as physiologic changes in health status, changes in personal relationships, adjustments of roles within the family unit, and changes in abilities and expectations (Chick & Meleis, 1986; Schumacher & Meleis, 1994).

The mother's response to transitions following childbirth is variable and is likely to be affected by the mother's appraisal of the transition, her level of knowledge and skill, her level of planning, her environment, and her emotional and physical well-being (Chick & Meleis, 1986; Schlossberg, 1984; Schumacher & Meleis, 1994). External resources, as well as internal resources, mediate the transition process and function as sources of new knowledge and skills to foster the mother's ability to adjust to these many changes as her infant is integrated into the family after childbirth (Schlossberg, 1984). Health care providers are valuable external resources that offer interventions to promote positive health behaviors for the childbearing family unit.

In addition to external resources, the concept often related to the successful processing of transitions is the environmental resource of social support within the family (Caplan, 1976; Schumacher & Meleis, 1994) and the internal resource of self-regulation as proposed in Bandura's (1977) social learning theory. Social support can have an indirect or buffering effect on health behavior. This mediating role of social support suggests that it functions to facilitate the process of transitions (Cobb, 1976, 1978; Schumacher & Meleis, 1994). Specifically, social support is a variable that is identified as a significant factor in determining the duration of breastfeeding. Several studies positively correlate social support with breastfeeding duration (Baranowski, Bee, Rassin, Richardson, Brown, Guenther, & Nader, 1983; Duckett, Henly, & Garvis, 1993; Kessler, Gielen, Diener-West, & Paige, 1995; Matich & Sims, 1992; Rentschler, 1991).

Self-regulation is a concept within social cognitive theory that plays a prominent role in the acquisition and retention of new behavior patterns (Bandura, 1977, 1986, 1991). Through self-regulation, individuals can influence their own actions and behavior, specifically in regard to

health-promoting activities. Social cognitive theory is essential in understanding the process by which the childbearing family acquires new knowledge and skills as they cope with the many transitions, such as learning to breastfeed. According to Bandura (1977, 1986, 1991), self-regulation is a process that involves self-observation, which assists in influencing a person's behavior. Through self-monitoring and setting realistic goals, a person can identify relevant aspects of their behavior and plan a course of action to reach certain goals or outcomes.

Interest in this research study was generated through the investigator's own childbirth and breastfeeding experience as well as through observations of breastfeeding mothers in clinical practice. These experiences led the investigator to see a relationship between the acquisition of knowledge and skills, social support, and self-monitoring in regard to breastfeeding duration. In practice, the investigator observed that those mothers who were educated with the knowledge and skills of breastfeeding, had good social support systems, and monitored their breastfeeding experiences appeared to breastfeed their infants longer. In clinical observations, the investigator found that mothers

in her practice often stopped breastfeeding in the early weeks due to perceived problems and concerns with breastfeeding. In a review of the literature on breastfeeding, in hopes of identifying effective nursing interventions, the investigator found inconclusive evidence for specific interventions to promote breastfeeding duration and, overall, a very limited body of knowledge on interventions for the breastfeeding client.

The focus of the majority of previous research on breastfeeding duration has been to identify the variables that influence the breastfeeding experience and to identify the advantages of breastfeeding. One of the most frequently cited reasons for discontinuing breastfeeding has been the mother's reports of inadequate milk supply (Barron, Lane, Hannan, Struempler, & Williams, 1988; Chen, 1993; Hill, 1991; Lutfiyya, et al. 1997; Rentschler, 1991; West, 1980).

Even though this perception of inadequate milk supply was reported in 28% to 57% of the mothers terminating breastfeeding, one study concludes that only 15% of healthy primiparous breastfeeding mothers developed insufficient lactation at 2 to 3 weeks postpartum (Neifert, 1995). This insufficient lactation at 2 to 3 weeks postpartum is

referred to as secondary insufficient lactation and is often attributed to infrequent or short breastfeeding and it is preventable or remediable if recognized and treated early (Neifert, 1995).

This research study questions what type of nursing intervention would be beneficial to breastfeeding mothers to assist in regulating breastfeeding to promote frequent, effective emptying of the breasts. What type of nursing intervention could be used to either prevent secondary insufficient lactation or to recognize the condition early, in both mothers with perceived or actual secondary insufficient lactation? Would a self-regulation nursing intervention, involving self-monitoring, assist the breastfeeding mother in regulating her experiences in order to effectively empty the breasts, and would this intervention identify cues in the infant that indicate adequate milk transfer? Would this nursing intervention then decrease the frequency of secondary insufficient lactation at two to three weeks postpartum and thus prolong breastfeeding duration? To begin to answer these questions, a review of the literature was completed. This review of the literature disclosed no studies that examined the effect

of a theory-based intervention, self-regulation, on breastfeeding duration.

A considerable amount of research has been conducted on determining the advantages to breastfeeding for the infant and mother. Numerous studies determined that breastfeeding provides a wealth of advantages to both the newborn and mother that make it the optimal feeding method for infants (Davis, Savitz, & Graubard, 1988; Dewey, Heinig, & Nommsen-Rivers, 1995; Duncan, Ey, Holberg, Wright, Martinez, & Taussig, 1993; Gielen, Faden, Paige, Buxton, Brown, & Chwalow, 1988; Howie, Forsyth, Ogston, Clark, & Florey, 1990; Owen, Baldwin, Swank, Pannu, Johnson, & Howie, 1993; Paradise, Elster, & Tan, 1994; Piper, 1989; Worthington-Roberts & Williams, 1989; Wright, Holberg, Martinez, Morgan, & Taussig, 1989).

Since the advantages of breastfeeding have been well-documented in the literature, the Surgeon General and the U.S. Department of Health and Human Services have identified a goal to increase breastfeeding duration and frequency by the year 2000 (Public Health Service, 1991). These previously cited targets are to increase breastfeeding among new mothers at a rate of 75% by hospital discharge and to

increase the duration of breastfeeding by 6 months postpartum to 50% (Public Health Service, 1991). Trends in breastfeeding demonstrate that a resurgence of interest and participation in breastfeeding occurred during the 1980's. In the 1970's, the frequency of breastfeeding was 22% at hospital discharge (Martinez & Krieger, 1985). Through the 1980's and 1990's, the percentage of all new mothers breastfeeding at hospital discharge gradually rose to 59.7% (Ross Laboratories, 1995).

Even though there has been a gradual increase in breastfeeding at hospital discharge, the percentage of mothers breastfeeding at 6 months postpartum has not increased at the same rate. In 1980, 23.2% of mothers were continued to breastfeed at 6 months. This percentage gradually decreased to 17.6% in 1990. Since 1990 there has been a slight increase to 21.6% (Ross Laboratories, 1995). While there has been a slight increase in the number of new mothers breastfeeding, there has not been the same concurrent rise in mothers continuing to breastfeed at 6 months. In addition, even though the percentages depicted an increase in breastfeeding mothers continuing to breastfeed, the national averages are well below the targets

set by the Healthy People 2000 initiatives (Public Health Service, 1991; West Virginia Bureau of Public Health, 1994).

Purpose

The long-term objective of this research study was to promote the health of mothers and their infants by improving breastfeeding duration outcomes. The purpose of this study was to evaluate the effect of an intervention, self-regulation, on breastfeeding duration in primiparous mothers. In addition, the research study examined the effect of variables, such as social support and demographic variables, on breastfeeding duration in primiparous breastfeeding mothers who receive a self-regulation intervention when compared with a group of mothers who did not receive the intervention.

Specifically, the aims of this research study were to: a) test the efficacy of education and the self-regulation intervention, self-monitoring, on breastfeeding duration in primiparous mothers, b) investigate the effects of the timing of the initial breastfeeding session and the return to work/school on breastfeeding duration and the efficacy of

the intervention, and c) examine the relationship between social support and breastfeeding duration.

Research Questions

The following were the research questions in this research study:

1. What is the length of time to breastfeeding weaning for a group of primiparous mothers in a community hospital participating in an educational session followed by a self-regulation intervention with self-monitoring, as compared with a group of primiparous mothers who only receive the breastfeeding educational session?
2. What is the relationship of the length of time to breastfeeding weaning with the timing of the initial breastfeeding session and the return to work/school?
3. What is the relationship between the response to the intervention and the timing of the initial breastfeeding session and the return to work/school?
4. What is the relationship between perceived social support and breastfeeding duration?

Research Hypotheses

1. Primiparous breastfeeding mothers who receive both the breastfeeding educational session and the self-

regulation intervention will demonstrate a longer length of time to breastfeeding weaning when compared with primiparous breastfeeding mothers who only receive the breastfeeding educational session.

2. Primiparous breastfeeding mothers who have an earlier initial breastfeeding session or who return to work in more than 8 weeks postpartum will have a longer length of time to breastfeeding weaning.

3. Primiparous breastfeeding mothers receiving the self-regulation intervention, who have a later initial breastfeeding session or who return to work in less than 8 weeks, will have a longer length of time to breastfeeding weaning as compared with similar mothers not receiving the intervention.

4. The perceived social support of primiparous breastfeeding mothers will be positively correlated with the length of time to breastfeeding weaning.

Definition of Terms

The following are operational definitions of terms used in this research study.

Breastfeeding Duration. The length of time, measured in completed weeks, that the breastfeeding experience

continues as measured by self-report and validated by physician report. The first day that the mother has the infant at breast at least twice within 24 hours will be defined as the beginning date for calculation of the breastfeeding duration. The ending date for calculation of the breastfeeding experience will be defined as the last day that the infant receives breast milk. In the event that the breastfeeding experience is interrupted and breastfeeding is stopped for a period of time, only the days that the infant receives breast milk will be included in the calculation of breastfeeding duration.

Breastfeeding Educational Session. A videotaped, thirty-minute, educational session that includes the following topics: supporting the breast; positioning the baby; getting started--rooting reflex; getting started--latching on; how the baby gets breastmilk; breastfeeding positions; ending a feeding; burping the baby; fathers; getting help and encouragement; bottle feeding and nipple confusion; waking a sleepy baby; relief of sore nipples; care of cracked nipples, plugged ducts, and mastitis; relief of engorgement; areolar expression and breast massage; manual expression and pumping; supplemental breastfeeding;

and maternal diet needs. In addition, subjects will receive two breastfeeding pamphlets during the educational session, Nursing Your Baby for the First Time (Danner, 1996) and Breastfeeding Basics (Clark, Tullo, & Bolane, 1996). The educational session was conducted by the investigator, a certified lactation consultant.

Breastfeeding Weaning. The ending date for calculation of the length or duration of the breastfeeding experience. Breastfeeding weaning is defined as the date in which the baby is no longer receiving breast milk.

Full Breastfeeding. The implementation of exclusive breastfeeding with the exception of vitamins, water, and juice, not to exceed more than once or twice per day, not more than one to two swallows during the first 6 weeks following birth.

Partial Breastfeeding. The planned implementation of breastfeeding with planned supplementation with formula feedings during the first 6 weeks following birth.

Primiparous Mother. An adult, 18 years of age and older, who has given birth to her first child.

Self-monitoring. Self-monitoring is one component of the self-regulation program for the experimental group. The

subjects in the experimental group will be asked to complete the Mother's Breastfeeding Daily Log for the first six weeks following birth. This intervention involves the completion of the Mother's Breastfeeding Log on a daily basis, with a comparison made to proximal and distal goals for breastfeeding. The Mother's Breastfeeding Daily Log includes the following information: time of feeding, length of feeding on right breast, length of feeding on left breast, presence of swallowing, presence and color of infant's urine, presence and color of infant's stool, amount and type of supplement, amount and length of pumping, mother's feelings, and infant's behavior.

Self-regulation. An intrinsic process which includes the three sub-processes of self-observation, judgmental processes, and self-reaction (Bandura, 1977, 1986, 1991). During the first sub-process, self-observation, an individual self-monitors her behavior for a given task. This sub-process will be accomplished by completing a minimum of the first 3 weeks of the Mother's Breastfeeding Daily Log. In the second sub-phase, the individual then employs judgmental processes to compare her individual performance to personal and referential standards. Based on

the self-evaluation in the third sub-phase, the individual will determine either a positive or negative self-reaction (Bandura, 1977, 1986, 1991).

Social Support. Encompasses emotional support, esteem support, and network support (Cobb, 1976) as measured by the Hughes Breast-Feeding Support Scale (HBSS).

Support Person. For the subject who is married, her support person is defined as her husband. For a subject who has a single marital status, her support person is defined as the person closest to her providing her with the most assistance with her infant.

Significance to Nursing

Health promotion is a significant concept in nursing. Specifically, this study sought to promote the health of mothers and infants by enhancing breastfeeding duration and thus was significant to nursing practice. By promoting breastfeeding duration, breastfeeding mothers and their infants can receive the optimal physiological and psychological benefits of this method of infant feeding. This research study provides additional knowledge to the existing body of knowledge on breastfeeding by moving beyond the current level of factor-isolating and factor-relating

research in regard to breastfeeding to a higher level of situation-relating research. Specifically, the findings help clarify variables that influence breastfeeding and also guide health professionals in developing effective interventions to promote breastfeeding duration. This research study explored the effects of a theory-based intervention, self-regulation, on breastfeeding duration in primiparous mothers during the 6 months postpartum.

CHAPTER II

REVIEW OF THE LITERATURE

The following review of the literature is divided into four sections. The four sections include: 1) the presentation of the theoretical framework guiding the study, Bandura's (1977, 1986) social cognitive theory; 2) transition to childbearing; 3) breastfeeding; and 4) self-regulation.

Theoretical Framework

Social cognitive theory (Bandura, 1977, 1986) is the theoretical framework that guided this research plan. Bandura's social cognitive theory provides a foundation for understanding behavioral change. This theory explains the cognitive processing of knowledge and how knowledge is then transformed into behaviors as individuals are confronted with new knowledge, skills, and tasks. Therefore, social cognitive theory is essential to understanding the process by which the childbearing family acquires new knowledge and skills as they cope with the many transitions of parenthood.

To plan for nursing interventions it is essential to understand the process of cognition as well as how knowledge

and skills are transformed into behavioral change. Social cognitive theory proposes that "human functioning is explained in terms of a model of triadic reciprocality in which behavior, cognitive and other personal factors, and environmental events all operate as interacting determinants of each other" (Bandura, 1986, p. 18). The relative influence exerted by each of these factors will vary between individuals and across circumstances. This three-way interaction between one's behavior, personal factors, and environment influences the process of learning.

Bandura (1977, 1986) proposes that an individual acquires cognitive skills and new patterns of behavior by observing the performance of others. The learning that takes place may be varied from new behavior patterns to new standards or cognitive competencies. Observing modeled behavior in others can produce four possible effects in the observer. The effects of modeling can include observational learning, inhibition, disinhibition, or response facilitation (Bandura, 1986). Observational learning occurs when the observer acquires cognitive skills and new patterns of behavior by observing the behavior of others. A second function of modeling is to strengthen or weaken inhibitions

over behavior that has been previously learned. Modeling can also serve as facilitator, stimulus enhancers, and emotion arousers (Bandura, 1986).

Cognitive processes are involved in the observation of modeled behavior to create changes in behavior. Bandura (1986) outlines the sub-processes governing observational learning, including attentional processes, retention processes, production processes, and motivational processes. Each sub-process have corresponding factors that contribute to the cognitive processing of the new knowledge or skill. Even when new knowledge is cognitively processed, it may not be necessarily transformed into behavior. The last sub-process, which deals with motivational factors that enhance or suppress the performance of behaviors learned through observation, deals with the production of new knowledge into behavior.

One factor that influences an individual's motivation to perform modeled activities is perceived self-efficacy (Bandura, 1977, 1986). Self-efficacy refers to the self-belief that one is capable of completing a given task or skill. Individuals choose to engage in activities that they believe they can master, and they tend to avoid activities

that they believe exceed their coping abilities (Bandura, 1989). In addition, a high level of self-efficacy serves as a motivational force that assists individuals to persevere during experiences that are difficult or problem laden (Bandura, 1988). Thus, individuals with a high perceived self-efficacy for a task can overcome obstacles to achieve their goal.

Self-efficacy expectation and self-efficacy outcome are two concepts which are differentiated in social cognitive theory (Bandura, 1977, 1986, 1988). Self-efficacy expectation is an individual's perception of the capability to complete a given activity. This perceived self-efficacy affects both initiation and persistence in an activity. Self-efficacy outcome refers to an individual's perception of whether a given behavior leads to a given outcome. Therefore, efficacy expectations affect the decision to engage in a task, the amount of time given to execute the task, the level of energy expended in a task, and the degree of persistence in completing the task (Bandura, 1986).

Bandura (1977, 1986, 1988) identifies four principle sources of information for developing one's self efficacy. The major sources of information are personal

accomplishments, vicarious experiences, verbal persuasion, and physiological states. Personal accomplishments through successes at given tasks will raise an individual's perceived self-efficacy, whereas, repeated failures at a task will lower one's self-efficacy. As one's self-efficacy becomes robust for a given task the enhanced self-efficacy tends to generalize to other situations (Bandura, 1977, 1986, 1988).

The second source of information for self-efficacy is through vicarious experiences. Observing others as they perform successfully can increase one's perceived self-efficacy regarding ability in an activity. Verbal persuasion is the third source of information that assists one in developing self-efficacy. "People who are persuaded verbally that they possess the capabilities to master given tasks are likely to mobilize greater sustained effort than if they harbor self-doubts and dwell on personal deficiencies when difficulties arise" (Bandura, 1986, p. 400).

The fourth source that individuals use to judge their self-efficacy or capabilities is their physiological state. Anxiety and stress situations activate the autonomic nervous

system and create physiological changes that tend to decrease an individual's self-efficacy.

Thus, self-efficacy has an effect on the activities in which an individual will choose to participate. Also, perceived self-efficacy can affect coping efforts once an activity is initiated (Bandura, 1977). An individual's perceived self-efficacy will determine how much effort will be given to a particular task and how long one will persist in the experience when difficulties arise. "The stronger the perceived self-efficacy, the more active the efforts" (Bandura, 1977, p. 194).

In addition to self-efficacy, Bandura (1986) describes an intrinsic process, referred to as self-regulation, that affects behavior. Self-regulation is a cognitive process that provides the basis for purposeful action. Through this process, an individual plans a course of action or behaviors to produce an anticipated outcome (Bandura, 1991). Self-regulation is a process that includes three sub-processes, which include self-observation, judgmental processes, and self-reaction. During the first sub-process of self-observation, an individual self-monitors behavior for a given task. By completing self-observation, realistic

performance standards for the task can be set, and this can contribute to self-directed change. During the judgmental process, the individual compares performance to personal and referential standards. Based on one's self-evaluation, the individual will determine either a positive or negative self-reaction in the final sub-process of self-regulation. Positive self-reaction or successes will increase desired behavior, whereas, observing negative reactions causes little change or lowers achievement (Bandura, 1986). Factors affecting self-observation include mood states and motivational level. Self-observation is thus more likely to change behavior in motivated individuals and in those with positive mood states.

In summary, social cognitive theory provides a framework for understanding how knowledge is acquired and transformed into behavioral change. This theoretical framework, as applied to the breastfeeding experience, is depicted in Figure 1. During the transition to childbearing, new knowledge regarding the topic of breastfeeding is presented to the parents in various observational learning experiences. During these observational experiences, parents will cognitively process

Social Cognitive Theory

Two Central Concepts to Learning a New Skill (Breastfeeding)

Observational Learning

Attention processes → Breastfeeding Educational Session which models breastfeeding techniques
↓
Retention processes → Breastfeeding Practice
↓
Production processes
↓
Motivational processes → High motivation increases self-monitoring
↓

Self-Regulation

Self-Observation → Self-monitoring with Daily Breastfeeding Log
↓
Judgmental Processes → Comparison betweeen Daily Breastfeeding Logs and personal standards and referential standards, reinforced by telephone follow-up at 1 week, 2 weeks, and 3 weeks
↓
Self Reaction →

Positive Self Reaction	Negative Self Reaction
↓	↓
Perceived success with breastfeeding, baby's needs being met	Perceived failure with breastfeeding, baby's needs not being met
↓	↓
Increased self-efficacy	Decreased self-efficacy
↓	↓
Continued breastfeeding	Supplementation with formula Early termnation of breastfeeding

Figure 1
Application of Social Cognitive Theory to the Breastfeeding Experience

the knowledge obtained from observational learning in a three-way interaction with their own behavior, personal factors, and their environment through four processes. These four processes in observational learning are attention, retention, production, and motivation. The Breastfeeding Educational Session, which models breastfeeding techniques, begins the process of observational learning in the attention category. Retention processes will begin after the birth of the infant with actual breastfeeding experiences. Motivation to perform breastfeeding will be influenced by the individual's perceived self-efficacy of the task. A high motivation increases self-monitoring. Factors that will increase an individual's self-efficacy include positive feedback from support persons, knowledge of breastfeeding, positive mood states, successful attempts at breastfeeding, and positive self-reaction after using self-monitoring and goal-setting interventions. Conversely, those factors that will negatively affect perceived self-efficacy are a lack of social support, knowledge deficits, lower mood states, unsuccessful attempts at breastfeeding, and negative self-reactions.

Self-regulation is a component of social cognitive theory which involves the three processes of self-observation, judgmental processes, and self-reaction. The self-observation aspect of self-regulation was operationalized in this research study by self-monitoring with the Daily Breastfeeding Log. Subjects compared their completed breastfeeding logs with personal standards and referential standards and were reinforced by telephone follow-up at 1 week, 2 weeks, and 3 weeks to operationalize the judgmental processes. Self-reaction is the final step in self-regulation in which the person concludes either a positive or negative response to the breastfeeding experience. A positive self-reaction is perceived as breastfeeding success with the infant's needs being met. This positive reaction will increase the breastfeeding mother's self-efficacy and breastfeeding will continue. Conversely, a negative self-reaction will be perceived as breastfeeding failure where the infant's needs are not being met. This negative self-reaction will decrease a mother's self-efficacy and result in formula supplementation and early termination of breastfeeding.

Theoretical and Empirical Literature

The review of theoretical and empirical literature will be presented in three sections: 1) transition to childbearing, 2) breastfeeding, and 3) self-regulation.

Transition to Childbearing

Transition is a concept that has significant utility to the practice of nursing. A transition is defined by Chick and Meleis (1986) as a passage from one life phase, condition, or status to another. This transition, or passage, is a process that occurs over time and encompasses an intrinsic change in identities, roles, relationships, abilities, and patterns of behavior (Chick & Meleis, 1986; Schlossberg, 1984; and Schumacher & Meleis, 1994). Transition refers to both the process and the outcome of the complex person-environment interaction that is inherent in the life processes of human beings. To understand these processes and outcomes is valuable to the practice of nursing as therapeutic interventions are implemented and evaluated to promote positive outcomes during these life events. Schumacher and Meleis (1994) argue for the use of transition as a central concept to nursing, since it provides an organizing framework to consider patterns of

responses rather than single responses and allows the nurse to identify vulnerable and critical points during transitions that will help guide health promotion.

Transitions may be categorized into types that address developmental, situational, and health-illness events (Chick & Meleis, 1986). The developmental transition that is most often studied is the transition of becoming a parent. Many new roles are required of new parents as they embark upon parenthood. These roles, for the first-time parent, are new, unfamiliar, difficult to carry out, unrehearsed, and yet necessary. The new parent proceeds with role learning through the process of interaction with others (Mead, 1934). Interaction with significant social supports fosters the achievement of these new roles.

Transition to the Maternal Role

Acquisition of the maternal role has been specifically studied by Rubin (1967, 1975, 1977, 1984) and Mercer (1981, 1986, 1990). Through the work of Rubin (1984), the concept of maternal identity has evolved to identify the subjective, cognitive experiences of women during pregnancy and postpartum. Maternal identity is a learned process that involves a progressive series of cognitive operations: "The

formation of a maternal identity that binds the women in to this child and becoming the mother of this child is gradual, systematic, and extensive" (Rubin, 1984, p. 39).

Maternal Role Theorists. Rubin (1984) identifies two fundamental aspects in becoming a mother: the acquisition of the maternal role and the identification of the infant. The development of the maternal role begins during pregnancy and encompasses four phases in the process: replication and mimicry, replication and role-playing, fantasy, and de-differentiation (Rubin, 1984). Replication and mimicry represent the phase in the pregnant mother when she begins to copy maternal-role behaviors in her dress, speech, and gesture. She begins to practice behaviors that she perceives are encompassed in the maternal role. This replication of maternal-role behaviors is further expanded in the second phase as role-playing occurs. During the fantasy phase, the expectant mother cognitively explores possibilities in her new role as mother. This process of developing a maternal identity is a cognitive process, which involves completion of four complex tasks that make for the "binding-in" relation to the child. The four tasks include seeking safe passage for herself and her child through

pregnancy and labor delivery, ensuring acceptance of the child by significant persons in her family, binding-in to the child and giving of oneself (Rubin, 1984).

The concept of a developing maternal role was further studied in the work of Mercer (1981, 1986, 1990), who identified four stages in the acquisition of the maternal role: the anticipatory, the formal, the informal, and the personal-level stages. The anticipatory stage begins during the pregnancy as the woman accepts the pregnancy and begins a relationship with the unborn child. During this stage, the mother attempts to resolve any conflicts with her mother and realigns the relationship into one with peer qualities. The expectant mother identifies with the maternal role through much fantasy and role play. Expectant mothers seek role models for learning the role and expectations of becoming a new parent. The stage corresponds very closely to the replication stage as described by Rubin (1984).

The formal stage, identified by Mercer (1990), begins with the birth of the infant and proceeds to 6 to 8 weeks postpartum. Role behaviors are largely guided by others and social supports. Accomplishments of this stage include integration of the labor and delivery experience, resolving

any loss of expectations about the pregnancy or infant, ascertaining normalcy of her infant, developing skills in infant care, and redefining her role as parent. The informal stage begins when the parents have successfully learned appropriate responses to their infant's cues and they begin to respond in their own unique way rather than by the textbook. The stage extends to 4 to 5 months postpartum. The final stage is the personal level stage and is achieved by 85% of first-time mothers by 9 months postpartum (Mercer, 1990). This final stage occurs when the parents internalize their role and feel a sense of harmony with the infant, acknowledging the infant as a central person in their life.

Factors Influencing the Development of the Maternal Role. Mercer (1986) used this theoretical framework to guide a longitudinal study of 242 women to examine age group differences in maternal-role attainment at one year after giving birth and to identify major predictors of maternal-role attainment during this first year. The dependent variable, maternal-role attainment, was measured by adapting five existing tools that recorded maternal feelings about the baby, gratification in the maternal role, observed

maternal behaviors, ways of handling irritating child behavior, and infant growth. The Cronbach alpha reliability was reported for each tool at .61, .77, and .86, for the first three tools, respectively. A wide array of independent variables was selected for examination in the study, including educational level, race, marital status, age, perception of birth experience, days infant was hospitalized, social stress, social support, self-esteem, personality disorder, personality traits, empathy, rigidity, maternal-health status, infant-health status, and infant-temperament.

To measure independent variables, Mercer (1986) used instruments in this study, including The Life Experiences Survey, Tennessee Self-Concept Scale, Maternal Attitude Scale, 12-item empathy scale, and a 15-item rigidity scale. Reliability and validity of these instruments were not addressed. Two of the instruments, Tennessee Self-Concept Scale and the Maternal Attitude Scale, were quite lengthy, with 100 and 233 items, respectively.

Inclusion criteria for the study were mothers who had their first live birth, were fluent in English, with no infant anomalies, and with a gestation of greater than 37

weeks. The subjects were interviewed in their homes at 1, 4, 8, and 12 months following delivery. The subjects were placed into one of three groups according to age: 15 to 19 years, 20 to 29 years, and 30 to 42 years. The results demonstrated that the two groups of older women had significantly higher means on the observed maternal behaviors as compared with the adolescent group, with a F statistic value of 15.45 with a p-value <.001, specific Duncan multiple range test results not included. Stepwise multiple regression was employed to determine the amount of variance that could be attributed to the independent variables. The independent variables predicted 37.9% of the variance in the maternal-role attainment index. Self-concept contributed the largest degree of variance explained at 16.9%. However, maternal age was not a predictor of maternal role attainment at one year with educational level, race, and marital status controlled (Mercer, 1986). Social support, infant temperament, and health status failed to demonstrate any predictive value. Mercer (1986) demonstrated that self-concept and maternal age differences are variables which may positively handle child behavior

during the first year in the transition to the maternal role.

Chick and Meleis (1986) identified personal and environmental factors that influence the transition process. Among these factors are the meaning of the transition in one's life, personal expectations, level of knowledge and skill, environment, level of planning, and emotional and physical well-being (Shumacher & Meleis, 1994). These factors can serve to either mediate or make more difficult the transition process.

Personal factors that influence the transition process include the subjective appraisal of the meaning of the transition, personal expectations, level of knowledge and skill, level of planning, and emotional and physical well-being. The meaning given to a transition varies for each individual, and the awareness of the interpretation by the individual is necessary in understanding one's experience (Schumacher & Meleis, 1994). Another subjective aspect that influences the transition experience is personal expectations. Previous experience and acquisition of knowledge influence what expectations an individual has for any given transition.

In summary, the childbearing period encompasses many transitions for the new parent. These transitions encompass intrinsic changes in identity, roles, relationships, and abilities. Rubin (1967, 1974, 1977, 1984) and Mercer (1981, 1986, 1990), in their research into the transition to the maternal role, have identified the period following delivery and extending to 8 weeks as a time when role behaviors are largely guided by others. It is during this time for the breastfeeding mother that the development of her role as a mother and the development of the skill to breastfeed is largely influenced by external resources, such as health-care providers and support systems. This research study examined the effect of these support systems, a health promotion intervention and social support, on breastfeeding duration.

Breastfeeding

The breastfeeding section will be sub-divided to include breastfeeding trends, breastfeeding advantages, and breastfeeding duration. A taxonomy was used to detail the section on breastfeeding duration and includes the categories of maternal antecedents, internal resources, external resources, and interferences.

Breastfeeding Trends

Since 1955, infant-feeding patterns have been surveyed by Ross Laboratories to document national trends and demographic factors associated with different feeding methods.

National Breastfeeding Trends. The early data in 1955 revealed that 29.2% of mothers surveyed were breastfeeding their infants at 1 week of age (Martinez & Dodd, 1983). By 1970, the percentage was at its lowest, with only 24.9% of mothers surveyed breastfeeding at 1 week postpartum. From 1971 through 1981, the surveys indicated a steadily increasing incidence of breastfeeding for all mothers surveyed. From 1971 to 1981, breastfeeding in the hospital rose from 24.7% to 57.6% for all infants (Martinez & Dodd, 1983). This increase was also noted among infants 5 and 6 months of age, where the breastfeeding rates rose from 5.5% to 26.8% for 1971 and 1981, respectively.

In addition to surveying the infant-feeding methods, the Ross Laboratories Mothers Survey evaluated demographic factors. The 1981 data revealed that breastfeeding in the hospital was positively related to maternal education,

primiparous mothers, unemployed mothers, and mothers with higher family incomes (Martinez & Dodd, 1983).

In 1982 breastfeeding reached its peak with 61.9% of infants being breast-fed in the hospital (Martinez & Krieger, 1985). From 1982 to 1990 the data demonstrate a decline in the number of women initiating breastfeeding from the peak in 1984 at 59.7% to a low in 1990 of 51.5% (Ross Laboratories, 1995). A similar decline was noted in the duration of breastfeeding, with a peak of 23.8% in 1984 as compared with a low of 17.6% in 1990 of mothers continuing to breastfeed at 6 months (Ross Laboratories, 1995). Since 1990, both initiation and duration of breastfeeding have begun a gradual increase. For 1995, 59.7% of mothers are breastfeeding at hospital discharge and 21.6% of mothers are breastfeeding at 6 months (Ross Laboratories, 1995).

Similar demographic data in the national surveys were found in 1989 as compared with 1984 data. Breastfeeding duration was more common in western states and among mothers who were older, multiparous, better-educated, white, and had higher incomes (Ryan, Rush, Krieger, & Lewandowski, 1991).

West Virginia Breastfeeding Trends. For West Virginia, the 1995 statistics reveal that the state is well below the

national averages. For 1995-1996, the number of new mothers initiating breastfeeding was 46.28%, and at 5 months only 13% were continuing to breastfeed (Lutfiyya et al., 1997).

In summary, breastfeeding rates peaked in 1984 followed by a decline in both initiation and duration. Since 1991, there has been a resurgence in breastfeeding with gradual increases in both initiation and duration. However, breastfeeding duration rates have not increased at the same rate as breastfeeding initiation rates. Increased numbers of mothers are beginning to breastfeed, specifically those mothers who traditionally did not breastfeed: less-educated, under 20 years of age, with lower income, employed full-time, primiparous, enrolled in WIC, and of Hispanic or African American ethnicity (Ross Laboratories, 1995). However, even though there are increased numbers of breastfeeding mothers at hospital discharge, the same increases in breastfeeding duration have not been achieved. Most recent breastfeeding data concludes that 79.4% of breastfeeding mothers are weaning their infants by 6 months postpartum (Ross Laboratories, 1995).

Breastfeeding Advantages

The monitoring of trends in infant feeding patterns is significant since the advantages and importance of breastfeeding have been well documented in the literature. Breastfeeding has been identified as the optimal feeding method for infants for the first 5 to 6 months (American Academy of Pediatrics, 1982, 1997; American Dietetic Association, 1993, 1997). Advantages to breastfeeding have been identified for both the mother and the infant and encompass physiological and psychological benefits.

Breastfeeding Advantages for Infant. The immunological significance of human milk is the most significant physiological advantage to the newborn. All classes of immunoglobin are found in human milk; however, most notable is IgA. The concentration of IgA is highest in colostrum, and the level falls during the first four weeks postpartum to a still substantial level that is maintained throughout the first year. The immunoglobins, especially IgA, provide local intestinal protection against viruses, such as poliovirus, rotovirus, and herpes virus, as well as protection against bacteria such as E. coli (Lawrence, 1994). The breast milk IgA has an antitoxin activity

against enterotoxins, such as E. coli and V. cholerae, which may prevent cases of infantile diarrhea. In a prospective study of 750 infants, followed for two years, those infants who were breast-fed for longer than 13 weeks had significantly less gastrointestinal illnesses than those infants who were bottle-fed or breastfed for less than 13 weeks (Howie, et al., 1990)

In addition to the immunoglobins, human milk contains antimicrobial factors, which include lysozyme, lactoferrin, gangliosides, and bifidus factor. Bifidus factor inhibits the replication of certain bacteria by creating a normal flora in the intestine of predominantly lactobacilli. This normal flora environment with lactobacilli may protect against shigella, salmonella, and some E. coli infections. Gangliosides, lysozyme, and lactoferrin also contribute to providing an antibacterial-protective factor against organisms such as E. coli, salmonella, and V. cholerae (Lawrence, 1994). Thus, these immunologic and antibacterial properties of human milk promote a resistance to bacterias and viruses. These protective benefits were demonstrated in a study by Dewey, Heinig, and Nomnsen-Rivers (1995). This study concluded that breastfeeding infants enrolled in a

matched-cohort research study had a 50% lower incidence of diarrhea during the first year of life as compared with bottle-feeding infants in the study.

Emerging research is also indicating that human milk also provides some protection from infections outside of the gastrointestinal tract. Wright, et al. (1989) studied 1000 healthy infants and found that those infants who were breast-fed had significantly less lower respiratory tract infections in the first 4 months of life. The incidence of otitis media has also been negatively correlated with breastfeeding. In a prospective, cohort study of 315 infants with cleft palate, those infants who were artificially fed with human milk had significantly less occurrences of otitis media (Paradise, Elster, & Tan, 1994). Mothers of infants who had no occurrences of otitis media were those who continued to breastfeed significantly longer than those mothers whose infants developed otitis media. A prospective study of 698 healthy infants also concluded that a shorter duration of breastfeeding was associated with an increase in the occurrence of otitis media (Owen et al., 1993). Another prospective study of 1220 infants concurred with the finding that exclusive breastfeeding of more than 4

months protected infants from single and recurrent episodes of otitis media (Duncan et al., 1993). Duncan et al. (1993) reports that the breast-fed infant, exclusively breast-fed for four or more months, had half the mean number of acute otitis media episodes as compared with infants fed with formula.

Additional benefits of breastfeeding for the infant include a reduced risk of sudden infant death syndrome (SIDS) and a reduced frequency of certain chronic diseases later in life, which include non-insulin dependent diabetes and childhood cancers such as acute leukemia or lymphoma (Davis, Savitz, & Grauford, 1988; Institute of Medicine, 1991). The association between SIDS and breastfeeding was examined in a study of 485 infants with deaths associated with SIDS as compared with 1800 randomly selected controls (Ford, Taylor, Mitchell, Enright, Steward, Beecroft, Scragg, Hassall, Barry, & Allen, 1993). The study concluded that a reduced risk of SIDS in breastfed infants continued during the first 6 months after controlling for variables.

The relationship between breastfeeding and the development of juvenile rheumatoid arthritis (JRA) was examined in a case-control study of 54 children with JRA and

79 control children (Mason, Rabinovich, Fredrickson, Amoroso, Reed, Stein, & Kredick, 1995). The study concluded that children with a history of breastfeeding are less likely to develop JRA, particularly with longer durations of breastfeeding.

Finally, breastfeeding has been linked to cognitive development. "The unique composition of breastmilk provides the ideal nutrients for human brain development in the first year of life" (Lawrence, 1997, p. 3). Cognitive development in breastfeeding and bottle-feeding infants was compared by Rogan and Gladen (1993). In their study, 855 newborns were followed through school-age. Testing included the use of the Bayley Mental Development Index and the McCarthy Scale. The Bayley Mental Development Index was administered at 6, 12, 18, and 24 months and the McCarthy Scale was administered at 3, 4, and 5 years of age. The relationship of various cognitive scores to breastfeeding was examined using multiple regression techniques. The results demonstrated that the breastfed children scored statistically higher on some subscales of both instrument and at all time points from 2 to 5 years. Scores were higher for cognitive skills than for motor skills. The sub-

group of infants who breastfed 20 weeks or more consistently had the higher scores. This study demonstrates that breastfeeding may have the potential to enhance cognitive development.

These studies support that breastfeeding promotes the health of infants and children by reducing the risk of many acute and chronic diseases and may enhance cognitive development. Riordin (1997) estimated that the annual health-care costs incurred for treatment of diarrhea, respiratory illness, insulin-dependent diabetes mellitus and otitis media in children who were not breastfed was calculated over one billion dollars. Therefore, not only does breastfeeding lead to healthier children, but it can significantly reduce health-care costs.

Breastfeeding Advantages for Mother. Breastfeeding also provides physiological and psychological benefits to the mother. Among the benefits during the immediate postpartum period are enhanced maternal-infant bonding, more rapid uterine involution, and conservation of maternal iron stores (Institute of Medicine, 1991).

In addition, a long-term benefit to the breastfeeding mother is a reduced risk of premenopausal breast cancer

(Newcomb, Storer, Longnecker, Mittendorf, Greenberg, Clapp, Burke, Willett, & MacMahon, 1994). The relationship between breastfeeding and breast cancer was examined in this large study of 6,888 subjects with a diagnosis of breast cancer and 9,529 case control subjects. Subjects were under 75 years of age and data were collected by telephone interview. The results of the study demonstrate that premenopausal women with a history of breastfeeding had a slight reduction in the risk of breast cancer. The relative risk of breast cancer in the premenopausal woman with a history of breastfeeding was .78, as compared with women who never breastfed. The duration of breastfeeding was also associated with a reduction in the risk of breast cancer in premenopausal women. For those premenopausal women with a cumulative total of more than 24 months of breastfeeding, the relative risk of breast cancer was .72 as compared with women who had never lactated (Newcomb et al., 1994).

The health-promoting benefits of breastfeeding, to both mother and infant, are well-documented in the literature. These benefits include short-term advantages as well as advantages that affect the health of the mother and infant even later in life. Advantages to the infant include

protection against a variety of conditions, such as infections, diabetes, arthritis, and SIDS. Infants tolerate human milk very well and there is less incidence of food allergies. Benefits to the mother encompass enhanced maternal-infant bonding, more rapid uterine involution, and reduced risk of breast cancer in the premenopausal period.

Therefore, based on these documented advantages, breastfeeding needs to be encouraged as a health-promoting behavior. To assist the new mother during the transition following delivery, interventions should be planned by the health-care provider to offer education and assistance to learn this new skill.

Breastfeeding Duration

The length of time that a woman breastfeeds is influenced by numerous factors. Research has identified the prenatal intent, specific maternal antecedents, internal resources, external resources, and interferences, all of which interact with and influence the length of breastfeeding. The professional governing body for pediatrics, The American Academy of Pediatrics (1982, 1997), recommends breastfeeding as the optimal feeding method for

infants, with either breast milk or formula recommended as the type of milk during the first year of life.

Prenatal Decision. The decision to initiate breastfeeding after the birth of a child is generally a decision that is determined prenatally (Coreil & Murphy, 1988; Baisch, Fox, Whitten, & Pajewski, 1989; Dix, 1991). And a mother's decision to breastfeed is strongly affected by the infant feeding preference of the significant other (Kessler, et al., 1995). One longitudinal study of 44 breastfeeding mothers analyzed the influence of prenatal intention and other variables on breastfeeding duration (Coreil & Murphy, 1988). The convenience sample in the study was Caucasian, median age of 28, median education of 14 years, married, with a middle- to upper-class income. A prenatal questionnaire was completed at a childbirth education class to determine the intended duration of breastfeeding, expected time to return to work, and demographic information. An interview was conducted in the home at 4 to 6 weeks after birth with a follow-up mail questionnaire at one year after birth. An attrition rate of 19% was reported. The questionnaires were investigator-developed, and reliability and validity of the instruments

was not determined. The analysis identified eight psychosocial and biobehavioral predictors of breastfeeding duration. These predictors included age, intended duration, confidence in ability to breastfeed, degree of social support, early first feeding, continuity of breastfeeding, milk expression, and absence of formula supplementation. Intended duration was the strongest predictor of actual duration. Intended duration and early supplementation explained 48% of the variance in the dependent variable, breastfeeding duration (Coreil & Murphy, 1988).

The prenatal decision on the method of infant feeding was also supported in the study by Baisch et al. (1989). In their comparison study of low-income adolescents and adult women, the choice of infant feeding post-delivery was significantly related to the prenatal intention. Dix (1991) interviewed 81 women prenatally regarding their choice of infant feeding. Of these women, 50% made their decision to breastfeed during pregnancy, and 41% made their decision to breastfeed prior to conception. These studies demonstrate that the decision to breastfeed is predominantly made during pregnancy, and often made prior to conception.

Predictors for Breastfeeding Duration. In the review of the literature on breastfeeding duration, four categories of predictors for breastfeeding duration were developed by Duckett, Henly, and Garvis (1993). The taxonomy of potential predictors for breastfeeding duration are maternal antecedents, internal resources, external resources, and interferences. From their experience as practitioners and researchers, the authors identify age, education, ethnicity, and parity as the maternal antecedents that have been related to breastfeeding duration. Internal resources include reasons for breastfeeding, attitude toward breastfeeding, and perceived success of early postpartum breastfeeding efforts. Among the external resources identified were encouragement of breastfeeding and sources of breastfeeding information. Interferences to breastfeeding duration include discouragement of breastfeeding by support persons, breastfeeding problems encountered, and in-hospital supplementation with formula. These fours areas for classifying predictors of breastfeeding duration will be used as a framework to present the following theoretical and empirical data.

Maternal Antecedents. Of the research studies examining breastfeeding duration, a majority of the studies have been descriptive in identifying maternal antecedents that affect the duration of breastfeeding. Common demographic variables associated consistently with breastfeeding duration are age, education, race, and income. Generally, women who are older, well-educated, and caucasian tend to breastfeed longer than women who are of African descent or who are women with less education (Barnes, Leggett, & Durham, 1993; Hill, 1991; Matich & Sims, 1992; Matthews, 1993; Piper & Parks, 1996; Richardson & Champion, 1992). Table 1 depicts the methodologies of the studies examining the maternal antecedents and breastfeeding duration.

A study of 400 mothers, including 200 women enrolled in the Women, Infants, and Children (WIC) program and 200 not enrolled in the program, identified variables that predicted breastfeeding duration in the first 8 weeks postpartum (Hill, 1991). The retrospective, comparative study was completed in the Midwest in seventeen WIC agencies and two private pediatrician offices. The sample-inclusion criteria were that mothers could speak English, were able to read and

Table 1

Methodologies of Studies of Maternal Antecedents and Breastfeeding Duration

Author	Year	Sample Size	Sample Characteristics	Theory	Design Type	Method	Time Frame	Maternal Antecedents Identified
Barnes, Leggett, & Durham	1993	58	Primiparous Breastfeeding and bottle feeding	_	C	IDQ S	During hospital stay	Age, education, income
Hill	1991	400	WIC and Non-WIC	-	C	IDQ S	8 weeks postpartum	Age, education, race, income
Matich & Sims	1992	159	WIC Breastfeeding and bottle feeding	-	C	IDQ S	Third trimester, 4 weeks postpartum	Age, education, income
Matthews	1993	59	Primiparous	-	D	IDQ I	Hospital discharge, 6-8 weeks postpartum	Education
Piper & Parks	1996	2372	Stratified, sampling plan from 1988 vital records from 48 states	-	C	NMIHS	28 months postpartum	Age, education, race
Richardson & Champion	1992	102	Breastfeeding, term infants with no complications	-	C	IDQ	Hospital discharge, 6 and 12 months postpartum	Age, education, income
Ross Laboratories	1996	251,009	Breastfeeding	-	C	RMS Mail survey	6 months postpartum	Age, education, income

Design Type:
C=Correlation
D=Descriptive
I=Intervention

Method:
IDQ=Investigator Designed Questionnaire
S=Self Report
I=Interview
RMS=Ross Mothers Survey
NMIHS: National Maternal-Infant Health Survey

Maternal Antecedents:
A=Age
E=Education
R=Race
I=Income

write, and had initiated breastfeeding for a single infant. A 15-page questionnaire was developed by the investigator, and content validity was established for the questionnaire; however, reliability was not addressed. The questionnaire focused on demographic, obstetric, psychosocial, and bio-behavioral factors that may influence breastfeeding. The questionnaire pertained to the first 8 weeks after delivery, even though mothers may have completed it at any time between 8 to 14 weeks after delivery. Increased maternal age, greater education of the mother and father, Caucasian background, and higher income were all significantly correlated with breastfeeding duration by using the Pearson product-moment correlation, with coefficients of .15, .16, .15, and .12, respectively. Hill (1991) reports that all the coefficients were significant, however the article includes only the p-value of the income variable at $p = .018$.

Matich and Sims (1992) sought to examine differences in perceived social support in a comparative study of breastfeeding and bottle-feeding mothers. In addition to support, the investigators identified some other predictors for the women intending to breastfeed. Eighty-five

breastfeeders and 74 bottle-feeders were compared on demographic data and social support variables. For the demographic characteristics, the researcher used the t-test to compare the differences between the two groups. The variables of age, education, and income between the two groups were all significant, with *t*-values of 3.09, $p < .01$; 5.58, $p < .001$; and 12.93, $p < .05$, respectively.

These findings in regard to maternal education were supported in a study of 61 primiparous mothers who planned to breastfeed and had healthy, term infants (Matthews, 1993). This study used an investigator-generated checklist, The Infant Breast-Feeding Assessment Tool (IBFAT), to assess the infant's feeding behavior while in the hospital. The researcher reports an interrater reliability for the IBFAT of 91% between mothers and researcher, which was established in a previous study. For this study, the mother completed the IBFAT at each feeding during her hospitalization of four to five days. At discharge, the mother completed a self-report questionnaire on her breastfeeding experience, and at 6 to 8 weeks following delivery the mothers were contacted by phone to assess their breastfeeding experience. Maternal educational level positively correlated with continuance of

breastfeeding at 6 to 8 weeks post delivery, with a Pearson correlation coefficient of $r = .53$, $p < .01$.

Age, higher socioeconomic level, and higher maternal education were also significantly related to using the Pearson correlation coefficient in the study by Richardson and Champion (1992). This prospective comparative study used a convenience sample of 102 breastfeeding mothers who delivered term infants and had no complications. A breastfeeding survey was developed by the researcher and was composed of four parts, a benefits and barriers scale, knowledge scale, social support scale and experiential and demographic variables. This breastfeeding survey was completed prior to discharge and then the women were contacted at 6 and 12 months to gather information about breastfeeding. Age was significantly related to breastfeeding duration, with older mothers breastfeeding longer. Higher socioeconomic status and higher education also evidenced a significant positive correlation with breastfeeding duration, $r = .36$ and $r = .38$, respectively. The p-values for these findings were not reported.

Barnes, Leggett, and Durham (1993) explored demographic variables and perceived differences in femininity between

mothers who chose to breastfeed and women who chose to bottle-feed. Similar maternal antecedents were found in the sample of 58 primiparous women in regard to age, education, and income in those mothers choosing to breastfeed. A demographic questionnaire was completed during the mother's postpartum stay, and a contingency table analysis was used to investigate the relationship between education and income and the decision to breastfeed. The results demonstrated that there was a significant relationship between level of education and the decision to breastfeed ($X^2 = 11.94$, $p < .01$), suggesting that breastfeeders had higher educational backgrounds. Income level was also positively correlated with breastfeeding duration ($X^2 = 4.39$, $p < .05$), breastfeeding mothers reported higher income levels. A point-biserial correlation between age and the decision to breastfeed indicated that older mothers were more likely to breastfeed (.40, $p < .01$).

The relationship between these identified maternal antecedents and breastfeeding duration was examined in this study. Specifically, the variables of age, educational level, income, and race was measured on the Personal Data Form (PDF) and related with breastfeeding duration.

Internal Resources. Internal resources related to breastfeeding duration include the reasons for breastfeeding, attitudes toward breastfeeding, and perceived success of early postpartum efforts (Duckett, Henly, & Garvis, 1993). Table 2 describes the studies examining internal resources and breastfeeding duration.

A review of the literature on breastfeeding duration yielded one qualitative study which used a phenomenological approach to explore what themes emerged in the breastfeeding mother who persisted with the experience (Bottorff, 1990). A theme that emerged in the breastfeeding mother was the use of personal commitment and internal self-talk dialogue in motivating her during the experience. A second theme was the importance of support and the acceptance from others, which facilitated the breastfeeding experience. Methodological details were not addressed in the article in regard to sample size and procedure.

Numerous studies have identified the mother's perception of her breastfeeding experience on her eventual success (Cornett, 1989; Duckett, Henly, & Garvis, 1993; Hill, 1993; Hill, Humenick, Argubright, & Aldag, 1997; Matthews, 1993; Richardson & Champion, 1992). In these

Table 2

Methodologies of Studies of Internal Resources and Breastfeeding Duration

Author	Year	Sample Size	Sample Characteristics	Theory	Design Type	Method	Time Frame	Internal Resources Identified
Bottorff	1990	*	Breastfeeding	_	Q	*	*	Personal commitment, self, talk, and acceptance from other common themes related to continuation of breastfeeding
Duckett, Henly, & Gravis	1993	230		-	D	IDQ	6 months postpartum	Correlation between duration and reasons for breastfeeding and attitude toward breastfeeding
Hill	1991	400	WIC and Non-WIC	-	C	IDQ S	8 weeks postpartum	Perception of inadequate milk supply lead to early termination
Matthews	1993	59	Primiparous	-	D	IDQ I	Hospital discharge, 6-8 weeks postpartum	Perceived baby not satisfied, predominant reason for discontinuing breastfeeding
Rentschler	1991	150	Married, Primiparous		D	IDQ SR	During childbirth class, 6 weeks postpartum	Achievement motivation positively related to breastfeeding success

Design Type:
C=Correlation
D=Descriptive
I=Intervention
Q=Qualitative

Method:
IDQ=Investigator Designed Questionnaire
S=Self Report
I=Interview

Internal Resources:
PC=Personal commitment
ST=Self talk
AO=Acceptance from others
*Data not available

studies, the problem most often cited for termination of breastfeeding was the mother's perception that there was inadequate milk or an unsatisfied infant. These studies will be further detailed under the section on interferences to breastfeeding duration, since these perceptions often contribute to termination or to supplementation with formula.

The relationship between internal resources and breastfeeding duration will be examined in this study. Specifically, satisfaction with breastfeeding and the perception of the breastfeeding experience will be measured on the Breastfeeding Experience Instrument and related with breastfeeding duration.

External Resources. External resources cited for their relationship to breastfeeding duration are those that encourage breastfeeding and provide breastfeeding information (Duckett, Henly, & Garvis, 1993). Among these sources are social support and information from family and health care providers. Table 3 depicts the studies that have addressed external resources and the relationship to breastfeeding duration.

Table 3

Methodologies of Studies of External Resources and Breastfeeding Duration

Author	Year	Sample Size	Sample Characteristics	Theory	Design Type	Method	Time Frame/Intervention	External Resources Identified
Auerback	1985	50	WIC	-	I	IDQ		Mothers in contact with lactation consultant had significantly longer breastfeeding duration
Barron, et al.	1988	40	Primiparous, low-income	_	D	IDQ I	Prior to hospital discharge, then every 2 weeks by phone until 3 months postpartum	Doula support, spouse support
Bernard-Bonin, et al.	1989	*	Nine studies		M	Pooled data under 4 headings	N/A	Significance of nursing support with telephone follow-up on breastfeeding duration
Bottorff	1990	*	Breastfeeding	-	Q	*	*	Themes emerged related to breastfeeding duration: commitment to breastfeeding; Doula support, acceptance of others
Brent, et al.	1995	108	Primiparous, low-income	-	I	I	2-4 prenatal consults, daily rounds by LC, 48 hour postpartum call, visits through 1 year of age	Intervention: Lactation-consultant visits and support, experimental group had significant difference in breastfeeding duration

Table 3 (Cont'd)

Methodologies of Studies of External Resources and Breastfeeding Duration

Author	Year	Sample Size	Sample Characteristics	Theory	Design Type	Method	Time Frame/Intervention	External Resources Identified
Chen	1993	180	Breastfeeding, healthy newborns	-	I	I PSS BAS BES	1, 2, 4, 8 weeks postpartum	Intervention: 3 groups with home visit, phone calls, control, no significant difference between groups
Duckett, Henly, & Garvis	1993	230	Breastfeeding, healthy newborns	-	D	IDQ	6 months postpartum	Correlations between sources of encouragement and sources of information and breastfeeding duration
Freed	1993	268	Couples in Prepared Childbirth Classes	-	C	IDQ	Prenatal classes	Partner's attitude influenced choice of infant feeding
Giugliani, et al.	1994	200	Breastfeeding and non-breastfeeding mothers	-	C	IDQ	24 hours postpartum	Prenatal class, breastfeeding support from lay people, attitude of partner influenced breastfeeding (Odds ratio: 2.7, 3.3, 32.8, respectively)
Grossman, et al.	1990	97	Low-income		I	IDQ	6 weeks postpartum	Longer breastfeeding durations in subjects attending childbirth education classes

Table 3 (Cont'd)

Methodologies of Studies of External Resources and Breastfeeding Duration

Author	Year	Sample Size	Sample Characteristics	Theory	Design Type	Method	Time Frame/Intervention	External Resources Identified
Hill	1987	64	Low-income	-	I	IDQ S	6 weeks postpartum	Intervention: slide-education program. No significant difference in breastfeeding duration between groups
Hills-Bonczyk, et al.	1994	623	Primiparous	-	C	IDQ	12 months postpartum	Perceived support
Littman, Medendorp, & Goldfarb	1994	115	Postpartum	-	C	IDQ	24 hours postpartum	Strong approval by father assoicated with higher incidence of breastfeeding
Lynch, et al.	1986	270	Breastfeeding	_	I	IDQ	9 months postpartum	Intervention: lactation-consultant visit
Matich & Sims	1992	159	WIC Breastfeeding and bottle feeding	-	C	IDQ S	Third trimester, 4 weeks postpartum	Information support
Matthews	1993	61	Primiparous	-	D	IDQ I	Hospital discharge, 6-8 weeks postpartum	Correlation between childbirth education classes and breastfeeding duration
McNatt & Preston	1992	45	Primiparous	-	D	HBSS	6 weeks postpartum	Information support

Table 3 (Cont'd)

Methodologies of Studies of External Resources and Breastfeeding Duration

Author	Year	Sample Size	Sample Characteristics	Theory	Design Type	Method	Time Frame/Intervention	External Resources Identified
Quarles, et al.	1994	161	Breastfeeding	-	I	I	I and 4 months postpartum	Intervention: exposure to lactation consultant, significant difference in experimental group
Rentschler	1986	150	Married, Primiparous	-	C	IDQ SR	During childbirth class, 6 weeks postpartum	Did not demonstrate relationship between husband's support and success with breastfeeding
Wiles	1984	40		-	I	IDQ		Intervention: prenatal breastfeeding education program, experimental group had significantly higher frequency of breastfeeding success and scored higher on perception of their infants

Design Type:
C=Correlation
D=Descriptive
I=Intervention
Q=Qualitative
M=Meta-analysis

Method:
IDQ=Investigator Designed Questionnaire
S=Self Report
I=Interview
PSS=Perceived Stress Scale
BAS=Breastfeeding Attitude Scale
BES=Breastfeeding Experience Scale

External Resources:
IS=Information support
PS=Perceived support
DS=Doula support
SS=Spouse support
AO=Acceptance of others

*Data not available

Social support is a variable that is identified as a significant factor determining the duration of breastfeeding (Baranowksi, et al., 1983; Barron, et al., 1988; Bottorff, 1990; Duckett, Henly, & Garvis, 1993; Matich & Sims, 1992). Emotional, informational, and network are various types of social support examined in the literature. In addition, the mother's perception of her partners attitudes toward breastfeeding strongly influence her decision whether to breastfeed or bottle-feed. Freed, Fraley, and Schanler (1993) found that if a mother perceives that her partner has negative feelings about breastfeeding, she will probably not choose this method of infant feeding. Conversely, Littman, Medendorp, & Goldfarb (1994) concluded that, in a sample of 115 postpartum women, a strong approval of breastfeeding by the father of the baby was associated with a higher incidence of breastfeeding. The incidence of breastfeeding was 98.1% in the group with strong approval of the father as compared to 26.9% in the group where the father was indifferent to the feeding choice ($p < .001$). The effect of social support on breastfeeding initiation and duration has been demonstrated in these studies.

Barron et al. (1988) studied 40 low-income primiparous

women and the relationship between support and breastfeeding duration. This descriptive study used a structured interview designed by the investigator. The initial interview was completed shortly after delivery, and then each subject was contacted by phone every 2 weeks until 3 months post delivery. The structured interview was designed to ascertain information on the presence a of support person, the attitudes of the support person towards breastfeeding, the mother's own attitude toward breastfeeding, and the reasons for terminating breastfeeding. The sample was then divided into two groups for analysis; one group included the mothers who breast-fed for 2 months or less and the other group was comprised of mothers who breast-fed for longer than 2 months. Forty percent of the mothers in the sample terminated breastfeeding before 2 months post-delivery. The results demonstrated that there was a positive correlation between those mothers who indicated that they had sources of assistance for the first 2 weeks post-delivery and breastfeeding duration. Those mothers with assistance in the first 2 weeks breastfed longer. A chi-square test was used for this analysis and showed an association between

outside assistance and breastfeeding duration (X^2 = 9.90, p < .003). In addition to this finding, there was a positive correlation between the number of friends that were currently breastfeeding and breastfeeding duration, showing a Pearson correlation of r = .32, p < .05. There was no significant relationship between the mother's perceived attitudes of family and friends and breastfeeding duration.

Sources of support were also examined in the study by Matich and Sims (1992). In this two-group, longitudinal design, the investigators surveyed a total of 159 breastfeeding and bottle-feeding women. An initial survey was completed during the third trimester of the pregnancy, and all subjects were asked to complete the questionnaire. A second survey was completed only by the breastfeeding mothers at 4 weeks postpartum. The survey was an investigator-designed tool that incorporated social support variables, affective variables, and demographic information. The social support tool was developed to elicit information about tangible, emotional, and informational support. Content validity was determined and the Cronbach's alpha for each of the three scales, tangible, emotional, and

informational support, was reported as .88, .94, and .93, respectively.

Tangible and emotional support were not significantly different between those mothers planning to bottle feed and those mothers planning to breastfeed. However, informational support was significantly higher for those mothers planning to breastfeed (t = 2.03, p < .05). In analyzing specific sources of support, those mothers planning to breastfeed indicated that the baby's father was a significant source of tangible, emotional, and informational support as compared with the mothers planning to bottle-feed (t = 2.40, p < .05; t = 1.96, p < .05; t = 2.09, p < .05, respectively). Some caution has to be used in this interpretation, since a larger number of breastfeeding mothers were married than were the bottle-feeding mothers.

In regard to childbirth preparation classes as a source of support, there was a significant relationship between informational and emotional support for those mothers planning to breastfeed who attended class as compared with those mothers bottle-feeding. However, since a majority of mothers who breastfed attended prepared childbirth classes

as compared with the bottle-feeding mothers, the relationship between social support and childbirth classes cannot be determined. In the descriptive study by Matthews (1993), attendance at childbirth class correlated with breastfeeding continuance at 6 to 8 weeks after delivery, with a correlation of $r = .54$, $p < .01$.

Social support and breastfeeding outcomes were examined in the study by McNatt and Freston (1992). Forty-five primiparous, breastfeeding women were measured on their perceived social support at 4 to 6 weeks post delivery, via a mailed questionnaire. The Hughes Breastfeeding Support Scale (HBSS) was used to measure the perceived social support. Content and face validity for the scale was reported. Reliability correlations were obtained from a sample of 30 primiparous women; however, no correlations were given in the report.

After completion of the questionnaire at 4 to 6 weeks post-delivery, the subjects were grouped as satisfied or dissatisfied with breastfeeding based on their response to questions which rated their breastfeeding experience. The groups were then compared on demographic and social support variables. There were no statistically significant

differences between the groups in regard to the demographic variables, and no statistically significant differences between the groups in regard to amount of perceived support or types of support and breastfeeding outcome. The *t*-test was significant concerning the number of people who provided informational support to the mother who, in turn, reported satisfaction with breastfeeding ($t = 2.23$, $p < .03$). Mothers who reported satisfaction with breastfeeding had twice as many information-support providers as compared with women who were not satisfied with their breastfeeding experience.

Although social support, in some form, was found to be significant in the above studies, Renstschler (1986) did not find a significant relationship between the mother's perception of her husband's support and success in breastfeeding. A study of 150 primiparous, married women who intended to breastfeed was undertaken to determine the relationship between the women's level of information about breastfeeding, perception of success with breastfeeding, perception of husband's support with breastfeeding and breastfeeding duration. The study concluded that the level of information about breastfeeding and the mother's

satisfaction with breastfeeding were positively correlated, with point biserial correlation of .32, $p < .001$. However, the mother's perception of husband's support was not correlated with breastfeeding success. The definition of success for the study was continuance of breastfeeding to 6 weeks postpartum.

These findings suggest inconclusive evidence that social support, in some form, positively correlates with longer breastfeeding duration. These studies examined social support from different perspectives and the tools used to measure the variables were often investigator-developed and lacked supportive reliability and validity. Generally, the studies were not theory-driven, and social support was not distinctly defined.

The relationship between external resources and breastfeeding duration will be examined in this study. Specifically, perceived social support was measured on the HBSS and correlated with breastfeeding duration. In addition, sources of information and support was measured on the PDF and correlated with breastfeeding duration.

External Resources: Intervention Studies. Studies examining the effect of educational programs as external resources have been limited and inconclusive in identifying specific interventions that increase the duration of breastfeeding. Three quasi-experimental studies evaluate the effect of interventions in regard to breastfeeding duration. Grossman, Harter, Sachs, and Kay (1990) studied 97 low-income mothers planning to breastfeed. Subjects included both primiparous and multiparous mothers. Mothers were assigned to the control or experimental group by random coin toss. The control group received the routine education during their hospital stay following delivery, and arrangements were made to contact them by phone at 6 weeks post-delivery. The experimental group received a visit from a lactation consultant during her hospital stay and subsequent contact by phone to assist with any problems. The phone calls were made to the experimental group at 2, 4, 7, and 10 days, and then again at 3 weeks post-delivery. At 6 weeks post-delivery, all subjects were contacted by phone and questioned regarding current method of feeding, age at weaning and supplementation (if applicable), and participation in the WIC program.

In the results of the study, there were no significant differences between the groups in regard to breastfeeding duration. There were no significant differences between groups in relation to the variables of race, marital status, and need to return to work and breastfeeding duration. The lack of prenatal childbirth education was associated with a shorter breastfeeding duration, with a $p < .006$. Those mothers not attending childbirth classes had significantly shorter breastfeeding durations as compared with mothers who attended classes.

Forty primiparous mothers were the sample in the quasi-experimental study to determine the effect of prenatal breastfeeding education on breastfeeding success and maternal perception of the infant (Wiles, 1984). The components of the prenatal breastfeeding education program were not detailed, nor, did the researcher describe how they differed from the components in the usual prenatal education classes. The experimental group reported a significantly higher frequency of success ($p < .01$) and scored significantly higher on the neonatal perception of the infant ($p < .001$) than those in the control group.

Hill (1987) examined the effect of prenatal breastfeeding education on the success of breastfeeding in 64 low-income mothers. Mothers were randomized to groups by parity. Two instruments were investigator-developed, the Breastfeeding Knowledge Questionnaire and the Telephone Interview Survey. Content validity was addressed and reliability was reported to be .63 and .66, respectively, for the Breastfeeding Knowledge Questionnaire and The Telephone Interview Survey. The experimental group received an educational program which included a 40-minute, color-slide program with lecture and discussion, followed by a 5-10 minute question and answer period and a pamphlet. The experimental group was post-tested immediately after the program with the Breastfeeding Knowledge Questionnaire. The control group received usual care. At 6 weeks post-delivery, all subjects were contacted by phone for completion of the Telephone Interview Survey.

The experimental and control group were not significantly different in regard to age, marital status, years of education, and income. Pregnant women who received the educational program were more knowledgeable about breastfeeding on the post-test. A one-tailed t-test was

used to contrast the pre-test and post-test, and the results were a $t = 7.99$, $p < 0.001$. There was no significant difference between the control and experimental groups in regard to breastfeeding duration at 6 weeks post-delivery. In addition, the mothers in the experimental group did not perceive themselves to be successful in any greater numbers than the mothers in the control group.

Chen (1993) examined the effects of home visits and telephone contacts on breastfeeding duration in a sample of 180 mothers, 60 subjects per group. Mothers were assigned to one of three non-randomized groups. Subjects in the groups were not significantly different in regard to age, parity, type of delivery, education, and employment. Subjects in Group I received home visits, while subjects in Group II received follow-up telephone calls, and subjects in Group III were the control group. The average length of stay was five days. Subjects in Group I and Group II received the interventions weekly for 2 weeks after discharge and then again during the fourth and eighth weeks postpartum. There was no significant difference in breastfeeding duration between the three groups. The mean number of breastfeeding weeks for Group I, Group II, and

Group III, was 4.07, 3.62, and 3.35, respectively. Multiparous mothers demonstrated a significantly longer duration of breastfeeding ($F = 5.62$, $p < .05$) as compared with the primiparous mothers. The most commonly reported reason for discontinuing breastfeeding was "insufficient milk." Percentages among groups were similar, with 43%, 38%, and 40% of the subjects in Group I, Group II, and Group III, respectively, reporting this problem.

The role of the lactation consultant as an external resource and breastfeeding duration has been examined in several studies. The majority of the studies reveal a significant impact on breastfeeding duration attributable to contact with a lactation consultant. Auerbach (1985) compared 50 infants randomly selected from their WIC population for 1983 and 1984. The mothers of the infants from 1984 had contact with a lactation consultant, whereas the mothers from 1983 did not. Breastfeeding duration for 1984 was significantly longer: 470 total weeks for 1983 as compared with 728 weeks for 1984 ($p < .05$). Fifty percent of the mothers who did not have contact with the lactation consultant terminated breastfeeding before 8 weeks. Sixty-eight percent of the mothers who had contact with the

lactation consultant breastfed their infants longer than 4 months.

The role of the lactation consultant was also examined in the two-group study by Quarles, Williams, Hoyle, Brimeyer, and Williams (1994). One group of mothers was from one hospital and had exposure to a lactation consultant (Hospital I), while the second group of mothers, from a different hospital, did not have exposure to a lactation consultant (Hospital II). There was a notable disparity in group sizes, with 46 subjects in Hospital I group and 115 subjects in Hospital II group. The mode of patient-care delivery was also significantly different between the two hospitals. Subjects from Hospital I were in a LDRP maternity unit, while subjects in the group from Hospital II were in a traditional maternity unit. Mothers in the two groups were signficantly different on the three variables of age (t = 3.59, p < .001), mother's educational level (t = 6.26, p < .001), and father's educational level (t = 7.66, p < .001). Mothers from the Hospital I group, who were exposed to the lactation consultant were significantly older and higher-educated. There was a significant difference in breastfeeding duration between the

two groups. The group exposed to a lactation consultant had a mean length of breastfeeding of 3.1 months (SD = 1.2), as compared with the group not exposed to a lactation consultant, with a mean length of breastfeeding of 2.4 months (SD = 1.2). A one-tailed Mann-Whitney test revealed a $Z = 1.94$, $p < .05$.

Brent, Redd, Dworetz, D'Amico, and Greenberg (1995) examined the efficacy of a lactation consultant program on breastfeeding duration in low-income women. A sample of 108 patients were randomly assigned to either a control or experimental group. The experimental group received a breastfeeding educational program and support from a lactation consultant during the prenatal and postpartum periods. The control group did not see a lactation consultant. The breastfeeding educational program for the experimental group consisted of two to four individual prenatal sessions, a telephone call at 48 hours following discharge, a one-week visit to the lactation clinic, and lactation consultation at each physician visit until weaning or until the child was 12 months of age. The experimental group had a significantly higher initiation of breastfeeding as well as a significantly longer duration of breastfeeding.

The incidence of breastfeeding in the experimental group was 61%, while in the control group the incidence was 31% (X^2 = 9.26, p = .002). The duration of breastfeeding at 2 weeks postpartum was significantly different. Forty-seven percent of the experimental group were still breastfeeding, whereas only 16% of the control group were still breastfeeding (p = .001). At 6 months of age, twice as many subjects in the experimental group were still breastfeeding as compared with the control group; however, this was not statistically significant.

Only one study failed to find a significant difference in breastfeeding duration in subjects exposed to a lactation-consultant intervention. Lynch, Koch, Hislop, and Coldman (1986) completed a randomized control study of 270 breastfeeding mothers. The experimental group received a lactation-consultant intervention and the control group received a routine home visit by a public health nurse. The experimental group received a home visit by the lactation consultant within 5 days of hospital discharge. All subjects were contacted by telephone at 1 month, 3 months, 6 months, and 9 months after delivery to determine breastfeeding status by a blinded interviewer. There was

not a signficant difference in breastfeeding duration between the two groups. Breastfeeding percentages were 84%, 62%, 42%, and 29%, respectively, at 1 month, 3 months, 6 months, and 9 months.

These intervention programs demonstrate that the educational programs were somewhat effective in transferring breastfeeding knowledge to the mothers. However, the studies were limited to measuring the transfer of knowledge and did not explore the other variables that impact how knowledge is then processed into behaviors. The role of the lactation consultant is demonstrated to have a significant impact on the duration of breastfeeding. These studies have not examined what specific interventions employed by the lactation consultant significantly impact the duration of breastfeeding. Therefore, this research study examined the effect of an educational program, conducted by a lactation consultant, and a self-regulation intervention on breastfeeding duration in an experimental group, as compared with a control group only participating in the educational program.

Interferences. Mothers report numerous reasons for terminating breastfeeding earlier than intended. Among the

reasons most commonly cited in the literature for termination of breastfeeding are problems encountered, breastfeeding practices, and psychosocial factors. Table 4 depicts the methodologies of studies examining interferences and breastfeeding duration.

Interference: Insufficient Milk Supply and Formula Supplementation. Under the category of problems encountered, the most common problem reported by the breastfeeding mother is the perception of insufficient milk (Barron, et al. 1988; Chapman, Macey, Keegan, Borum, & Bennett, 1985; Cornett, 1989; Duckett, et al. 1993; Hill, Humenick, Argubright, & Aldag, 1997; Hillewik-Linquist, 1991; Lawson & Tulloch, 1995; Rentschler, 1991; Watters & Kristiansen, 1995). Insufficient milk supply "can be conceptualized as a state in which a mother has or perceives that she has an inadequate supply of breast milk to either satisfy her infant's hunger and/or support the infant's adequate weight gain" (Hill & Humenick, 1989, p. 147). The most-common symptoms reported by mothers that lead to their conclusion of insufficient milk are fussiness between feedings, increased feedings, and lack of satisfaction after feedings (Hill & Aldag, 1991). A breastfeeding mother will

Table 4

Methodologies of Studies of Interferences and Breastfeeding Duration

Author	Year	Sample Size	Sample Characteristics	Theory	Design Type	Method	Time Frame/Intervention	Interferences Identified
Barron, et al.	1988	40	Primiparous, low-income	_	D	IDQ I	Prior to hospital discharge, then every 2 weeks by phone until 3 months postpartum	Perception of low milk supply contributed to supplementation
Bernard-Bonin, et al.	1989	*	Nine studies	-	M	Pooled data under 4 headings	N/A	Significance of nursing support with telephone follow-up on breastfeeding duration
Bruce, Khan, & Olsen	1991	250	Breastfeeding	-	D	IDQ	Postpartum	Mothers having a cesarean delivery were more lik-ly to terminate breastfeeding by 6 weeks
Buxton, et al.	1991	187	Breastfeeding	-	C	IDQ	Prenatl and postpartum interviews	Four variables were identified which predicted breastfeeding failure: lower self-confidence in ability to breastfeed, delayed first-breastfeeding experience, lack of rooming-in

Table 4 (Cont'd)

Methodologies of Studies of Interferences and Breastfeeding Duration

Author	Year	Sample Size	Sample Characteristics	Theory	Design Type	Method	Time Frame/Intervention	Interferences Identified
Chapman, Macey, Keegan, Boram, & Bennett	1985	50	Breastfeeding	-	D	IDQ	Birth to 4 months postpartum	Common concerns expressed were adequate milk supply, sore nipples, frequency of feeding, milk collection and storage.
Coreil & Murphy	1988	44	Breastfeeding	-	D	IDQ	Prior to delivery and at 4-6 weeks postpartum	Supplementation during first 6 weeks postpartum influenced breastfeeding duration, inverse correlation between social support and supplementation
Cornett	1989	119	Breastfeeding mothers attending prepared childbirth classes	-	D	IDQ	1, 4, 8 weeks postpartum	50% of subjects started supplementation due to concern over insufficient milk supply
Duckett, Henly, & Garvis	1993	230	Breastfeeding	-	C	IDQ	Birth to 12 months postpartum	Maternal unease and in-hospital supplementation cited as interferences, concern over milk supply

Table 4 (Cont'd)

Methodologies of Studies of Interferences and Breastfeeding Duration

Author	Year	Sample Size	Sample Characteristics	Theory	Design Type	Method	Time Frame/Intervention	Interferences Identified
Grossman, et al.	1990	97	Low-income	-	I	IDQ Self-report	2,, 4, 7, 10 days and 3 weeks postpartum	
Hillervik-Lindquist	1991	51	Breastfeeding	-	D	IDQ Home visits	Birth to 18 months	55% of subjects reported perceived breast milk insufficiency
Hill	1987	64	Low-income	-	I	IDQ S	6 weeks postpartum	Intervention: slide-education program. No significant difference in breastfeeding duration between groups. Perceived inadequate milk supply was most-commonly cited by mothers for supplementation
Hill	1991	400		-	D	IDQ		Mothers who breastfed within 4 hours after delivery breastfed significantly longer than those mothers who began to breastfeed at 8 hours or longer after delivery

Table 4 (Cont'd)

Methodologies of Studies of Interferences and Breastfeeding Duration

Author	Year	Sample Size	Sample Characteristics	Theory	Design Type	Method	Time Frame/Intervention	Interferences Identified
Hill & Aldag	1996	510	Term and LBW infants	-	C	IDQ	8 weeks postpartum	Decreased breastfeeding rates at 8 weeks for employed mothers, insufficient milk cited as reason for termination, decreased breastfeeding duration in mothers who smoke.
Hill, Humenick, Brennan, & Woolley	1997	343		-	C	IDQ	Breastfeeding rates compared at 4, 8, 12, 16, and 20 weeks for group of mothers reporting exclusive breastfeeding at 2 weeks post delivery and for group of mothers who were supplementing with formula at 2 weeks post delivery	Significantly greater percentages of mothers were breastfeeding at all time periods in the group that reported exclusive breastfeeding at 2 weeks post delivery
Kearney, Cronenwett, & Reinhardt	1990	121	Primiparous	-				No significant between type of delivery, pain,or fatigue and breastfeeding duration.

Table 4 (Cont'd)

Methodologies of Studies of Interferences and Breastfeeding Duration

Author	Year	Sample Size	Sample Characteristics	Theory	Design Type	Method	Time Frame/Intervention	Interferences Identified
Kurinij & Shioni	1991	1179	>17 Delivering full-term healthy infant	-	-	IDQ		Delayed initial breastfeeding increased the odds of formula use. Mode of delivery a predictor of exclusive breastfeeding.
Lawson & Tulloch	1995	78	Primiparous	-	C	IDQ	12 weeks postpartum	Timing of the first breastfeeding related to breastfeeding duration.
Matthews	1993	61	Primiparous	-	D	IDQ I	Hospital discharge, 6-8 weeks postpartum	Correlation between childbirth education classes and breastfeeding duration

Table 4 (Cont'd)

Methodologies of Studies of Interferences and Breastfeeding Duration

Author	Year	Sample Size	Sample Characteristics	Theory	Design Type	Method	Time Frame/Intervention	Interferences Identified
Piper & Parks	1996	2372	1998 National Maternal-Infant Health Survey	-	C			Predictors of duration > 6 months were full breastfeeding duration first month postpartum, nonsmoking, higher parity, prenatal intent, delayed return to work, increased birth weight, and increased maternal age
Quinn, Koepsell, & Haller	1997	101	Vaginal delivery	-	C	IDQ	6 to 8 weeks post delivery	No different was found in incidence of breastfeeding at 6 to 8 weeks PP in molters who had a 48-hour length of stay as compared with mothers who had 24-hour length of sty. Two most common reasons for termination of breastfeeding was perceived insufficient milk (35%) and return to work (19%).

Table 4 (Cont'd)

Methodologies of Studies of Interferences and Breastfeeding Duration

Author	Year	Sample Size	Sample Characteristics	Theory	Design Type	Method	Time Frame/Intervention	Interferences Identified
Richardson & Champion	1992	102	Breastfeeding, term infants with no complications	-	C	IDQ	Hospital discharge, 6 and 12 months postpartum	Negative correlation between formula supplementation and breastfeeding duration
Sayers, Thronton, Corcoran, & Burke	1995	162	Breastfeeding	-	C	IDQ	Birth to 12 weeks postpartum	Smoking correlated with shorter duration of breastfeeding in lower social class.

Design Type:
C=Correlation
D=Descriptive
I=Intervention
Q=Qualitative
M=Meta-analysis

Method:
IDQ=Investigator Designed Questionnaire
S=Self Report
I=Interview

often terminate breastfeeding or begin formula supplementation when she perceives she has inadequate milk. Hill (1991) found that perceived inadequate milk supply was the reason most commonly cited by mothers for supplementing with formula. In addition, 44% of the mothers who weaned in the study by Rentschler (1991) reported insufficient milk as the primary problem.

In a longitudinal study of 44 breastfeeding mothers over one year following birth, the relationship between formula supplementation and duration was explored (Coreil & Murphy, 1988). Using multiple regression analysis, Coreil and Murphy (1988) concluded that formula supplementation was a predictor of breastfeeding duration, with a regression coefficient of 2.78 ($F = 4.74$, $p < .05$). Supplementation during the first 6 weeks postpartum had a negative influence on breastfeeding duration. In addition, this study found a negative relationship between supplementation and social support ($r = -0.42$, $p < .01$). Two variables, intended duration and supplmentation, explained 48% of the variance in the dependent variable of breastfeeding duration. The study concluded that early supplementation increased the risk of early weaning and that a lack of social support may

be a mediating variable in the decision to use formula supplementation (Coreil & Murphy, 1988). The study found no correlation between returning to work and breastfeeding problems with formula supplementation.

Cornett (1989) found that over 50% of the subjects in the descriptive study started supplementing with formula due to a concern over insufficient milk supply. The perception of low milk supply and supplementation was also supported in the study by Barron, et al. (1988). In this study of 40 mothers, 40% of the subjects terminated breastfeeding before 2 months. Fifty-seven percent of the mothers who terminated breastfeeding cited milk insufficiency as the primary reason. Milk insufficiency was significantly correlated with breastfeeding less than 2 months ($X^2 = 6.2$, $p < .02$). Richardson and Champion (1992) also found a significant negative correlation between formula supplementation and breastfeeding duration ($r = -.32$, $p < .04$).

Interference: Delay in the Initial Breastfeeding Session. In addition to breastfeeding problems, certain breastfeeding practices, such as a delay in the initial breastfeeding experience and early supplementation with formula, have been correlated with early termination of

breastfeeding. As mentioned, the perception of inadequate milk supply often leads the mother to begin formula supplementation. However, certain hospital practices with supplementation and a delay in initiating the breastfeeding experience may contribute to early termination.

Length of breastfeeding and early supplementation was compared in two groups of mothers at 20 weeks post delivery (Hill, Humenick, Brennan, & Woolley, 1997). Mothers (N = 343) were surveyed at 2 weeks post delivery to determine if supplementation with formula was being used. The sample was then divided into 2 groups, those mothers who were exclusively breastfeeding at 2 weeks and those mothers who were supplementing with formula at 2 weeks. The breastfeeding rate of these two groups of mothers was compared at 4, 8, 12, 16, and 20 weeks. For each time period, those mothers who reported exclusive breastfeeding at 2 weeks had significantly greater percentages of breastfeeding. At 20 weeks, this trend continued with 63% (Phase I: X^2 = 10.9, p < .001)) and 59.7% (Phase II: X^2 = 14, p < .001) who reported exclusive breastfeeding at 2 weeks were still breastfeeding at 20 weeks as compared with only

28% (Phase I) and 24.2% who reported supplementation at 2 weeks were still breastfeeding.

Hill (1991) examined the relationship between the timing of the first feeding after delivery and breastfeeding duration. In a study of 400 subjects, timing of the first breastfeeding experience was grouped into four categories: within one hour after delivery, two to four hours after delivery, five to seven hours after delivery, and eight hours or longer after delivery. For these categories, the mean duration of breastfeeding was 43, 40, 37, 31 days, respectively. A one-way ANOVA indicated that the means were significantly different ($F = 6.23$, $p < .0004$). A post-hoc analysis concluded that those mothers breastfeeding less than four hours after delivery breastfed significantly longer than those mothers who began to breastfeed at eight hours or longer after delivery.

The importance of timing of the initial breastfeeding session was supported in the study by Kurinij and Shioni (1991). The time between birth and the initiation of breastfeeding was a strong predictor of formula use. The longer a mother waited to initiate breastfeeding, the more likely she was to use formula. The adjusted odds ratio for

women who initiated breastfeeding within 2 to 6 hours was 1.1 (CI: 0.7-1.9, $p < .05$), within 7 to 12 hours was 0.5 (CI: 0.3-0.8, $p < .05$), and greater than 12 hours was 0.2 (CI: 0.1-0.4, $p < .05$).

Interference: Cesarean Delivery. Often the mother who experiences a cesarean delivery may have a delay in initiating breastfeeding (Kearney, Cronenwett, & Reinhardt, 1990). The literature is inconclusive in determining if this mode of delivery is a significant factor in breastfeeding duration. Hospital practices and mode of delivery were explored in a study of 250 mothers by Bruce, Khan, and Olsen (1991). The study concluded that those mothers undergoing a cesarean delivery were more likely to terminate breastfeeding by 6 weeks. However, a study of 121 primiparous mothers to examine the impact of cesarean delivery on breastfeeding found no significant relationships between delivery type, pain, or fatigue and breastfeeding duration (Kearney, Cronenwett, & Reinhardt, 1990).

Kurinij and Shioni (1991) found that breastfeeding and delivery mode was significantly correlated ($r = -.38$, $p < .05$). A vaginal delivery was a predictor of exclusive breastfeeding, the odds ratio was 1.8 (CI: 1.1 - 2.8).

Interference: Psychosocial Factors. Psychosocial factors determined to impact breastfeeding include confidence in ability to breastfeed, less certainty in the decision to breastfeed, depressive disorder, and smoking. Mothers who smoke had significantly shorter breastfeeding durations (Hill & Aldag, 1996; Sayers, Thornton, Corcoran, & Burke, 1995). Buxton, et al. (1991) explored variables that predicted failure to breastfeed for more than seven days. The study of 187 mothers identified four significant variables that predicted breastfeeding failure. Lower self-confidence in ability to breastfeed, less certainty in the decision to breastfeed, delayed first breastfeeding experience, and lack of rooming-in with the baby all demonstrated significant probabilities for early termination of breastfeeding. The predicted probabilities based on logistic regression for the four variables were .28 (X^2 = 13.31, $p < .001$), .33 (X^2 = 9.85, $p < .01$), .18 (X^2 = 5.88, $p < .02$), and .26 (X^2 = 4.40, $p < .05$), respectively (Buxton, et al. 1991).

Piper and Parks (1996) utilized the 1988 National Maternal-Infant Health Survey of 2372 breastfeeding women to examine predictors of duration of breastfeeding. Several of

the previous mentioned interferences were noted in this study. Significant predictors of breastfeeding duration at 6 months were full breastfeeding during the first month postpartum (Odds ratio = 3.49; CI = 2.641 - 4.623; R = -0.1829), nonsmoking postpartum (Odds ratio = 1.956; CI = 1.435 - 2.667; R = 0.0846), higher parity (Odds ratio= 1.694; CI = 1.069 - 2.684; R = 0.0360), consistency with prenatal intent (Odds ratio = 1.68; CI = 1.309 - 2.159; R = -0.0794), childbirth education (Odds ratio = 1.46; CI = 1.140 - 1.879; R = -0.0556), delayed return to work (Odds ratio = 1.344; CI = 1.229 - 1.470; R = 0.1389), increased birth weight (Odds ratio = 1.134; CI = 1.047-1.228; R = 0.0556), and increased maternal age (Odds ratio = 1.055; CI = 1.030 - 1.073; R = 0.0971)

In summary, significant interferences to the breastfeeding experience include perceived insufficient milk supply, supplementation with formula, delayed first experience with breastfeeding, and psychosocial factors such as lower confidence, less certainty in breastfeeding, depressive disorder, smoking, and a return to work.

Self-Regulation

For health-care providers, a priority goal is to assist

individuals in maintaining behaviors that produce optimal health. Numerous factors have been identified that affect the development and maintenance of health-promoting behaviors (Redland & Stuifbergen, 1993). The factors include demographic and socioeconomic characteristics, motivation, self-efficacy, and barriers and facilitators. By acknowledging these factors, the health-care provider can plan appropriate interventions to assist individuals in developing and maintaining healthy behaviors. The use of behavioral strategies such as self-regulation can enhance the development of these healthy behaviors (Redland & Stuifbergen, 1993). The self-regulation intervention of self-monitoring was used in this study. The effect of this intervention on maintaining the health behavior of breastfeeding was examined.

These interventions for health promotion are often referred to as self-management strategies and have historically been used to assist individuals in maintaining healthy behaviors in chronic disease. These self-management tasks assist individuals in addressing complex problems associated with managing their disease (Clark, Janz, Dodge,

& Sharpe, 1992). Latham and Locke (1991) write,

> ...training in self management teaches people to assess their problems, to set specific hard goals in relation to those problems, to self-monitor ways in which the environment facilitates or hinders goal attainment, and to identify and administer rewards for working toward and penalties for failing to work toward goal attainment. Consequently, the people who receive this training learn to observe their own behavior, to compare their behavior with the goals that they set, and to self-administer rewards and punishments to bring about and sustain commitment to their goals (p. 234-235).

Self-Monitoring

Self-monitoring is a strategy by which an individual can monitor one's own performance and thus can influence one's motivation and action (Bandura, 1991). The monitoring of one's performance accomplishes two important functions in the process of self-regulation. First, it provides information needed for setting realistic goals, and second, it provides information for evaluating one's progress toward the goals (Bandura, 1991).

The use of the health diary or daily log has been a prospective procedure used for three primary purposes. Health diaries have been used in research studies to compare reporting levels for procedures, to function as a memory aid to improve recall of health events, and to serve as a primary data source (Verbrugge, 1980). For this study, the health diary was used to monitor the mother's breastfeeding experience and compare breastfeeding patterns.

Verbrugge (1980) reviewed the use and application of the health diary in research studies and made recommendations for the continued use of the health diary or log in practice. Among the advantages in using a health diary are a lower recall error, thus resulting in more valid data. In one of the studies reviewed by Verbrugge (1980), there were very high rates of agreement to complete the diary and high rates of continuation of the diary. Total attrition in the studies was very low, and when it did occur it did so in the beginning of the data collection. The study found that most of the studies reported good data quality, seldom reporting missing pages or missing data. The author concluded that when subjects are monitored and given active encouragement throughout the diary period,

their diaries suffer less missing data. Burman (1995) also recommends the use of follow-up procedures during data collection to enhance completion rates, particularly if the diaries are returned through the mail.

Verbrugge (1980) addresses two conditioning effects of using health diaries: sensitization and fatigue. Additionally, researchers should note the considerations of survey costs, the complexity of collecting, editing, and coding the health diary data, and the complexity of data analysis in determining the appropriateness of this form of methodology in research.

There are two general types of health diaries, a ledger or a journal diary. A ledger diary is used to record only when certain events occur, whereas daily entries may be made in a journal diary regardless of whether an event occurred (Burman, 1995). The length of a diary period varies greatly. The length of time for the diary period needs to be determined dependent upon the purpose (Burman, 1995). Diary periods can be short and some have been as long as several years (Verbrugge, 1980). In research, diaries typically have been completed for a period of 2 to 4 weeks (Burman, 1995).

The American Academy of Pediatrics (1997) supports the "maternal recording of the time of each breastfeeding and its duration, as well as voiding and stooling during the early days of breastfeeding in the hospital and at home, greatly facilitates the evaluation process" (p. 1026).

Summary of the Review of the Literature

Breastfeeding is the optimal infant-feeding method and encompasses numerous physiological and psychological benefits for the mother and infant. However, current breastfeeding initiation and duration rates are well below the national targets. The highest incidence of breastfeeding is found in women with college education and higher income level who are non-WIC and over 30 years of age. However, the largest increase in breastfeeding at hospital discharge in recent years is in women with a lower education, employed full-time, under 20 years of age, income less than $10,000, primiparous, WIC, Hispanic or African American (Ross, 1995). Although more women are initiating breastfeeding, only a small percentage continue to their intended duration.

During childbearing, a new mother is confronted with many transitions and changes in roles. For the

breastfeeding mother, the skill of breastfeeding must be learned. Social cognitive theory provides a framework for understanding how knowledge of breastfeeding is acquired and transformed into a successful experience. One component of the social cognitive theory that increases an individual's self-efficacy is self-monitoring.

Research in the area of breastfeeding has primarily focused on isolating factors impacting the experience. Factors positively correlated with breastfeeding include social support, parity, prepared childbirth classes, exposure to a lactation consultant, and postpartum follow-up. Factors correlating with breastfeeding weaning include perceived insufficient milk supply, formula supplementation, delayed initial breastfeeding session, cesarean delivery, smoking, lack of social support, and lack of confidence or uncertainty with breastfeeding. Research to examine specific interventions to promote successful breastfeeding has been somewhat limited. Therefore, this research study explored the effects of a theory-based intervention, self-regulation, on breastfeeding duration during the 6 months postpartum in primiparous mothers.

CHAPTER III

PILOT STUDY

The pilot study for this research plan included several components that provided essential information for refining the research protocol and determining the sample size for the full study. The first phase of the pilot study was to examine the effect of the self-regulation intervention on breastfeeding duration in a study of 16 subjects randomly assigned to two groups. Following the analysis of the first phase of the pilot study, it was determined that modifications to the pilot study were necessary to ascertain additional data. These modifications guided the second phase of the pilot study to examine additional characteristics of the subject population and to evaluate the data collection instrument in the control group. Specifically, the pilot study assisted in refining the intervention protocol for the implementation of the research plan, determining the length of time required to complete the data collection instruments, determining a menu of specific reinforcers for the self-regulation intervention,

estimating the effect size for the sample size estimation of the full study.

Pilot Study, Phase I

The first phase of the pilot study began on March 12, 1996, following approval of the Institutional Review Committee at Wheeling Hospital and the Psychosocial Institutional Review Board at the University of Pittsburgh. This first phase involved 16 subjects who were randomly assigned to two groups using permuted blocks within strata randomization for the purpose of evaluating and refining the developed research protocol. Stratification prior to randomization was used to equalize subjects between the two treatment groups on the variable of degree of breastfeeding, planned partial or full breastfeeding for the first 6 weeks.

Research Design

This phase of the pilot study employed a two-group design, a control group and an experimental group, to evaluate the effect of the self-regulation intervention on breastfeeding duration. All subjects received the educational session on breastfeeding in order to equalize the education received in both groups in order to control for this variable. However, only the experimental group

participated in the self-regulation intervention involving self-monitoring, contracting, and reinforcement. The self-regulation intervention involved participation for 6 weeks. Breastfeeding duration was compared for each group at the 6 week data collection point. The design for data collection during Phase I of the pilot study is depicted in Table 5.

Research Procedure

The investigator reviewed the daily census logs on the postpartum unit to determine potential subjects who met the inclusion and exclusion criteria. Postpartum mothers were invited to participate in the pilot study if they met the following inclusion criteria: a) primiparous; b) between the ages of 18 and 40; c) planned to breastfeed; e) able to read, write, and speak English; d) attended the prenatal class on breastfeeding; e) vaginal delivery; and f) delivery of healthy infant greater than 38 weeks gestation. Mothers were excluded from the pilot study if the initial breastfeeding experience was delayed for more than two hours or if the infant was unable to breastfeed due to a medical condition.

During the pilot study, a log (Appendix L) of all breastfeeding mothers at the research site was maintained to

Table 5

Research Design for Phase I: Pilot Study

ASSESSMENTS	TIME					
GROUP/ INSTRUMENT	TIME 1	1 WEEK	2 WEEK	3 WEEK	4 WEEK	5 WEEK	TIME 2
EXPERIMENTAL GROUP							
1. PDF	X						
2. BEI, HBSS, POMS	X						
3. Telephone Contact		X	X	X			X
4. Self-Regulation		X	X	X	X	X	X
5. Breast-Feeding Instrument		X	X	X	X	X	X
CONTROL GROUP							
1. PDF	X						
2. BEI, HBSS, POMS	X						
3. Breast-Feeding Instrument		X	X	X	X	X	X

Note: PDF (Personal Data Form), BEI (Breastfeeding Experience Instrument), HBSS (Hughes Breastfeeding Support Scale), POMS (Profile of Mood States).

identify the characteristics of the breastfeeding population at Wheeling Hospital. Each breastfeeding mother, delivering during the subject recruitment phase of the pilot study, was evaluated for demographic factors and data according to the inclusion and exclusion criteria established for this study. For those mothers meeting the study criteria, the log also included their decision regarding participation in the study. To ensure confidentiality, the log was maintained by the investigator and secured in a locked file cabinet. The log was used to determine the percentage of eligible subjects participating in the study. In addition, the log was used to identify the population characteristics of breastfeeding mothers at Wheeling Hospital.

Those mothers meeting the inclusion and exclusion criteria were visited by the investigator and a prepared statement was read to introduce the research study (Appendix J). Those mothers who were interested in participating in the study were asked to sign the consent form. Three copies of the consent form were obtained. One copy of the consent form was given to the subject, the second copy was placed on the mother's hospital record, and the third copy was kept by

the investigator and maintained in a locked, secured file cabinet.

Data collection points for all subjects were designated as Time 1: 12 to 24 hours following delivery; Time 2: 6 weeks following delivery. Subjects remained in their assigned groups throughout the data collection period.

Time 1. Following the completion of the consent form, all subjects were taken to the educational room to complete the following measurements: a) Personal Data Form (PDF); b) Breastfeeding Experience Instrument (BEI); c) Hughes Breastfeeding Support Scale (HBSS); and d) Profile of Mood States (POMS). The investigator measured the length of time it took each subject to complete the instruments. The educational room was used consistently for all data collection in the hospital environment to reduce threats to internal validity.

Following the completion of the data instruments, the investigator met with each subject in the educational room on the obstetrical department. All subjects received two breastfeeding pamphlets from the investigator, Nursing Your Baby For the First Time (Danner, 1996) and Breastfeeding Basics (Clark, Tullo, & Bolane, 1996). The investigator

presented the videotaped breastfeeding educational session, which included the following topics: supporting the breast; positioning your baby; getting started with the rooting reflex; getting started with latching on; how the baby gets breast milk; breastfeeding positions; ending a feeding; burping the baby; fathers; getting help and encouragement; bottle-feeding and nipple confusion; waking a sleepy baby; relief of sore nipples; care of cracked nipples, plugged ducts, and mastitis; relief of engorgement; areolar expression and breast massage; manual expression and pumping; electric pumping; supplemental breastfeeding; and maternal diet needs (Breastfeeding chart and teaching notes, Bolane & Predmone, 1991). Following the presentation of the breastfeeding educational session the investigator answered any questions the subject had in regard to breastfeeding.

Following the completion of the educational session, each subject was asked to indicate whether she planned on full breastfeeding or partial breastfeeding. The definitions of full and partial breastfeeding were read to each subject. Given the subject's plans for their degree of breastfeeding, the subjects were assigned to either the control group or the experimental group using a

randomization schedule generated by a statistician using permuted block randomization. Permuted block randomization within strata was utilized to balance treatment groups within each level of breastfeeding. This design was chosen to prevent confounding of the treatment with this critical variable since research demonstrates that mothers who supplement with formula wean significantly sooner (Coreil & Murphy, 1988; Hill, 1991; Kearney, Cronenwett, & Barrett, 1990).

Following assignment into groups, the investigator met with the experimental group to provide directions on the self-regulation intervention of self-monitoring, contracting and reinforcement. The subjects in the experimental group were instructed on the process for completing the Breastfeeding Daily Logs and the return of the logs to the investigator on a weekly basis in the pre-addressed, stamped envelopes. The subjects in the experimental group were instructed on completion of the Breastfeeding Daily Log starting at the time they were assigned to the experimental group and continuing until 6 weeks following delivery.

Additionally, the subjects in the experimental group were asked to complete a Breastfeeding Contract and then

instructed on self-selecting a reinforcer when standards were achieved. The contract detailed personal standards on length of breastfeeding, degree of breastfeeding, and commitment to evaluating the daily and proximal standards. Daily proximal standards and weekly distal standards for breastfeeding were set according to documented standards in the literature (Lawrence, 1994; Riordan & Auerbach, 1993). In addition to the referential standards, personal standards were identified for each subject depending on their intended duration and their intended degree of breastfeeding, full or partial. The subjects were asked to sign two copies of the contract; one copy was given to the subject and the second copy was kept by the investigator in a locked, secured file cabinet.

For the reinforcement component of the intervention, subjects were asked to list five leisure activities as their reinforcers, activities that they have enjoyed in the past and that could be completed in less than two hours. At the end of each day and each week, each subject was asked to identify if the proximal and distal standards had been met. As standards were attained on a weekly basis, subjects were directed to self-select one of the identified reinforcers.

External reinforcement was provided by the investigator during the telephone contacts at 1 week, 2 weeks, 3 weeks, and 6 weeks. The investigator positively reinforced any progress made toward goal attainment with verbal praise. If goal attainment was not progressing, the investigator praised the subject's breastfeeding efforts.

Following assignment into groups, the investigator also met with the subjects in the control group and they were instructed on the process for weekly completion of the Breastfeeding Instrument. All subjects were instructed on the process for the 6 week telephone interview.

Time 2. The Time 2 data collection period was at 6 weeks following delivery. Twenty-four to forty-eight hours prior to the Time 2 data collection period, the investigator sent a postcard to all subjects reminding them of the telephone interview. At 6 weeks post delivery, the investigator attempted to contact all subjects by telephone to complete the following measurements: a) BEI; b) HBSS; and c) POMS. Five of the subjects were unable to be reached by telephone to complete the questionnaires. After two unsuccessful telephone attempts, the questionnaires were mailed to the subjects. All mailed questionnaires were

returned. The time for the completion of the measurements during the telephone interview was 10 to 15 minutes. Any questions or problems reported by the mother were directed appropriately to their primary health care provider. In addition to the completion of the measurements, the subjects in the experimental group were asked to review their recent Breastfeeding Logs with the investigator.

Following participation in the research study, the investigator sent a note to each subject expressing gratitude for her participation in the study and extending best wishes to her family.

Research Findings

The findings for Phase I of the pilot study will be discussed based on the sample characteristics and the identified aims of the pilot study. The aims of the pilot study were to refine the protocol for the implementation of the research plan, determine the length of time required to complete the data collection instruments, identify a menu of reinforcers, and evaluate the subject's responses to the research plan.

Sample Characteristics. During the subject recruitment phase of the pilot study, March 12, 1996 through May 21,

1996, 119 breastfeeding mothers delivered at the research site. Of the 119 breastfeeding mothers, 46 (38.7%) mothers were primiparous and 73 (61.3%) mothers were multiparous. Therefore, based on gravida, there were 46 potentially eligible subjects. The mothers were then screened according to the remaining inclusion and exclusion criteria. Of the 46 primiparous mothers, 19 (41%) met all of the inclusion criteria. Table 6 identifies the inclusion/exclusion criteria not met by 27 of the screened primiparous mothers. Of the 19 eligible mothers, 16 (84.2%) consented to participate in the study. Two of the eligible mothers declined to participate. One mother cited "not enough time" as the factor for declining to participate and the other mother cited "being overwhelmed and having reservations about breastfeeding." One eligible subject was lost to the study due to a weekend delivery.

Additional demographic data for the breastfeeding population at the research site was collected during the subject-recruitment phase of the pilot study. The demographic factors of age, marital status, race, and educational level were compared for the total population at the research site, then compared with the breastfeeding

Table 6

Inclusion/Exclusion Criteria Not Met in Population at Research Site in Phase I: Pilot Study

Inclusion/Exclusion Criteria	n (%)
Cesarean Delivery	16 (59.3%)
Initial Breastfeeding Delayed > 2 hours	7 (25.9%)
Infant <38 weeks gestation	3 (11.1%)
No prepared childbirth education	1 (3.7%)

population and the subjects in the research study. The demographic findings in the breastfeeding population at the research site support the existing literature that it is generally the older, higher-educated, married mother who decides to breastfeed. The comparison of the demographic characteristics is detailed in Table 7.

Evaluation and Recommendations. In addition to the analysis of the demographic data during the course of the pilot study, additional analyses were made regarding the identified aims of the research study. The following

Table 7

Comparison of Demographic Data Between Total Population

Total Breastfeeding Population at Research Site

Demographic Data	Total Population n=240	Breastfeeding Population n=119	Research Study Population n=16
Age			
M	27.89	28.24	25.88
SD	5.43	4.88	5.31
Marital Status			
-Married	82.5%	86.9%	75%
Race			
-Caucasian	96.7%	95.4%	100%
Educational Level			
-Less than high school	9.2%	3.8%	
-High School	31.3%	26.9%	25.0%
-Some college	31.3%	30.0%	18.75%
-College degree	18.3%	23.8%	50.0%
-Above college degree	10.0%	15.4%	6.25%

discussion includes each identified aim and the findings/recommendations from the pilot study based on investigator and subject evaluation.

1. Refine the protocol for the research plan.

   A. Smoking status, categories for occupation, type of delivery, sex of infant, birth weight, and discharge weight not included in data collection. These variables need to be analyzed for an association with breastfeeding duration. These variables to be included on the PDF in the full study.

   B. Seven breastfeeding mothers (25.9%) did not meet the inclusion criteria for the pilot study, due to a delay in the initial breastfeeding experience greater than 2 hours following delivery. For this group, the mean length of time for the initial feeding was 4.0 hours. In addition, 10 out of the 16 breastfeeding mothers who did not meet the inclusion criteria due to a cesarean delivery also had a delay in the initial breastfeeding experience, with a mean of 7.7 hours. This variable has been shown to have an association to

breastfeeding duration. To analyze the effect of this variable, it is recommended to delete this variable as inclusion criteria in this research study and examine it as a variable in the data analysis. Include the time of the initial breastfeeding experience on the BEI.

Of the primiparous mothers, during the recruitment phase of the pilot study, 59% were excluded from the study due to their mode of delivery, cesarean delivery. Since the existing literature is inconclusive on the effect of this mode of delivery on breastfeeding duration, it is recommended to include all primiparous mothers in the full study and use mode of delivery as stratifying factor during randomization. In addition, plans to return to work is to be used as an additional stratifying factor in the full study.

C. Screening for subject eligibility was maintained in a log with 12 subjects per page. For the full study it is recommended that a form be developed to screen each potential subject individually and

be filed with the research materials.

D. The contracting and self-reinforcement components of self-regulation were used in the pilot study. It was found that the components in the contract actually included standards for breastfeeding from the literature and personal standards developed by the subject, rather than a contract component specifying goals to be attained and consequences of attaining or failing to attain the goals (Latham & Locke, 1991). In addition, subjects displayed some uneasiness with the concept of contracting and reported that it was difficult to find the time to use the reinforcers. Therefore, it is recommended to delete the Breastfeeding Contract and the self-reinforcers. In addition, include a Breastfeeding Plan that outlines the breastfeeding standards and incorporate the plan as a component of the self-monitoring intervention.

E. One subject commented in the evaluation that it would be helpful to change Mother's Breastfeeding Log to include more spaces for comments and

several questions to prompt responses to questions on mother's feelings and infant's behavior. This recommendation included in the full study.

F. Since data collection on the dependent variable is by self-report, it is recommended to corroborate the data received from the subject to strengthen the internal validity of the study. Therefore, it is recommended to develop a questionnaire to be sent to the infant's physician to corroborate evidence on length of breastfeeding and to obtain data on infant's weight gain.

G. Degree of planned breastfeeding was treated as a stratifying factor for randomization. Only two subjects in the pilot sample planned on partial breastfeeding in the first 6 weeks. Since this was such as small percent, it is recommended to delete this as a stratifying factor in the full study.

2. Determine the length of time required to complete the data collection instruments. The mean length of time to complete the data collection instruments during the Time 1 period was 17 minutes. The mean length of time

to complete the data collection instruments during the Time 2 period was 13 minutes.

3. Identify a menu of reinforcers for the experimental group intervention. Subjects in the experimental group were asked to identify five reinforcers. The reinforcers identified included leisure and relaxation activities: go for walk, go shopping, go to library, visit friend, take a bath, do sewing, read a book, buy a small gift, and do nails.

4. Evaluate the subjects' response to the research. Subjects' responses to the data collection instruments were monitored throughout the study. The subjects responded unanimously that the paper-and-pencil questionnaires were easy to understand. Several subjects reported some confusion on the POMS questionnaire, since it directs the respondents to relate how they have felt in the last week. During the postpartum period there are so many variations in mood that the subjects had experiences in the last 24-48 hours for which they had some difficulty in determining a response. The subjects unanimously found the videotaped educational session and pamphlets easy to

understand. Overall, the experimental group responded very favorably to the Breastfeeding Log. Among the mother's responses were comments such as, "Made me feel confident baby was getting enough to eat"; "It helped a lot, it made me feel good, it helped me to regulate my schedule"; "I gave copies of the log to my friend who is breastfeeding"; and "It has been really helpful". All mothers reported it was easy to understand. One mother reported that it was time- consuming. The recommendation for the full study is to eliminate the POMS instrument, since there is concern over validity of the data.

5. Estimate the effect size for the proposed larger study. Sixteen subjects participated in Phase I of the pilot study, 8 subjects per group. Two (12.5%) subjects were lost due to attrition, resulting in 14 subjects completing the pilot study. Of the 2 subjects lost to attrition, 1 (12.5%) was lost per group, resulting in 7 subjects per group. A recommendation for the full study is to over-sample 15% to account for the risk of attrition.

Breastfeeding duration was measured at 6 weeks and compared for the two groups. The mean length of breastfeeding duration in the experimental group was 38 days, with a standard deviation of 10.58. The mean length of breastfeeding duration in the control group was 39 days, with a standard deviation of 7.94. These findings resulted in a calculated effect size of .11. Since the effect size was very minimal, an additional evaluation of the research plan and research population was warranted. A comparison of the breastfeeding initiation and duration rates was made to ascertain any significant differences between the national and the research site breastfeeding populations. Table 8 demonstrates that the initiation rates in West Virginia and at the research site are well below the national averages; however, the duration rate for the research site population is unknown.

Additionally, an evaluation of the research plan yielded a concern that the Breastfeeding Instrument used for data collection in the control group may have inadvertently imposed the intervention. In a review of the instrument, the statements seem to imply the breastfeeding standards, perhaps invoking some self-regulation. Based on these

Table 8

Comparison of Breastfeeding Initiation and Duration Rates: National, State, and Research Site Populations

Breastfeeding Initiation and Duration	National	State of WV	Research Site
Initiation at Hospital Discharge	59.7%	40.6%	49.0%
At 6 months	21.6%	Unknown	Unknown

Note. National data is from Ross Laboratories, 1995 data. State of WV data is from WV Department of Health and Human Resources. Research site data is from birth records, 1996 data.

additional findings from the pilot study, two additional components to the pilot study were warranted before proceeding with the full research study. The first modification to the pilot study was to revise the Breastfeeding Instrument and implement the instrument in an additional control group. Second, a modification was to develop a survey for the research site population in order to establish an average duration for comparison with the

national statistics. These two modifications were developed and implemented in Phase II of the pilot study.

Pilot Study, Phase II

Following approval from the Institutional Review Board at the University of Pittsburgh and Wheeling Hospital, the following two modifications to the initial pilot study were implemented. Initially, a second non-randomized control group was recruited in order to evaluate the Feeding Instrument. The second modification was the survey of breastfeeding mothers at 6 months following delivery to determine the average duration of breastfeeding for the research site population.

Procedure

Eight subjects were recruited from the research site to serve as a non-randomized comparison control group using a revised instrument, the Feeding Instrument. This group will be referred to as control group 2. The procedure for recruitment and implementation of the research plan in control group 2 proceeded as outlined in Phase I of the pilot study, with the exception of the revised instrument, convenience sampling, and the frequency at which the subjects were asked to complete the instrument. The Feeding

Instrument was completed at 3 weeks and at 6 weeks. Subject recruitment for this phase began on July 19, 1996 and concluded on August 15, 1996.

Findings

The mean length of breastfeeding duration in control group 2 was 23.33 days with a standard deviation of 20.49. A comparison of the mean length of breastfeeding duration between the three groups in the pilot study is detailed in Table 9.

Since there was a considerable difference in the length of breastfeeding between the experimental, control group 1, and control group 2, additional comparisons were made between the groups based on demographic data and breastfeeding plans. Table 10 depicts the comparisons between demographic data in the pilot study groups.

The second modification to the initial pilot study was to survey a group of mothers at 6 months post-delivery to determine the average duration of breastfeeding at the research site for this study. A list of all mothers who delivered at the research site between November 1 and December 31, 1996 was obtained, and demographic data was compiled for all the mothers. Those mothers who were

Table 9

Comparison of Breastfeeding Duration in Pilot Study Groups

	Experimental Group n=7		Control Group 1 n=7		Control Group 2 n=8	
Breastfeeding Duration	M	SD	M	SD	M	SD
Breastfeeding Duration In Days	38.00	10.58	39.00	7.94	23.33	20.49

Note. Maximum duration for pilot groups = 42 days.

breastfeeding at hospital discharge were sent an information letter, two consent forms, and the Feeding Instrument. Those mothers interested in participating were to forward one copy of the consent form and the completed questionnaire in the enclosed, stamped envelope. On August 8, 1996, letters were sent to the 103 breastfeeding mothers who had delivered during the designated time period. On August 19, 1996, reminder post-cards were sent to 76 of the mothers who had not yet responded to the questionnaire.

Table 10

Comparison of Demographic Data in Experimental and Control Groups: Pilot Study

Demographic Data	Experimental Group n=8 n(%)	Control Group 1 n=8 n(%)	Control Group 2 n=8 n(%)
Age			
M	27.5	24.3	22.5
SD	5.51	6.47	7.25
Marital Status			
-Married	(7)87.5%	(5)62.5%	(6)75.0%
Race			
-Caucasian	(7)87.5%	(8)100%	(8)100%
Educational Level			
-Less than high school			(1)12.5%
-High School	(1)12.5%	(3)37.5%	(1)12.5%
-Some college	(1)12.5%	(2)25.0%	(1)12.5%
-College degree	(5)62.5%	(3)37.5%	(5)62.5%
-Master degree	(1)12.5%		
Plans to Return to Work/School	(8)100%	(4)50.0%	(4)50.0%
Time to Return to Work/School			
-<2 months	(3)37.5%	(1)12.5%	(2)25.0%
-3-6 months	(3)37.5%	(1)12.5%	(1)12.5%
-7-9 months			
-10-12 months	(2)25.0%	(1)12.5%	(1)12.5%
->1 year		(1)12.5%	
-Not returning	0%	(4)50.0%	(4)50.0%

On August 27, 1996, a second mailing of the consent forms and questionnaire was forwarded to 57 of the mothers who had not yet responded to the questionnaire. At the completion of data collection, 69 mothers (67%) of the breastfeeding mothers surveyed had responded to the questionnaire, 31 primiparous mothers and 38 multiparous mothers. Of the responses, 41.9% (n = 13) of the primiparous mothers were breastfeeding at 6 months, and 52.6% (n = 20) of the multiparous mothers reported they were still breastfeeding at 6 months. These breastfeeding percentages at 6 months are well above the national statistics of 21.6% (refer to Table 8). The limitation to this survey is that it is a convenience, mail sample. This approach is weak and may involve problems of bias since mothers self-selected themselves by deciding to respond or not respond to the questionnaire (Polit & Hungler, 1995).

The mean duration of breastfeeding for the primiparous mothers was 14.87 weeks and for the multiparous mothers was 17.63 weeks. In the survey, it is interesting to note that 16.1% (n = 5) of the primiparous mothers stopped breastfeeding before 3 weeks and that 48.4% (n = 15) of the primiparous mothers stopped breastfeeding before 12 weeks.

In this group of primiparous mothers, the predominant reason for terminating breastfeeding prior to 12 weeks was reported as "baby not satisfied" (n = 9, 60%). Table 11 lists the reasons cited for termination of breastfeeding prior to 12 weeks and the number of primiparous mothers reporting that reason. These findings support existing literature that documents these as the most commonly cited reasons for termination of breastfeeding (Hill & Aldag, 1991).

Estimation of Sample Size

Prior to the pilot study, a preliminary power analysis procedure was used to assist in determining the necessary sample size that would increase the likelihood of demonstrating significant results for the full study. There are four components of a sample size determination, three of which must be known in order to estimate sample size. The components are the significance criterion, the sample size, the effect size, and the power (Cohen, 1988). Cohen (1988) describes that the power of a statistical test depends specifically upon the significance criterion, the sample size and the effect size parameters.

Table 11

Reasons Cited by Primiparous Mothers For Breastfeeding Termination Prior to 12 Weeks: Pilot Study

Reasons for Termination of Breastfeeding	n (%)
Baby not satisfied	9 (60.0%)
Nipple trauma	5 (33.3%)
Low milk supply	4 (26.7%)
Engorgement	3 (20.0%)
Had to return to work	2 (20.0%)
Mastitis/plugged duct	2 (20.0%)
Recommended by family	1 (6.7%)
Planned to stop then	1 (6.7%)
Other	1 (6.7%)

Note. Some subjects reported more than one reason for termination of breastfeeding. (N = 15).

To estimate sample size for this research study, the significance level, the estimated population effect, and desired power when testing will be the three specified parameters used to generate the sample size. The investigator has specified .05 as the significance level (one-tailed hypothesis testing) and .20 as the probability of Type II (β) error. Burns & Grove (1997) and Polit & Hungler (1995) report this significance level and rate of Type II error as standard for nursing research. The remaining component, effect size, was initially determined by utilizing data from an existing research study and revised based on the pilot-study data.

It is recommended that evidence, such as the effect size, from other published studies on the same or similar problem be used to calculate the necessary sample size (Polit & Hungler, 1995). In a review of the literature, one study was identified that most closely approximated the design of this research study. Quarles, et al. (1994) examined the breastfeeding duration in two groups of mothers. One group of mothers had access to a certified lactation consultant, while the other group did not have access to a lactation consultant. The hypothesis, that

mothers exposed to the certified lactation consultant would breastfeed longer than the mothers not exposed to the lactation consultant, was supported (t = 2.33, p < .02). The study reported a M = 3.1 months and SD = 1.2 for one group and a M = 2.4 months and a SD = 1.2 for the second group. The effect size determined from this research study and findings was .58.

The three known components of the sample size estimation were then entered into the computer program by Borenstein and Cohen (1988), for the procedure based on the literature, and into the Solo Power Analysis (1992) program, for the procedure based on the pilot study data. Based on the literature, the significance level of .05, the power level of .80, and the effect size of .58 then generated the sample size necessary for this study. The power analysis determined that 37 subjects per group, for a total of 74 subjects, would be necessary for this study, with a significance level of .05 and a power level of .80 (one-tailed). Table 12 compares the power analysis procedures based on the literature and the pilot study.

Based on the pilot study data, the Solo Power Analysis (1992) program was used to estimate the sample size based on

Table 12

Comparison of Power Analysis Procedures Based on the Literature and the Pilot Study

Power Analysis Components	Literature	Pilot Study
Effect Size	.58	.95
Beta	.20	.20
Power	.80	.80
Alpha	.05	.05
Estimated Sample Size	74	32

Note. The research study by Quarles, et al (1994) was used for the power analysis procedure based on the literature. Sample size estimation from pilot study data based on logrank procedure for hypothesis testing using the Solo Power Analysis program (1992).

the logrank test used for hypothesis testing to determine the necessary sample for this full study. The power analysis calculation, based on the comparison between the experimental group and control group 2, results in an effect size of .95, which estimates the necessary sample size at 16 subjects per group, a total of 32 subjects. However, since

regression analysis procedures were employed in the data analysis, the sample size for the full study was re-calculated. Five variables were examined in the regression analysis. Nunnally and Bernstein (1994) recommend at least 10 subjects per predictor. For this study, the investigator selected 15 subjects for each predictor, thus making the planned sample for the full study a total of 75 subjects.

Research studies in the area of breastfeeding duration indicate drop-out rates ranging from 1% (Matich & Sims, 1992) to 14% (Rentschler, 1991). The pilot study preceding this full study had an attrition rate of 13%. This study was a longitudinal research design over a 6 month period and the threat to internal validity by attrition was a concern to the investigator. In addition to research strategies throughout the study to reduce attrition, the loss of subjects during the course of the data collection was anticipated. Since the study was a longitudinal study, the investigator chose to over-sample 15%, resulting in a final sample size of 86 in the research study.

CHAPTER IV

METHODOLOGY

Design

A randomized, controlled, pretest-post test, two-group experimental design was used to examine the association between the self-regulation intervention and breastfeeding duration over 6 months in primiparous mothers. The independent variable in this experimental study was the self-regulation intervention, and the dependent variable was breastfeeding duration. The self-regulation intervention included self monitoring of breastfeeding over the first 6 weeks postpartum.

The sample consisted of 43 subjects in a control group and 43 subjects in the experimental group. Subjects were randomized to their protocol assignment using a permuted block within strata randomization using mode of delivery and return to work/school as stratifying factors. The study examined the effect of the self-regulation intervention on breastfeeding duration, specifically the length of time to breastfeeding weaning between the two groups. In addition, the relationship between social support, selected demographic characteristics, breastfeeding practices, and

breastfeeding duration was explored. This research plan was developed and refined based on the pilot study prior to the implementation of the research study.

Data collection for the study began within the first 12 to 48 hours following delivery and extended to 6 months following delivery. In addition to the initial data collection point during the postpartum hospitalization a second data collection point was at 6 months. The PDI, BEI, and HBSS instruments were completed at the initial data collection point and the BEI and HBSS were completed at the 6 month data collection point.

Time 1 (baseline) data was collected during the hospital stay for mothers between 12 and 48 hours following delivery. The Time 2 data collection point was at 6 months following delivery. Six months was selected as the final data collection point in this study since this is the time parameter recommended by the American Academy of Pediatrics (1982, 1997) and the American Dietetic Association (1993, 1997) for exclusive breastfeeding before any solids are introduced into the diet.

In addition to the pretest and post-test data collection points, breastfeeding duration was measured at

four data points over the 6 months following delivery. Breastfeeding duration was be measured for all subjects at 3 weeks, 6 weeks, 3 months, and 6 months. These data points were selected since these appear to be common time periods when breastfeeding is terminated according to the literature and the investigator's observations. The Feeding Instrument was used to assess breastfeeding continuance at these data points for all subjects. In order to validate the self-report breastfeeding data on the Breastfeeding Instrument, a method of data triangulation was incorporated into the study. During the 6 months following delivery, the primary care physician for the infant was asked to complete the Feeding and Weight Pattern Instrument (FWPI). This instrument addressed feeding and weight patterns over the first 6 months following delivery. The design of the research study is depicted in Figure 2.

The aims of this research study were to: a) test the efficacy of education and the self-regulation intervention, self-monitoring, on breastfeeding duration in primiparous mothers, b) investigate the effects of the timing of the initial breastfeeding session and the return to work/school on breastfeeding duration and the efficacy of

Figure 2. Research Study Design

Recruit subjects during postpartum hospitalization

Time 1: (12-48 hours following delivery)

All subjects consenting to participate will complete the PDI, BEI, and HBSS

All subjects will participate in breastfeeding educational session

Random assignment to experimental and control groups

EXPERIMENTAL GROUP	CONTROL GROUP
Receive instruction on the Self-regulation intervention	Receive Usual Care
Receive telephone contact from primary investigator at 1 week, 2 weeks, 3 weeks, and 6 weeks following delivery to review self-regulation intervention	Receive Feeding Instrument to complete at 3 weeks, 6 weeks, 3 months, and 6 months
Receive Feeding Instrument at 3 weeks, 6 weeks, 3 months, and 6 months	

Time 2: (6 months following delivery)

Receive telephone interview to complete the BEI and HBSS	Receive telephone interview to complete the BEI and HBSS

the intervention, and c) examine the relationship between social support and breastfeeding duration.

The following were the research hypotheses for this research study:

1. Primiparous breastfeeding mothers who receive both the breastfeeding educational session and the self-regulation intervention will demonstrate a longer length of time to breastfeeding weaning when compared with a group of primiparous breastfeeding mothers who only receive the breastfeeding educational session.
2. Primiparous breastfeeding mothers who have an earlier initial breastfeeding session or who return to work in more than 8 weeks postpartum will have a longer length of time to breastfeeding weaning.
3. Primiparous breastfeeding mothers receiving the self-regulation intervention, who have a later initial breastfeeding session, or who return to work in less than 8 weeks, will have a longer length of time to breastfeeding weaning as compared with similar mothers not receiving the intervention.

4. The perceived social support of primiparous breastfeeding mothers will be positively correlated with the length of time to breastfeeding weaning.

Assumptions

1. An individual is an open system in constant interaction with a dynamic environment.
2. Childbearing and development of the maternal role is a developmental transition for the new parent. The process and outcome of this transition is influenced by the meaning of the transition, expectations, level of knowledge, social support, level of planning, and emotional and physical well-being.
3. Learning the skill of breastfeeding is one of the transitions for a new mother.
4. Behavioral change during a transition occurs through cognitive processing of the self-regulation components of self-monitoring and reinforcement.

Setting

The community hospital used as the setting in this research study was established in 1850 and has been located in the current facility since its construction in 1976. The hospital is located in a health care complex with an

adjacent long-term care center and four adjoining professional buildings that house outpatient services and physician offices. For the 1995 fiscal year, the hospital had 276 licensed beds, 110 deliveries a month, and approximately 181,600 outpatient visits.

The hospital is licensed as a 276-bed institution and serves primarily Ohio County, a population of 50,871 (U.S. Department of Commerce, 1993). The hospital is located in an urban setting and is readily accessible by an interstate highway. Specialty services provided by the hospital include a Level II nursery, critical care units, trauma services, and open heart surgery.

The obstetric, gynecologic, and nursery departments of the hospital are located on the second floor of the hospital. The obstetric department is coordinated by one nurse manager and includes the labor and delivery area, as well as the postpartum unit. The labor and delivery unit has two birthing rooms, five traditional labor rooms, two delivery rooms, and a four-bed recovery room. All deliveries are performed in the labor and delivery unit. The postpartum unit is comprised of 15 beds utilized for antepartum and postpartum patients. The average daily

census on postpartum is eight patients, one to two of which may be antepartum admissions commonly admitted with a medical diagnosis of pregnancy-induced-hypertension. The average length of stay on the postpartum unit is 48 hours for a vaginal delivery and 72 hours for a cesarean delivery.

The nursery is coordinated by a nurse manager and is a Level II nursery which has a nine-bed special care nursery and is licensed for 28 cribs. The average census in the nursery is 10 patients, one to two of which may be in the special care nursery. Common medical diagnoses of the infants in the special care nursery are prematurity and rule-out sepsis.

The obstetric and nursery departments share two waiting rooms and an educational room. The educational room is adjacent to the nursery and is approximately 10 x 15 feet. Materials available in the room are a 3 x 6-foot table, a television and VCR unit, 12 stackable chairs, sink, restroom, and a 3 x 3-foot marker board attached on the wall. The room has four ceiling lights and two exit doors, one of which exits to the nursery and the other to the postpartum unit.

Numerous educational programs are available to the childbearing family by the obstetric and nursery departments. The educational programs include prepared childbirth classes, sibling classes, cesarean delivery classes, and infant CPR classes. The prepared childbirth classes consist of a series of eight classes planned for the second and third trimesters of pregnancy. The expectant couple attends one class every week starting at approximately 28 to 30 weeks gestation. Each class lasts approximately 90 minutes. The philosophy of the obstetrical department avidly supports prepared childbirth education.

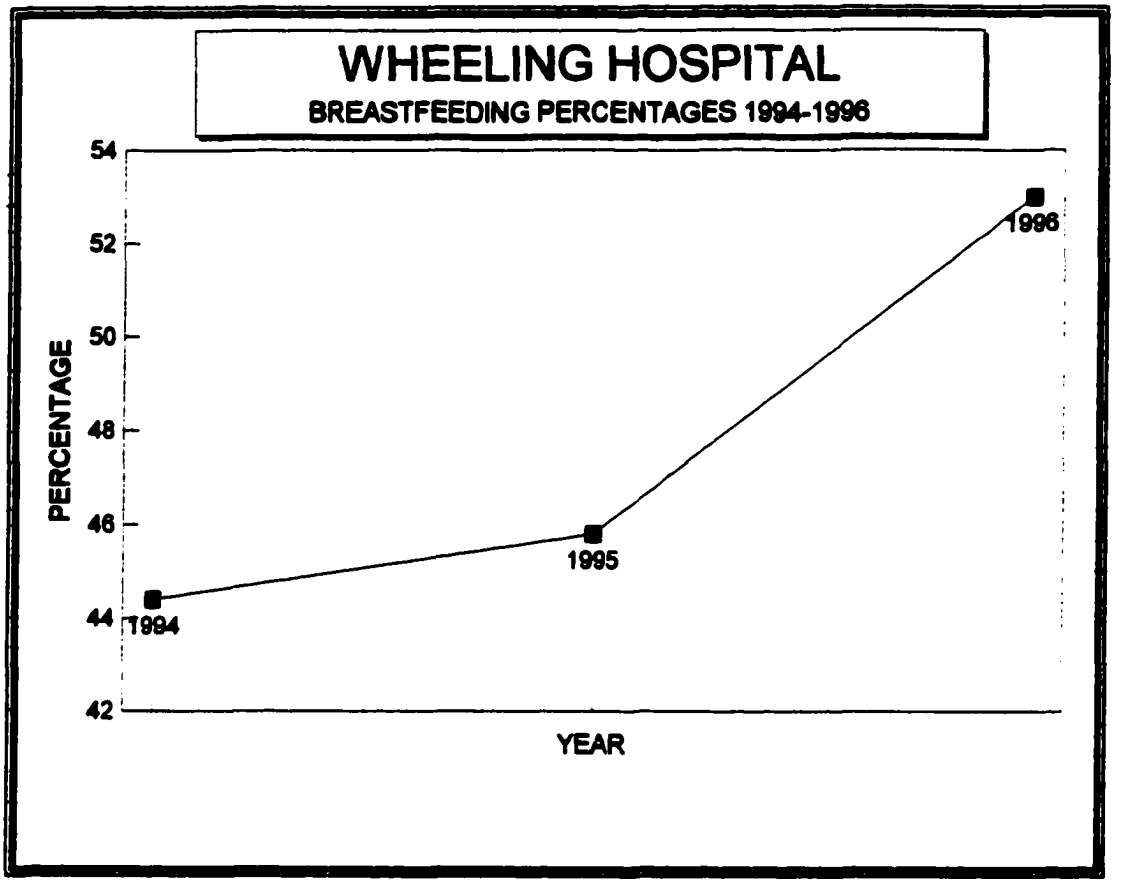
The first class in the prepared childbirth course is an overview, followed by three prenatal classes, then four classes preparing the couple for the labor and delivery experience. The three prenatal classes have objectives that are directed toward infant care and parenting skills. These infant care classes focus on infant feeding methods, infant care, infant behavioral patterns, and infant stimulation. Approximately 30 minutes in the second prenatal class is allotted to a discussion on breastfeeding. Included in this presentation are the advantages of breastfeeding, breastfeeding techniques, and a discussion of common

breastfeeding problems and their solutions. During this session a 15-minute videotape, depicting couples using breastfeeding techniques and some of the suggestions for common breastfeeding problems, is viewed and followed by discussion. Written materials which are distributed to the couple, addressing the topic of breastfeeding, include a pamphlet on breastfeeding techniques, which is printed by one of the infant formula companies. The instructor for this class is a nursery-staff nurse.

Approximately 50% of the couples delivering at this community hospital attend the prepared childbirth courses. An average of 50 couples attend these classes per month, the majority of which are primigravidas. The percentage of all mothers breastfeeding at hospital discharge was 44.4%, 45.8%, and 53.0%, for 1994, 1995, 1996, respectively, as depicted in Figure 3. There is an average of 20 to 30 primiparous breastfeeding mothers delivering per month at this community hospital.

Following the delivery of a mother planning to breastfeed, the goal of the nursing staff is to promote early initiation of breastfeeding and ongoing individualized education and support. Generally, the initial breastfeeding

Figure 3. Breastfeeding Percentages at Hospital Discharge for Research Site (1994-1996)

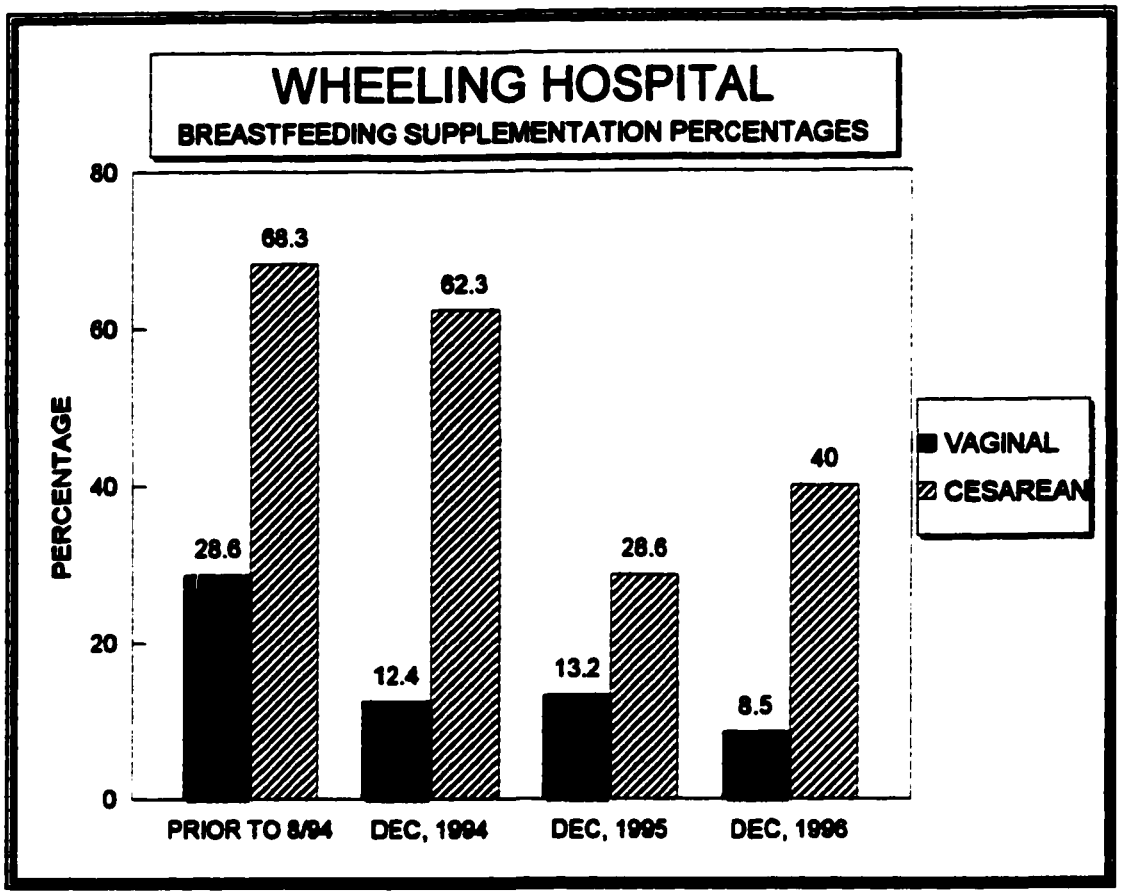


experience occurs within the first 60 minutes following a vaginal delivery. Factors which may delay this initial feeding generally include a cesarean delivery or an unstable status in the infant or mother. For this initial breastfeeding experience, the nursery nurse will instruct the mother on basic breastfeeding techniques and assist the mother with positioning the infant at the breast. The

nursery nurse will stay with the mother until the infant has been positioned effectively at the breast or as long as the mother desires. Generally, the mother is instructed to use both breasts at this initial feeding, approximately ten minutes per breast.

Following the initial breastfeeding experience, the mother is encouraged to feed the infant on demand and supplementation is discouraged. In August of 1994 the nursery staff initiated breastfeeding guidelines that strongly discourage supplementation for all breastfeeding mothers. Prior to that time, it was not uncommon for mother to request or the staff to recommend that the infant be fed formula supplementation during the first night following delivery. For the first eight months of 1994, 68.3% of the infants delivering at this community hospital whose mothers had a cesarean delivery, were supplemented with at least one bottle of formula during the hospital stay, as compared with 26.4% of those infants whose mother had a vaginal delivery. Since August of 1994, the percentage of breastfeeding infants supplemented with formula during the hospital stay whose mothers had a vaginal delivery significantly declined to 8.5%. Whereas, the percentage of breastfeeding infants

Figure 4. Breastfeeding Supplementation Percentages at Research Site (1994-1996)



supplemented with formula during the hospital stay whose mothers had a cesarean delivery, declined to 40% (Figure 4).

Orientation of Staff

Prior to the submission of the proposal to the hospital's Institutional Review Committee, the investigator met with the assistant administrator of nursing, the nurse managers of obstetrics and nursery, and the obstetricians.

The purpose of these meetings was to provide an overview of the research study and discuss any questions about the research study. The investigator elicited support for the research proposal from each of these groups prior to the submission to the Institutional Review Committee.

Prior to data collection, the investigator met with the nursing staff on the obstetrical and nursery units to provide an overview of the research project, discuss roles of the investigator and nursing staff, and answer any questions about the research study. The investigator planned several unit inservices for the purpose of conveying this information to all staff members. In addition to the planned inservices, a tape recording of one of the sessions was made available to those who were not able to attend one of the scheduled inservices. Throughout the data collection phase, the investigator met periodically with the nurse managers and staff to discuss any questions.

Sample

Subjects were recruited from the postpartum department at a community hospital in the northern panhandle of West Virginia. The selection of subjects for this research study was guided by a review of the literature and an evaluation

of the subject population at this community hospital during the pilot study.

Inclusion and Exclusion Criteria

Postpartum mothers were invited to participate in the full study if they met the following inclusion criteria:

1. primiparous
2. between the ages of 18 and 40
3. planned to breastfeed
4. able to read, write, and speak English
5. attended prepared childbirth classes
6. delivered healthy infant greater than 37 weeks gestation
7. initiated breastfeeding within 24 hours of delivery

Mothers were excluded from the study if the infant was unable to breastfeed due to a medical condition.

The investigator selected the inclusion and exclusion criteria based on research findings that have explicated variables impacting the breastfeeding experience. These criteria were selected to assist in controlling extraneous variables that may influence the internal validity of the study. The inclusion criteria of age, parity, and prenatal

preparation have been shown to influence breastfeeding duration (Chen, 1993; Hill, 1987; Matthews, 1993; Wiles, 1984).

The impact of parity was examined by Chen (1993), and the study concluded that the multiparous mother demonstrated a significantly longer duration of breastfeeding and a more positive experience about breastfeeding as compared with primiparous mothers. In addition, the self-regulation intervention selected for this study is primarily significant to the primiparous mother who is learning the new skill of breastfeeding for the first time.

Exposure to prenatal educational classes has also been correlated with longer durations of breastfeeding (Hill, 1987; Matthews, 1993; Wiles, 1984). Therefore, to minimize the effects of these extraneous variables a homogenous sample of primiparous mothers who have attended prenatal classes, are 18 years of age or older, and delivered a full-term, healthy infant were recruited for this study.

In addition to the inclusion criteria involving age, parity, and prenatal preparation, a delay in the initial breastfeeding experience has been identified as the exclusion criteria for the study. Problems with the

infant's or mother's medical condition are among the common reasons for a delay in the initial breastfeeding experience. To minimize the effects of this extraneous variable, mothers who have a delay in the initial breastfeeding experience of more than 24 hours will be excluded from the study. Buxton et al. (1991) found a significant percentage of mothers continuing to breastfeed after 7 days following delivery if they had the opportunity to breastfeed in the delivery room or recovery room as compared with mothers who had a delay in their initial breastfeeding experience. A similar result was found by Hill (1991), who reports that mothers initiating breastfeeding within the first 4 hours of delivery breast-fed longer than those mothers who had their initial breastfeeding experience at 8 hours or later following delivery. The joint statement by WHO/UNICEF (1989) identifies when to initiate the initial breastfeeding experience as one of the ten steps to successful breastfeeding. This statement by WHO/UNICEF recommends that mothers initiate breastfeeding within 30 minutes of delivery. This variable was evaluated in this study to determine if there was an association with breastfeeding duration.

Subject Recruitment

Potential subjects were recruited through a review of daily nursery logs at the community hospital. Those mothers meeting the inclusion/exclusion criteria were invited to participate in the study. During the recruitment phase, 235 breastfeeding mothers were screened on the nursery logs. Of the 235 mothers, 88 (37.5%) met the inclusion/exclusion criteria. Table 13 summarizes the characteristics of the mothers at the research site who did not meet the research study criteria during the subject recruitment phase of the study. The criteria not met by a majority of the mothers was due to parity, in that 132 (90%) of the ineligible mothers were multiparous. Of the 88 mothers meeting the study criteria, 2 (2.3%) mothers declined to participate in the study. Of the two mothers declining to participate, one mother reported an uncertainty about continuing breastfeeding and one mother reported inadequate time to participate.

The recruitment phase extended for 8 months from the screening of the first subject until the target sample of 86 was recruited and randomized. Table 14 is a summary of the

Table 13

Characteristics of Mothers at Research Site Not Meeting Inclusion/Exclusion Criteria

Criteria	n (%)
Multiparous	132 (89.7%)
<18 years of age	3 (2.0%)
No prepared childbirth classes	2 (1.4%)
<37 weeks gestation	2 (1.4%)
Initial breastfeeding >24 hours	4 (2.7%)
Unable to read, write, speak English	2 (1.4%)
Active psychotic episode, current substance abuse, etc.	2 (1.4%)
Total	147 (100%)

recruitment activity for the period between November 20, 1996 and June 4, 1997.

Ethical Considerations

Informed Consent. The consent form to act as a subject in a research study addressed the description and procedures for the study, risks and benefits, costs and payments, confidentiality, and the right to refuse or withdraw from the study. The investigator fully explained the contents of

Table 14

Monthly Subject Recruitment Activity

Month	#(%) Screened	#(%) Eligible	#(%) Randomized
November*	12 (5.1%)	3 (3.4%)	3 (3.5%)
December**	27 (11.5%)	9 (10.2%)	9 (10.5%)
January	37 (15.7%)	16 (18.2%)	15 (17.4%)
February	31 (13.2%)	12 (13.6%)	12 (14.0%)
March	36 (15.3%)	14 (15.9%)	14 (16.3%)
April	45 (19.2%)	16 (18.2%)	15 (17.4%)
May	43 (18.3%)	14 (15.9%)	14 (16.3%)
June*	4 (1.7%)	4 (4.6%)	4 (4.6%)
TOTAL	235	88	86

Note. *Reflects one week of recruitment
**Reflects two weeks of recruitment

the consent form with each subject. Each subject agreeing to participate in the study was asked to initial the first page of the consent form and sign the second page of the consent form. Each subject was asked to sign three copies of the consent form. One consent form was placed on the mother's hospital chart, one copy was given to the

mother, and one copy was kept by the investigator in a locked file cabinet.

Confidentiality. Each mother was assigned a code number upon enrollment in the study. The assigned code number appeared on all data collection instruments with no other distinguishing information. A master list of code numbers with corresponding names was maintained by the investigator in a locked file cabinet. Only the investigator had access to the locked file cabinet.

The completed data collection instruments were kept in a separate locked file cabinet and were hand delivered by the investigator to the file cabinet. All raw data and the master list will be destroyed three years after the completion of the study. The information obtained regarding individual subjects will not be revealed in any description or publication of the research findings.

Characteristics of the Sample

The characteristics of the sample is described in two categories: demographic data and breastfeeding support and commitment baseline data. The demographic data includes a description of the sample in regard to age, race, marital status, mode of delivery, infant gender, smoking status, WIC

status, and employment status. The breastfeeding support and commitment characteristics provides a description of the sample in regard to planned breastfeeding duration, degree of breastfeeding, timing of initial breastfeeding session, commitment to breastfeeding, and support person's attitude about breastfeeding.

The demographic data for the subjects were obtained from the PDF completed at Time 1. A summary of the demographic data for the sample (N = 86) is presented and was evaluated for group differences and representativeness with the target population. For categorical variables, the chi-square test (X^2) or the Fisher's Exact (FE) test was used to conduct two-tailed testing of the differences in the proportions between the groups. The Fisher's Exact test was used when the minimum expected cell frequency was below five (Munro, 1997). Mean, medians, ranges and standard deviations were calculated for continuous variables. For these variables, the two-tailed t-test was used to compare for differences in means between the groups. The sample was evaluated for group differences for the variables of age, infant gender, marital status, educational level, employment status, smoking status, income, race, and WIC (Women,

Infant, and Children program) enrollment. There were no significant differences in these demographic variables between the experimental and control groups, except for the employment status variable ($X^2(1, N = 86) = 8.14, p < .008$). For all comparative analyses, a two-tailed p-value of less than .05 was set as the level of statistical significance. Data were analyzed utilizing the statistical software package, SPSS for Windows Release 7.5 (SPSS, Inc., Chicago, IL).

Age. Table 15 compares the characteristics of the sample for age, race, and marital status in the overall sample and by group. The mean age for the total sample was 25.9 years. The mean age for the experimental group was 26.7 years and for the control group 25.2 years. There was no statistically significant difference in means between the control or experimental groups based on age.

Race. The sample was primarily Caucasian, with only three (3.5%) minority subjects. This minority percentage is representative of the minority population of Ohio County (county of research site in WV) 4.3% (U.S. Department of Commerce, 1993). There was no significant difference in

Table 15

Characteristics of Sample for Age, Race, and Marital Status

Variables	Total Sample (N=86)	Treatment Group (n=43)	Control Group (n=43)	Statistic (p-value)
Age (years)				
M	25.9	26.7	25.2	t = 1.5 df = 84
SD	4.7	4.7	4.7	(p = .134)
Race				
White	83 (96.5%)	41 (95.3%)	42 (97.7%)	X^2 = 3.0 df = 1
Non-white	3 (3.5%)	2 (4.7%)	1 (2.3%)	(p = .390)
Marital Status				
Married	69 (80.2%)	38 (88.4%)	31 (72.1%)	df = 1 (p_{FE} = .10)
Not currently married	17 (19.8%)	5 (11.6%)	12 (27.9%)	

Note. Unless otherwise noted, quantities in cells denote frequency counts and percentages overall or by group.

racial distribution between the control or experimental groups.

Marital Status. The majority of the overall sample was married, 80.2% (n = 69). Although there was a larger percentage of not currently married subjects in the control group (27.9%, n = 12) as compared with the experimental group (11.6%, n = 5), there was no significant difference in the proportion married between the control or experimental groups.

Mode of Delivery. Table 16 compares the characteristics for mode of delivery, infant gender, smoking status and WIC status in the overall sample and by group. The majority of the subjects had a vaginal delivery (74.4%, n = 64) versus a cesarean delivery (25.6%, n = 22). This is representative of the current cesarean delivery rate of 24.86% at the research site hospital (Wheeling Hospital, 1997). There was no significant difference between the control or experimental groups based on the distribution of mode of delivery.

Infant Gender. Female infants comprised more of the total sample than male infants, 53.5% (n = 46) versus 46.5% (n = 40), respectively. However, there was no significant

Table 16

Characteristics of Sample for Mode of Delivery, Infant Gender, Smoking Status and WIC Status

Variables	Total Sample (N=86)	Treatment Group (n=43)	Control Group (n=43)	Statistic (p-value)
Mode of Delivery				
Vaginal	64 (74.4%)	31 (72.1%)	33 (76.7%)	X^2 = 0.244 df = 1
Cesarean	22 (25.6%)	12 (27.9%)	10 (23.3%)	(p = .62)
Infant Gender				
Male	40 (46.5%)	21 (48.8%)	19 (44.2%)	X^2 = 0.187 df = 1
Female	46 (53.5%)	22 (51.2%)	24 (55.8%)	(p = .67)
Smoking Status of Mother				
Yes	5 (5.8%)	2 (4.7%)	3 (7.0%)	
No	81 (94.2%)	41 (95.3%)	40 (93.0%)	df = 1 (p_{FE} = 1.0)
WIC Enrollment				
Yes	35 (40.7%)	15 (34.9%)	20 (46.5%)	
No	51 (59.3%)	28 (65.1%)	23 (53.5%)	df = 1 (p_{FE} = .38)

difference between the control and experimental groups in the distribution of infant's gender.

The percentage of infant gender distribution during the research data collection period was slightly different than the total sample. The percentage of male infants was 52.6% as compared with 47.4% female infants from November, 1996 through June, 1997 (Wheeling Hospital, 1997a).

Smoking Status. A small percentage of subjects reported current smoking, 5.8%. There was no significant difference in the percentage of mothers smoking between the control or experimental groups.

WIC Status. There were approximately 10% less WIC clients in the research sample as compared with the average percentage at the research site during the data-collection period. During this period there were 50.9% mothers enrolled in WIC and 49.1% not enrolled in the program, as compared with 40.7% and 59.3% in the full study, respectively. Of the mothers enrolled in the WIC program, 37.3% of the mothers initiated breastfeeding during their hospital stay following delivery. National and West Virginia percentages for breastfeeding initiation for women enrolled in WIC are 42% and 36%, respectively (Lutfiyya,

1997; Ross Laboratories, 1996). The rate of breastfeeding initiation for mothers at the research site enrolled in WIC (37.3%) was comparable to the average national and West Virginia initiation rates of WIC-enrolled mothers and below the average breastfeeding initiation rate (45.9%) of the research site (Wheeling Hospital, 1997a). There was no significant difference in proportions of women enrolled in WIC between the control and experimental groups.

Educational Level. Table 17 compares the characteristics of educational level and income in the overall sample and by group. As reported in the breastfeeding literature, the majority of the subjects in this study were also well-educated, 75.5% reported having some college education to college degree. The educational level of this sample was much higher than the level of education for Ohio County residents. Only 38.7% of the residents of Ohio County report having some college education to college degree (U.S. Department of Commerce, 1993). This supports existing literature that a maternal antecedent predictive of breastfeeding initiation is education, with the higher-educated mother choosing to

Table 17

Characteristics of Sample for Educational Level and Income

Variables	Total Sample (N=86)	Treatment Group (n=43)	Control Group (n=43)	Statistic (p-value)
Education				X^2 = 5.87
< H.S.	1 (1.2%)	0 (0%)	1 (2.3%)	df = 4
				(p = .21)
HS Diploma	20 (23.3%)	9 (20.9%)	11 (25.6%)	
Some College	29 (33.7%)	11 (25.6%)	18 (41.8%)	
College Degree	29 (33.7)	18 (41.9%)	11 (25.6%)	
Master Degree	7 (8.1%)	5 (11.6%)	2 (4.7%)	
Income (in dollars)				X^2 = 3.80
				df = 5
				(p = .578)
<10,000	12 (14.0%)	6 (14.0%)	6 (14.0%)	
10,000-20,000	18 (20.9%)	8 (18.6%)	10 (23.2%)	
21,000-30,000	14 (16.3%)	6 (14.0%)	8 (18.6%)	
31,000-40,000	12 (14.0%)	5 (11.6%)	7 (16.3%)	
41,000-50,000	13 (15.1%)	6 (14.0%)	7 (16.3%)	
>50,000	17 (19.7%)	12 (27.8%)	5 (11.6%)	

breastfeed. There was no significant difference between the control and experimental groups based on educational level.

Income. The income status of subjects was dispersed across all categories. Approximately half (51.2%) of subjects reported an income below $30,000 and 48.9% of subjects reported an income above $31,000. These income levels are comparable to the median family income of Ohio County (county of research site) of %30,037 with 49.8% of residents with income less than $30,000 and 50.2% of residents with an income greater than $30,000 (U.S. Department of Commerce, 1993). There was no significant difference between the control and experimental groups based on income.

Employment Status and Plans to Return to Work/School. Table 18 compares current employment status and plans to return to work in the overall sample and by group. There was a higher percentage of subjects presently employed in the experimental group than in the control group, 74.4% and 44.25, respectively [$X^2(1, N = 86) = 8.14, p = .008$]. However, when comparing the percentage of subjects planning to return to work, there were no significant differences between the two groups [$X^2(1, N = 86) = 3.07, p = .080$].

Table 18

Characteristics of Sample for Employment

Variables	Overall Sample (N=86)	Treatment Group (n=43)	Control Group (n=43)	Statistic (p-value)
Presently Employed				X^2 = 8.14
				df = 1
Yes	51 (59.3%)	32 (74.4%)	19 (44.2%)	(p = .008)
No	35 (40.7%)	11 (25.6%)	24 (55.8%)	
Plans to Return to Work				df = 1
				(p_{FE} =.142)
Yes	72 (83.7%)	39 (90.7%)	33 (76.7%)	
No	14 (16.3%)	4 (9.3%)	10 (23.3%)	
When Plans to Return to Work				X^2 = 4.85
				df = 5
				(p = .434)
< 6 wks	8 (9.3%)	3 (7.0%)	5 (11.6%)	
7 wks to 2 mos	34 (39.5%)	19 (44.2%)	15 (34.9%)	
3 to 4 mos	20 (23.3%)	11 (25.6%)	9 (20.9%)	
5 to 6 mos	1 (1.2%)	1 (2.3%)	0 (0%)	
> 6 mos	9 (10.5%)	5 (11.6%)	4 (9.3%)	
never	14 (16.2%)	4 (9.3%)	10 (23.3%)	

Also there were no significant differences between the groups in regard to when they planned to return to work after delivery. About 23.3% of the subjects in the control group planned never to return to work. Of the overall sample, 9.3% of the subjects planned to return to work in < 6 weeks, 39.5% in 7 weeks to 2 months, 23.3% in 3 to 4 months, 1.2% in 5 to 6 months, 10.5% in > 6 months, and 16.3% never planned to return to work.

The breastfeeding support and commitment baseline data were obtained from the PDF and HBSS at Time 1. A summary of the planned breastfeeding duration, degree of breastfeeding, timing of initial breastfeeding session, commitment to breastfeeding, and support person's attitudes about breastfeeding, and social support baseline data for the 86 subjects is presented.

Planned Breastfeeding Duration. Table 19 compares planned breastfeeding duration in the overall sample and by group. In the overall sample, 44.2% of the subjects planned to breastfeed 6 months or less. Of the subjects in the experimental group, 51.2% planned to breastfeed 6 months or less as compared with 37.2% in the control group. More

Table 19

Characteristics of Sample for Planned Breastfeeding Duration

Planned Breast-feeding Duration	Total Sample (N=86)	Treatment Group (n=43)	Control Group (n=43)	Statistic (p-value)
1 to 3 mos	16 (18.6%)	11 (25.6%)	5 (11.6%)	X^2 = 7.99 df = 4 (p = .092)
4 to 6 mos	22 (25.6%)	11 (25.6%)	11 (25.6%)	
7 to 9 mos	6 (7.0%)	4 (9.3%)	2 (4.6%)	
10 to 12 mos	15 (17.4%)	9 (20.9%)	6 (14.0%)	
Undecided	27 (31.4%)	8 (18.6%)	19 (44.2%)	

subjects in the control group were undecided on their planned breastfeeding duration, 44.2% as compared with only 18.6% in the experimental group; however, there was no statistically significant difference between the control or experimental groups based on planned breastfeeding duration.

Timing of Initial Breastfeeding Session. Table 20 summarizes the initial breastfeeding session in the overall

sample and by group. About half (52.3%) of the total sample initiated breastfeeding within 2 hours following delivery. Only 12.8% of the overall sample initiated breastfeeding in more than 7 hours following delivery. There was no statistically significant difference in the control or experimental groups based on the timing of the initial breastfeeding session.

Commitment to Breastfeeding. There was no statistically significant difference in the commitment to breastfeed between the two groups [$X^2(1, N = 86) = 2.45$, $p = .294$]. The majority of subjects reported strong commitment to breastfeed, 79.1% and 69.8%, respectively in the experimental and control groups. Only two subjects (4.6%) in the control group reported a slight commitment to breastfeed.

Support Person's Attitudes about Breastfeeding. Support person was defined in this study as the husband, in a married subject, or as the person closest to the mother providing her with the most assistance with her infant, in a single subject. The vast majority of subjects reported that their support person's attitude toward breastfeeding was

Table 20

Characteristics of Sample for Timing of the Initial Breastfeeding Session

Timing of the Initial Session	Total Sample (N=86)	Treatment Group (n=43)	Control Group (n=43)	Statistic (p-value)
2 hours or less	45 (52.3%)	23 (53.5%)	22 (51.2%)	$X^2 = 3.02$ df = 3 (p = .388)
3 to 6 hours	30 (34.9%)	17 (39.5%)	13 (30.2%)	
7 to 12 hours	6 (7.0%)	2 (4.7%)	4 (9.3%)	
> 12 hours	5 (5.8%)	1 (2.3%)	4 (9.3%)	

Note. Hours calculated from delivery time.

very positive to positive, 97.7% (n = 84) in the overall sample.

Only two subjects (2.3%) reported that their support person's attitude was somewhat negative. No statistically significant difference between the control or experimental groups based on their support person's attitude [X^2(1, N = 86) = 2.053, p = .358].

Social Support Scores

Table 21 presents the HBSS scores in the overall sample and by group. The overall mean score on the HBSS for the total sample was 110.05. The mean scores for the total sample on the sub-scales of emotional, instrumental, and informational support were 37.83, 36.73, and 35.49, respectively. The scores on the social support scale were comparable between groups.

Summary of Sample Characteristics

The overall sample was composed primarily of Caucasian, well-educated, mothers with a moderate income. There were no significant differences between groups based on the demographic variables of age, race, marital status, mode of delivery, infant gender, smoking status, WIC status, educational level, and income.

The groups differed significantly in employment status with more subjects in the experimental group who were presently employed as compared with the control group. A marginally statistical difference in planned breastfeeding duration between groups, 25.6% of experimental group planned to breastfeed less than 3 months as compared with 11.6% of the control group. However, a significantly larger

Table 21

Characteristics of the Sample on Baseline HBSS Scores

Variables	Overall Sample (N=86)	Treatment Group (n=43)	Control Group (n=43)	Statistic (p-value)
Total HBSS Score				t = -1.261 df = 84
M	110.05	108.53	111.56	(p = .211)
SD	11.15	12.35	9.72	
Emotional Score				t = -1.547 df = 84
M	37.83	37.23	38.42	(p = .126)
SD	3.58	3.44	2.55	
Informational Score				t = -0.734 df = 84
M	35.49	35.07	35.91	(p = .465)
SD	5.28	5.52	5.05	
Instrumental Score				t = -1.098 df = 84
M	36.73	36.23	37.23	(p = .276)
SD	4.23	4.89	4.34	

percentage of subjects in the control group were undecided about their breastfeeding duration as compared with the experimental group, 44.2% and 18.6%, respectively.

The majority of subjects had their initial breastfeeding session in less than 6 hours following delivery. And there were no significant differences between groups in regard to commitment to breastfeeding, support person's attitudes about breastfeeding and baseline social support scores. Subjects reported an overall strong commitment to breastfeeding and positive affirmation from their support person. Overall the sample was characteristic of the target population.

Data Collection

The following instruments were used for the data collection process: a) Personal Data Form (PDF); b) Breastfeeding Experience Instrument (BEI); c) Hughes Breastfeeding Support Scale (HBSS); d) The Mother's Breastfeeding Daily Log; e) Feeding Instrument; and g) Feeding and Weight Pattern Instrument (FWPI).

Personal Data Form (PDF)

The Personal Data Form (PDF), adapted with permission from the Personal Data Inventory (PDI) instrument developed

by Rentschler (1986, 1991), was used to collect demographic data and information specific to breastfeeding. The inventory was designed to obtain information on those variables cited in the literature as influencing the breastfeeding experience. Items included on the instrument are: a) when the decision was made to breastfeed; b) length of time intended to breastfeed; c) degree of commitment, partial or full breastfeeding; d) plans to supplement with formula/solids; e) major influences in decision to breastfeed; f) support person's attitude toward decision to breastfeed; g) information sources for breastfeeding; h) smoking status; i) mother's and infant's primary care physicians; j) demographic information, including age, race, marital status, education level, occupation, employment status, and income; k) type of delivery; l) sex of newborn; m) birth weight and discharge weight; and n) complications experienced by mother and/or her infant. The information on type of delivery, birth weight and discharge weight, and complications experienced by mother and/or her infant was validated with the birth record.

Breastfeeding Experience Instrument (BEI)

The Breastfeeding Experience Instrument (BEI), adapted

with permission from the Breastfeeding Experience Questionnaire developed by Rentschler (1986, 1991), was used to obtain information about factors related to the breastfeeding experience. Items included on the instrument are: a) current length and frequency of breastfeeding; b) satisfaction with breastfeeding; c) experiences with weaning; d) reasons for weaning; e) use of supplements; e) any problems with breastfeeding; f) sources of support during breastfeeding; g) support person's attitude and knowledge of breastfeeding; h) sources of information during breastfeeding; and i) support person's support of breastfeeding.

Hughes Breastfeeding Support Scale (HBSS)

Description. The Hughes Breastfeeding Support Scale (HBSS), developed by Hughes (1984), is an instrument to measure emotional, instrumental, and informational support for breastfeeding mothers. The development of the tool was based on the theoretical definitions of social support as developed by Cobb (1976), which encompass emotional, instrumental, and informational support. Emotional support examines the interactions that convey caring, trust, and love. Instrumental support addresses task-oriented

behaviors that directly assist the individual. Informational support examines the sources of support in the form of knowledge.

The scale is a self-administered, 30-item paper-and-pencil questionnaire. Of the items, 10 relate to each area of support, emotional, instrumental, and informational. The response for each item can range from 1 to 4 on a Likert scale, with a score of 1 indicating "no help at all" and a score of 4 indicating "as much help as I wanted." A total score and a sub-score for each category of social support can be obtained. The higher the score, the greater the perceived social support. The average time for completing the questionnaire is 10 minutes (Hughes, 1984).

Reliability. Hughes (1984) reports reliability for the instrument based on a sample of 30 primiparous women approximately 1 month following delivery. Split-half reliability scores for the three categories of emotional, instrumental, and informational support were .85, .85, and .89, respectively. Internal consistency was measured using the alpha coefficient with scores of .86, .83, and .88, for the three categories of emotional, instrumental, and informational support, respectively. Evidence of temporal

stability based on test-retest reliability was not reported.

Validity. Evidence of concurrent or predictive validity was not reported.

Summary. The Hughes Breastfeeding Support Scale is a 30-item instrument to measure emotional, informational, and instrumental support specific to the breastfeeding experience. The tool is concise and generally can be self-administered in 10 minutes. Acceptable internal consistency of the instrument has been demonstrated but lacks evidence of concurrent or predictive validity.

Breastfeeding Daily Log

The investigator constructed The Breastfeeding Daily Log to record the mother's experiences during breastfeeding. The daily log was used by the subjects in the experimental group to self-monitor their breastfeeding experiences. The subjects in the experimental group self-monitored their breastfeeding experiences for the first 6 weeks following delivery. Six weeks was chosen as the time frame for self-monitoring since this is cited as the time when lactation is considered to be established (Lawrence, 1994).

The log has 12 rows for documentation of each breastfeeding session each day. Each day, starting at

midnight, a new log form was used to document the breastfeeding experiences. There are nine columns in the log, which address key aspects of monitoring the breastfeeding experience. The columns include the headings of length of feeding on each breast in minutes, presence of infant swallowing, urine, stool, supplement type and amount, pumping minutes and amount, mother's feelings, and infant's behavior. At the bottom of the log are some codes that can be used in the documentation of the breastfeeding experiences.

Feeding Instrument

The investigator constructed The Feeding Instrument to measure breastfeeding patterns in all subjects at 3 weeks, 6 weeks, 3 months, and 6 months post-delivery. The paper-and-pencil instrument contains 3 questions. Items included on the instrument are: a) current feeding status for solids, formula, breast milk, and juices; b) duration of breastfeeding; and c) reasons for weaning, if applicable.

Feeding and Weight Pattern Instrument

The investigator constructed The Feeding and Weight Pattern Instrument (FWPI) to measure feeding and weight patterns for the first 6 months following birth as reported

by the primary care physician for the infant. The instrument addresses five time periods over the first 6 months following birth when routine visits are scheduled and feeding and weight patterns are assessed. The five time-period visits identified are at 2 week, 1 month, 2 month, 4 month, and 6 month visits. For each of the five visits, the primary care physician was asked to answer four questions addressing feeding status, supplementation with formula, supplementation with solids, and infant's weight and height.

Procedure

The following section includes a discussion of the Institutional Review Process and the procedure for the full study. The research study was approved by the Scientific Review process in the Department of Nursing at the University of Pittsburgh, the Psychosocial Institutional Review Board at the University of Pittsburgh, and the Institutional Review Committee at Wheeling Hospital.

Enrollment of Subjects. The investigator reviewed the nursery logs on a daily basis to determine potential subjects that met the inclusion and exclusion criteria. Those mothers meeting the inclusion and exclusion criteria were visited by the investigator and a prepared statement

was read that introduces the research study.

Those mothers who were interested in participating in the study were asked to sign the consent form. Three copies of the consent form were obtained. One copy of the consent form was given to the subject, the second copy was placed on the mother's hospital record, and the third copy was kept by the investigator and maintained in a locked, secured file cabinet.

Data collection points for all subjects were designated as Time 1: 12 to 48 hours following delivery; and Time 2: 6 months following delivery. Subjects remained in their assigned groups throughout the data-collection period.

Time 1

Following the completion of the consent form, all subjects were taken to the educational room to complete the following measurements: a) PDF; b) BEI; and c) HBSS. The educational room was used consistently for all data collection in the hospital environment to reduce threats to internal validity.

Following the completion of the data instruments, the investigator met with each subject individually in the educational room on the obstetrical department. All

subjects received two breastfeeding pamphlets from the investigator, Nursing Your Baby For the First Time (Danner, 1996) and Breastfeeding Basics (Clark, Tullo, and Bolane, 1996). The investigator presented the videotaped Breastfeeding Educational Session. Following the presentation of the breastfeeding educational session the investigator answered any questions the subject had in regard to breastfeeding. Stratified randomization was not done until after the educational session.

Following the completion of the educational session, subjects were randomly assigned to either the control group or experimental group using stratified randomization where the treatment assignments are permuted in blocks of 4 (2x2). Four randomization lists were generated by a statistician for each combination of delivery mode, cesarean and vaginal, and return to work/school, $\leq$ 8 weeks and > 8 weeks. The lists stratified subjects into groups by using the variables, mode of delivery and plans to return to work/school, since research findings have suggested these variables may impact breastfeeding duration. This method assists in equalizing the number of subjects across combinations of these variables. The variables, mode of

delivery and plans to return to work/school, were measured on the PDI and based on the response to these questions each subject was randomized into groups based on one of the four categories, ≤ 8 weeks and vaginal delivery, > 8 weeks and vaginal delivery, ≤ 8 weeks and cesarean delivery, > 8 weeks and cesarean delivery.

Following assignment into groups, the investigator met with the experimental group to provide directions on the self-regulation intervention of self-monitoring. The subjects in the experimental group were instructed on the process for completing the Breastfeeding Daily Log and the return of the logs to the investigator on a weekly basis in the pre-addressed, stamped envelopes. The subjects were instructed on completion of the Breastfeeding Daily Log starting at the time they were assigned to the experimental group and continuing until 6 weeks following delivery. The subjects were instructed that their support person was to fill in the log in the event of their absence.

Following assignment into groups, the investigator also met with the subjects in the control group. The control group was given their Breastfeeding Information notebook and

instructed on the process for completing the Feeding Instrument.

Self-Regulation Intervention

The experimental group received the program on the self-regulation intervention of self-monitoring and reinforcement.

Self-Monitoring. The subjects in the experimental group were instructed to complete the Breastfeeding Daily Log starting at the time they were assigned to the experimental group and continuing until 6 weeks following delivery. A sample of a completed log was reviewed with the subject. Each breastfeeding experience was to be logged on the instrument.

The experimental group received pre-addressed, stamped envelopes and directions on returning the completed Breastfeeding Logs on a weekly basis to the investigator.

Reinforcement. Reinforcement was accomplished by external reinforcement by the investigator. External reinforcement was given by the investigator during telephone contacts at 1 week, 2 weeks, 3 weeks, and 6 weeks following delivery. The investigator contacted each subject in the experimental group at these time periods and reviewed her

Breastfeeding Daily Logs and standards with them. The investigator positively reinforced any progress made toward goal attainment. The semi-structured interview for these telephone contacts is in Appendix K.

Time 2

Time 2 was 6 months following delivery. Twenty-four to forty-eight hours prior to the Time 2 data-collection period, the investigator sent a postcard to all subjects, reminding them of the telephone interview. The following instruments were repeated at Time 2: a) BEI; and b) HBSS. The BEI measured breastfeeding duration in all subjects. The approximate time for the completion of the measurements was ten minutes. Any questions or problems reported by the mother during any contacts were directed appropriately to their primary health care provider. In the event the investigator was unable to contact the mother by telephone after three attempts, the questionnaires were mailed to the subject. All mailed questionnaires were returned.

The baby's primary care physician was asked to complete the FWPI and return to the investigator after the 6 month office visit. Following delivery, this instrument was mailed to the primary care physician with a stamped,

addressed envelope. The questionnaire was sent to the physician soon after enrollment in the study so that each office visit could be entered on the form as they occurred over the 6 months.

Following participation in the research study, the investigator sent a note to each subject expressing gratitude for their participation in the study and best wishes extended to their family. The design for data collection during the conduct of the study is depicted in Table 22.

Data Management and Analysis

Data analysis was completed by utilizing the data and/or scores on the PDF, BEI, HBSS, Mother's Breastfeeding Daily Log, and the FWPI. The dependent variable, breastfeeding duration, was measured at Time 2 on the BEI. Descriptive and inferential statistics were used to analyze these data.

To analyze the data, this research study utilized an IBM compatible computer with capabilities for data management using Paradox with interface into the data analysis program, statistical software package SPSS for

Table 22

Research Design for Data Collection

GROUP/ INSTRUMENT	TIME 1	1 WEEK	2 WEEK	3 WEEK	6 WEEK	3 MONTH	6 MONTH
EXPERIMENTAL GROUP							
1.PDF	X						
2.BEI, HBSS	X						X
3.Telephone contact		X	X	X	X		X
4.Self-regulation intervention		X	X	X	X		X
5.Feeding Instrument				X	X	X	
6.Breast-feeding and Weight Patterns: Birth to 6 Months							X
Control Group							
1.PDF	X						
2.BEI, HBSS	X						X
3.Feeding Instrument				X	X	X	X
4.Breast-feeding and Weight Patterns: Birth to 6 Months							X

Windows Release 7.5 (SPSS Inc., Chicago, IL). A double-entry, data-management program using Paradox was developed in consultation with a data manager. The coded data from the measurements were transferred onto a disk file by using the computer terminal. All instruments were edge-coded and data were entered directly from the instrument into instrument-specific Paradox tables. A code book was maintained by the investigator to document information on the coding decisions.

The data-management system used several procedures to minimize the risk of data-entry errors. The data-management system used range-checking, double-entry, and data-editing following double entry verification. The investigator entered and verified all data. Once data were entered and verified, a backup copy of the data files was stored in a locked cabinet by the investigator.

Descriptive statistics were employed initially to describe and synthesize the data. Each variable to be analyzed was classified according to its level of measurement in order to determine the appropriate descriptive statistic. Frequency and percentages descriptive statistics were calculated for variables

classified as the nominal or ordinal level of measurement. Frequency distributions, measures of central tendency, and variability were calculated for variables classified as interval level of measurement. Specifically, the frequency distributions were calculated to determine the shape of the distribution for interval level variables and the mean and median were used to describe the central tendency of these variables. The frequency distributions for the interval data demonstrated that age was positively skewed (.444), HBSS scores at baseline were negatively skewed (-1.32), and breastfeeding duration in weeks was positively skewed (.055). The findings suggest that the data were not normally distributed and that non-parametric inferential statistics were warranted. In addition, the range and standard deviation of the interval variables were used describe the variability or the extent to which the data varied.

Nominal and ordinal data from the PDF included when the decision was made to breastfeed, planned length of breastfeeding, plans to supplement, complications during hospital stay, degree of commitment to breastfeeding, information sources for breastfeeding, race, marital status,

education level, occupation, plan to return to work/school, smoking status, support persons's attitude, WIC status, income, type of delivery, and infant gender. Ratio data from the PDF included age, birth weight and discharge weight.

Additional descriptive statistics were compiled on information obtained from the BEI and HBSS. Nominal and ordinal data on the BEI included frequency and length of breastfeeding, reasons for weaning, problems encountered, and mothers' perceptions of the experience, supplementation, sources of support, and timing of first breastfeeding. Ratio data from the BEI included duration of breastfeeding in weeks. Interval data from the HBSS included the total HBSS, emotional, instrumental, and informational scores. The descriptive statistics described were examined for the entire sample, as well as within groups.

Comparisons were made between groups using inferential statistics. Chi-square test, Fisher's exact test, t-test, logrank test, and Cox proportional hazards regression (reported as Cox Likelihood Ratio: Cox LR) were the inferential procedures employed in this study. The chi-square test statistic was used for nominal and ordinal data

comparisons between groups in the study. The assumptions underlying chi-square statistic were met in this study and include frequency data, adequate sample size, independence, and categorical data (Munro, 1997). When the expected cell frequency was below five, the Fisher's exact test was used as an alternative to the chi-square. The t-test was used to compare age and HBSS scores between groups since they were at least interval level data.

Nonparametric inferential statistics were used for the hypothesis testing procedures, specifically logrank test, Cox proportional hazards regression, and Kaplan-Meier estimation. With nonparametric statistics there is no assumption to be met about the distribution of the variable. As mentioned previously, the measures of central tendency indicated that age and breastfeeding duration data in this study was not normally distributed. In addition, survival analyses is a series of statistical techniques that lend itself well to analyzing longitudinal data over time, such as breastfeeding duration, in that the cumulative proportion continuing to breastfeed can be determined and any subjects lost to attrition can be maintained in the study up until their last contact. Another feature of survival analysis

data is the presence of censored observations in which the event time is not completely monitored, as in this study when subjects were still breastfeeding at 6 months post delivery when data collection was ended (Burns & Grove, 1997). Survival analyses take into consideration these censored observations which are incomplete observations due to termination of the study or to subject attrition.

The survival analyses techniques used in this study were life table for creation of a table of estimates of cumulative proportion breastfeeding, Kaplan-Meier estimation curve for plotting of estimates of cumulative proportion breastfeeding, logrank test, and Cox proportional hazards regression. These survival analysis techniques analyze data on the length of time it takes a specific event to occur (Sereika, 1995). The event in this research study is breastfeeding weaning and the event time is defined as from birth to breastfeeding weaning up to 6 months post delivery and was measured in weeks.

In survival analysis a life table is created to compare the experimental and control groups on the proportion of breastfeeding weaning (Pocock, 1991). The purpose of the life table was to estimate for each group the percentage of

subjects still breastfeeding at each week following delivery up to and including 24 weeks (6 months). Each week the percentage of subjects still breastfeeding was calculated as cumulative percentage surviving or still breastfeeding. This life table was then graphically displayed in a survival curve which depicts the cumulative percentage still breastfeeding. This survival curve is sometimes called the Kaplan-Meier method of life-table estimation (Pocock, 1991). The logrank test was then used to assess for overall difference in breastfeeding experience between the experimental and control groups.

Cox proportional hazards regression procedures are used to determine if the time-to-event dependent variable, such as breastfeeding duration, can be predicted by prognostic variables such as the return to work/school, timing of the initial breastfeeding session, and social support scores. These regression procedures are techniques which help to predict outcomes and explain the interrelationship between the outcome and predictor variables. A hazard ratio is generated in these procedures to estimate the relative risk of the explanatory variable on the dependent variable.

For the experimental group, additional descriptive statistics were used to depict the characteristics of the group from the Mother's Breastfeeding Daily Log. The means for number of feedings per day, the length of breastfeeding in minutes per day, the number of voids and stools per day for the infant, and the number of supplements per day were determined for each week.

Research Hypothesis One. "Primiparous breastfeeding mothers who receive both the breastfeeding educational session and the program on the self-regulation intervention will demonstrate a longer length of time to breastfeeding weaning when compared with a group of primiparous breastfeeding mothers who only receive the breastfeeding educational session." Survival analysis techniques were used to examine length of time it takes for termination of breastfeeding to occur, the event of weaning, in the experimental group and the control group. The differences between weaning in the two groups from birth to 6 months. A life table was used to display graphically the comparison between the experimental group and the control group in regard to the estimate of subjects in each group still breastfeeding. The findings in the life table were graphed

in a Kaplan-Meier survival curve. Specifically, the logrank test assessed for treatment difference between the experimental and control groups for the event of weaning.

The comparisons between the treatment and the dependent variable, breastfeeding duration, using the survival analysis techniques were made using three approaches: the intention-to-treat model, the treatment received model, and per-protocol model. For the intention-to-treat approach all subjects remained in their respective groups for comparisons regardless of the degree of the treatment received. This method of analysis is the main statistical approach in randomized studies because of its unbiased comparisons (Pocock & Abdalla, 1998). The secondary analyses based on the treatment received have a degree of implied bias since they deviate from the principle of randomized comparison, however can be integrated into a study analyses to make recommendations for future treatment protocols (Pocock & Abdalla, 1998). The second approach compared subjects according to the amount of the treatment received. Those subjects in the experimental group receiving the full self-regulation intervention will be compared with the subjects in the experimental group not receiving the full self-

regulation intervention. Lastly, a comparison was made using the per-protocol approach. For this approach subjects completing the full self-regulation intervention were compared with the control group.

Research Hypothesis Two. "Primiparous breastfeeding mothers who have an earlier initial breastfeeding session or who return to work in more than eight weeks postpartum will have a longer length of time to breastfeeding weaning."

Cox proportional hazards regression procedures (Afifi & Clark, 1997) were used as a method of modeling the relationship between these independent variables and the survival time in the overall sample. The variables were collapsed into categories for these comparisons. The variable on when returning to work/school was collapsed into two categories for analyses, return to work/school in less than or equal to 8 weeks (coded as '0') and return to work/school in greater than 8 weeks (coded as '1). Subjects who planned never to return to work were coded as '1'. The indicator variable was coded as '1'. These time frames were chosen based on a research study by Kearney, Cronenwett, and Reinhardt (1990). Women in this study who returned to work before 8 weeks had more breastfeeding problems and weaned

earlier than those who waited longer before returning to work.

The timing of the initial breastfeeding session was collapsed into two categories for comparison, breastfeeding session within 6 hours (coded as '0') or the initial breastfeeding session beyond 6 hours (coded as '1'). The indicator variable was coded as '1'. These categories were chosen based on the research conducted by Hill (1991). Hill concluded that mothers breastfeeding in 4 hours or less after delivery breastfed significantly longer than those mothers who began to breastfeed at 8 hours or longer after delivery.

Research Hypothesis Three. "Primiparous breastfeeding mothers receiving the self regulation intervention, who have a later initial breastfeeding session or who return to work in less than eight weeks, will have a longer length of time to breastfeeding weaning as compared with similar mothers not receiving the intervention".

Cox proportional hazards regression procedures were used as a method of modeling the relationship between these independent variables and the survival time in the subjects in the experimental group.

Research Hypothesis Four. "The perceived social support of primiparous breastfeeding mothers will be positively correlated with the length of time to breastfeeding weaning".

Cox proportional hazards regression procedures were used as a method of modeling the relationship between the social support scores and the survival time in the overall sample.

CHAPTER V

RESULTS

The purpose of this randomized, two-group experimental design was to examine the effect of the self-regulation intervention, self-monitoring, on breastfeeding duration in the 6 months following delivery. Breastfeeding duration was the major outcome variable measured at 6 months postpartum. Eighty-six primiparous mother were recruited for the study. Eighty four subjects finished the study, 43 in the control group and 41 experimental group. Two subjects (2.3%) in the experimental group were lost due attrition. The following chapter presents the results of each of the study hypotheses and secondary findings from the study.

Breastfeeding Duration

Breastfeeding duration was measured on the BEI at 6 months following delivery. An initial analyses of breastfeeding duration for the total subjects in the experimental and control groups was first completed. Following this initial comparison, additional analyses evaluated the experimental group in regard to the amount of treatment received. The research plan identified that the subjects in the experimental group needed to complete a

minimum of the first 3 weeks of the breastfeeding logs and the 3 weekly phone calls from the research investigator in order to receive the self-regulation intervention as designed in the research study. However, 10 subjects in the experimental group received the weekly calls but did not complete any of the breastfeeding logs, the self-monitoring component of the intervention. Two of these subjects were lost due to attrition and eight of the subjects continued in the study but did not complete the breastfeeding logs. These subjects thus did not receive the full self-regulation intervention. Therefore, the sample characteristics and the breastfeeding duration of this sub-group, within the experimental group, were evaluated and compared with the subjects in the experimental group who completed the self-regulation intervention to identify variables that may impact the acceptability of the self-regulation intervention.

Research Question and Hypothesis #1

The first research question investigated the length of time to breastfeeding weaning, for a group of primiparous mothers in a community hospital participating in an educational session and the self-regulation intervention,

self-monitoring, as compared with a group of primiparous mothers who only receive the breastfeeding educational session. It was hypothesized that primiparous breastfeeding mothers who received both the breastfeeding educational session and the self-regulation intervention would demonstrate a longer length of time to breastfeeding weaning when compared with a group of primiparous breastfeeding mothers who only received the breastfeeding educational session.

Findings. The following description will present the findings from the overall comparison between the experimental and control groups using the intention-to-treat approach, and secondly, present the findings from the comparison within the experimental group on the amount of self-regulation intervention using the treatment received approach and the per-protocol approach.

The mean and median breastfeeding duration for the overall experimental group were 13.74 (95% CI: 10.93 - 16.55) and 15.00 (95% CI: 7.54 - 22.46) weeks, respectively. The mean and median breastfeeding duration for the control group were 12.12 (95% CI: 9.13 - 15.10) and 10.83 (95% CI: 5.72 - 14.28) weeks, respectively. Figure 5 depicts the

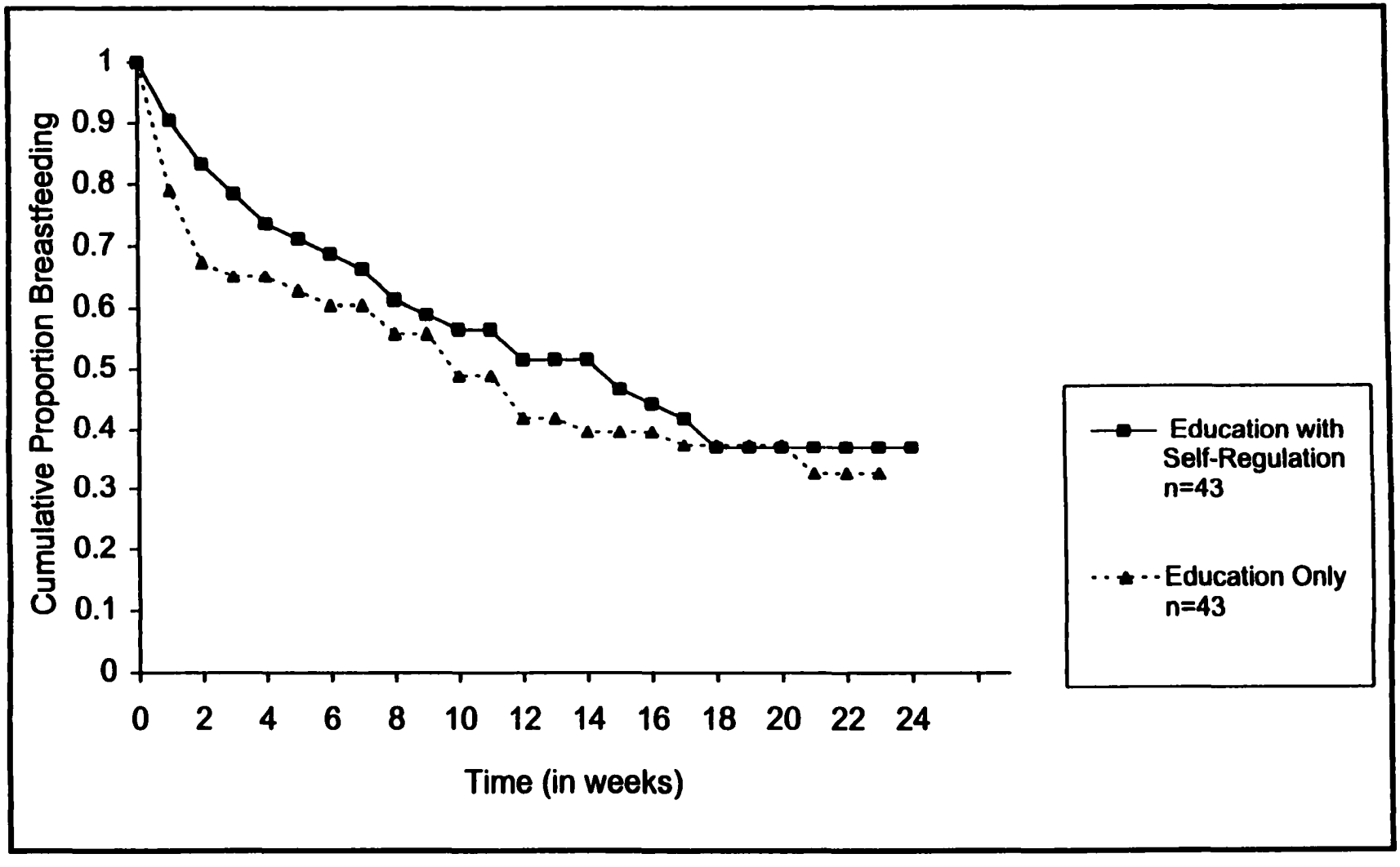


Figure 5

Breastfeeding Duration Curves for Subjects in the Experimental Group (Education with Self-Regulation) and the Control Group

breastfeeding event curves for the experimental and control groups for the 6 months following delivery. Subjects in the experimental group breastfed a comparable length of time as compared to the education only control group, therefore Hypothesis I was not supported [$X^2_{logrank}(1, n = 84) = .5, p = .2387$].

Table 23 depicts the breastfeeding percentages for the experimental and control groups at 3, 6, 12, 18, and 24 weeks. At 6 months postpartum, a comparable number of subjects in both groups were still breastfeeding, 37% in the experimental group and 33% in the control group. Secondary findings for breastfeeding duration rates at 3 weeks postpartum were investigated to evaluate the percentage of subjects in both groups who weaned since this is when the self-regulation intervention was implemented and when secondary lactation insufficiency may occur. During the first 3 weeks postpartum, the life table demonstrated that 65% of the experimental group were still breastfeeding at 3 weeks, whereas, 79% of the experimental group were still breastfeeding. A Z-statistic was computed and it demonstrated that there was not a significant difference in

Table 23

Breastfeeding Percentages for Experimental and Control Groups at 3, 6, 12, 18, and 24 Weeks Postpartum

Weeks Postpartum	Treatment Group (n=43)	Control Group (n=43)
3 weeks	32 (79%)	28 (65%)
6 weeks	30 (70%)	26 (61%)
12 weeks	23 (56%)	18 (42%)
18 weeks	17 (42%)	16 (37%)
24 weeks	15 (37%)	14 (33%)

breastfeeding duration between the two groups at 3 weeks postpartum (Z = -1.386, p = .0885).

The second aspect of these analyses was to evaluate the sample characteristics and the breastfeeding duration of the subjects in the sub-group (n = 10), within the experimental group, who did not complete the self-monitoring intervention. These sample characteristics are displayed in Table 24. Subjects in this group were defined as those mothers who completed 3 weeks or less of the Daily Breastfeeding Logs. The subjects in the sub-group who did

Table 24

Characteristics of Subjects in Experimental Group Completing and Not Completing the Self-Monitoring Component

Variables	Completed Self-Monitoring Component (n=33)	Did Not Complete Self-Monitoring Component (n=10)	Statistic (p-value)
Age			
M	27.4	24.3	t = -1.919 df = 41
SD	4.18	5.67	(p = .062)
Strong Commitment to Breastfeeding	25 (75.8%)	9 (90.0%)	df = 1 (p_{FE} = .315)
Education -HS Diploma	5 (15.2%)	4 (40.0%)	X^2 = 6.33 df = 3
-Some College	23 (69.7%)	6 (60.0%)	(p = .097)
Presently Employed	26 (78.8%)	6 (60.0%)	df = 1 (p_{FE} = .248)
Initial Breastfeeding Within 6 hours	31 (93.3%)	9 (90.0%)	X^2 = 3.83 df = 3 (p = .281)
Support Person Attitude Very Positive	19 (57.6%	9 (90.0%)	df = 1 (p_{FE} = .061)

Table 24 (Cont'd)

Characteristics of Subjects in Experimental Group Completing and Not Completing the Self-Monitoring Component

Variables	Completed Self-Monitoring Component (n=33)	Did Not Complete Self-Monitoring Component (n=10)	Statistic (p-value)
Plans to Return to Work/School	30 (90.9%)	9 (90.0%)	df = 1 (p_{FE} = .668)
Mode of Delivery			
-Vaginal	23 (69.7%)	8 (80.0%)	
-Cesarean	10 (30.3%)	2 (20.0%)	df = 1 (p_{FE} = .421)
Enrolled in WIC	9 (27.3%)	6 (60.0%)	df = 1 (p_{FE} = .073)
Single	1 (3.0%)	4 (40.0%)	df = 1 (p_{FE} = .007)
Income <$20,000	7 (21.3%)	7 (70.0%)	X^2 = 10.74 df = 5 (p = .057)
Planned Breastfeeding Duration < 6 months	17 (51.5%)	5 (50.0%)	X^2 = .284 df = 4 (p = .991)

Note. Subjects receiving self-regulation completed 3 or > weeks of the Daily Breastfeeding Logs. Subjects not receiving the self-monitoring intervention completed none of the Daily Breastfeeding Logs.

not complete the self-monitoring component of the intervention were similar in the percentage of subjects returning to work/school (p_{FE} = .668), had a marginally larger percentage who reported a very positive social support attitude towards breastfeeding (p_{FE} = .061), had a similar planned duration of breastfeeding (p = .991), and had a similar initial breastfeeding session (p = .281) as compared with the subjects in the experimental group completing the self-monitoring. The sample characteristics of age, marital status, income, and WIC enrollment demonstrated marginal to significant differences. Subjects who did not complete the self-monitoring intervention tended to be single (p_{FE} = .007), younger (p = .062), had an income less than $20,000 ($p$ = .057), were less educated (p = .097) and were enrolled in WIC (p_{FE} = .073).

Following the comparison of sample characteristics between the experimental group subjects who completed the self-monitoring component of the intervention and those who did not, a comparison was made between breastfeeding durations for these groups. Figure 6 depicts the event time for the comparison in breastfeeding duration between the group of subjects in the experimental group who completed

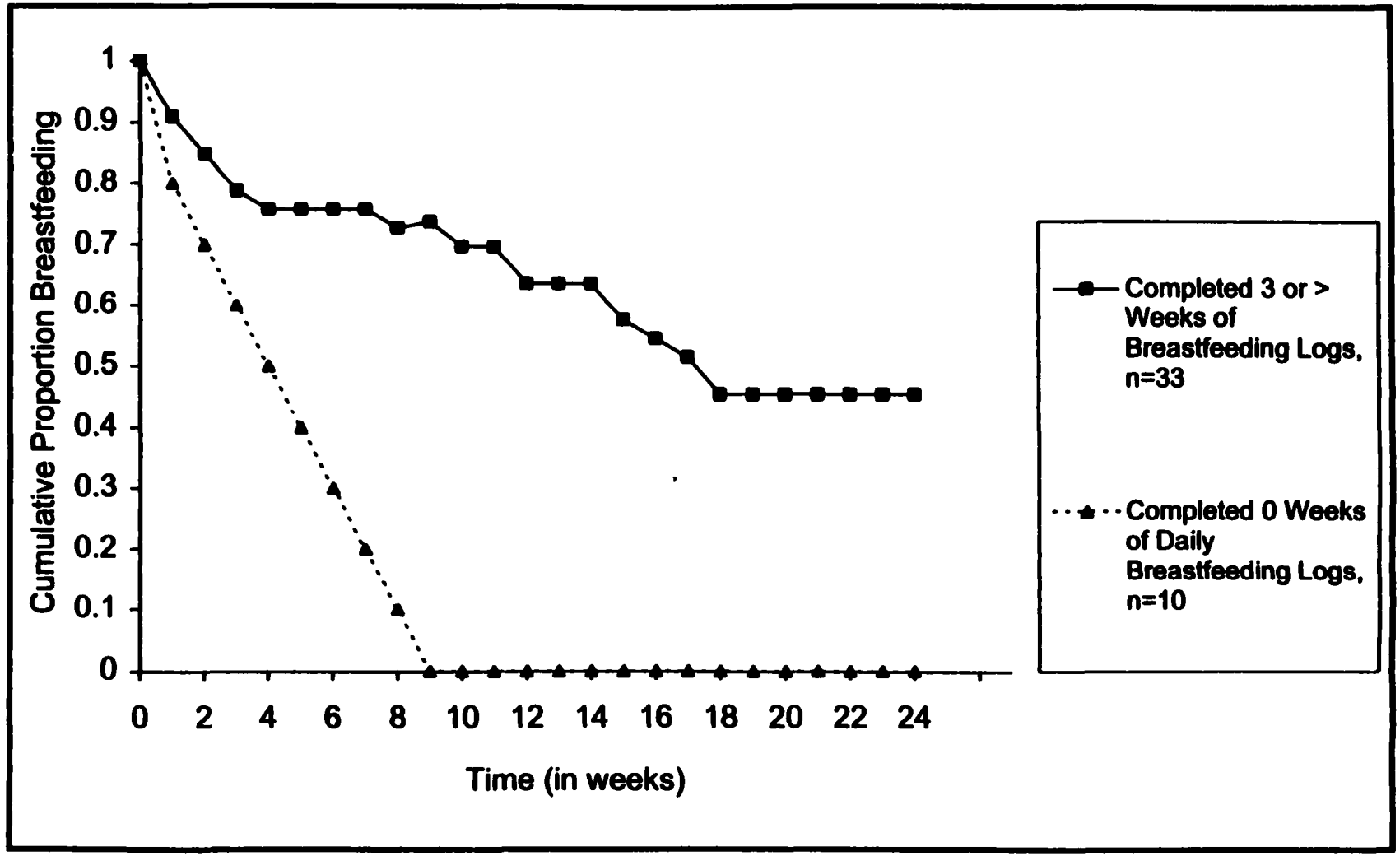


Figure 6

Breastfeeding Duration Curves for Subjects in the Experimental Group Completing and Not Completing the Self-Monitoring Intervention

the self-monitoring component and the sub-group within the experimental group that did not complete the intervention. The mean and median length of breastfeeding duration for the subjects in the experimental who did not complete the self-monitoring was 4.52 (95% CI: 2.67 - 6.38) and 4.00 (95% CI: .90 - 7.10) weeks, respectively, with these subjects having been weaned by 8 weeks postpartum. The mean and median length of breastfeeding duration for the subjects in the experimental group who completed the self-monitoring were 16.56 (95% CI: 13.78 - 19.34) and 18.00 (95% CI: 15.65 - 20.35) weeks, respectively. Subjects in the experimental group who completed the self-monitoring intervention breastfed significantly longer than those subjects in the experimental group who did not complete the intervention [$X^2_{logrank}(1, n = 43) = 17.66, p = .001$]. There is some caution in the interpretation of these findings since the subjects who did not complete the self-regulation intervention were not randomized but were self-selected and chose not to complete the Daily Breastfeeding Logs. Those subjects who did not complete the intervention tended to be enrolled in WIC, a larger percentage were single and younger, less educated, and their income was lower than those subjects who

completed the intervention. This suggests that these variables may influence the acceptability of the self-monitoring intervention.

A comparison was then made between breastfeeding duration in the control group and in the group of subjects in the experimental group that completed the self-monitoring intervention as per protocol. Figure 7 depicts the event time for the comparison in breastfeeding duration between these two groups. Subjects in the experimental group who did not complete the self-monitoring portion of the intervention were omitted from this analyses. The mean and median length of breastfeeding duration for the subjects in the experimental group who completed the self-monitoring component of the intervention were 15.70 (95% CI: 12.59 - 18.80) and 18.00 (95% CI: 15.34 - 20.66) weeks, respectively. The mean and median length of breastfeeding duration for the subjects in the control group were 12.12 (95% CI: 9.13 - 15.10) and 10.83 (95 % CI: 5.72 - 14.28), respectively. Subjects in the experimental group who completed the self-monitoring intervention breastfed significantly longer than those subjects in the control group [$X^2_{logrank}$ (1, n = 76) = 3.68, p = .0275].

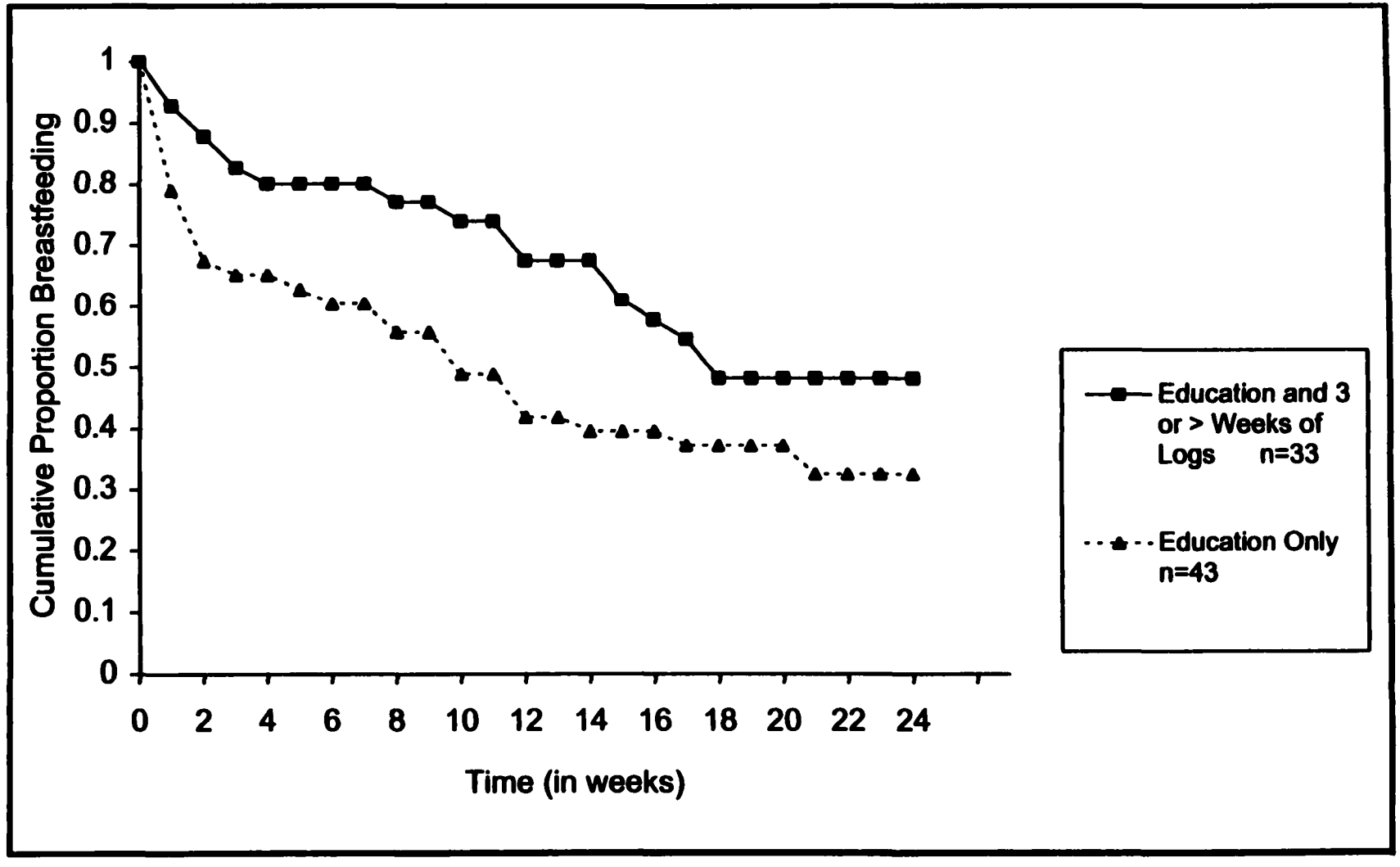


Figure 7

Breastfeeding Duration Curves for Subjects in the Experimental Group (Education and Completed 3 or More Weeks of Breastfeeding Logs) and the Control Group

Lastly, Cox proportional hazards regression procedures were used to examine the relationship between components of the self-regulation intervention (components of the treatment received) and breastfeeding duration. For an analysis of the two components of the self-regulation intervention, phone calls and breastfeeding logs, all subjects were coded on whether the intervention was received. For each variable, phone calls and breastfeeding logs, each subject was coded '0' if they did not receive the intervention and was coded '1' if they received the intervention. Subjects in the experimental group who completed none of the breastfeeding logs were coded as '0'. The indicator variable was coded as '1'. Cox regression hazard proportions was then completed for each variable. Completion of the daily breastfeeding logs was a significant predictor of breastfeeding duration [Cox LR (1, n = 84) = .0082, p = .007, Hazard Ratio: 3.17], whereas receiving the phone calls was not a significant predictor [Cox LR (1, n = 84) = -.0040, p = .577, Hazard Ratio: .885]. Subjects who completed the self-regulation intervention, self-monitoring, were more than three times as likely to breastfeed longer than subjects not completing the intervention.

In summary, subjects in the experimental group did not significantly breastfeed longer than the control group. A sub-group of subjects (n = 10) in the experimental group did not complete the intervention as designed in the study and the mean duration of breastfeeding for these subjects was significantly shorter as compared with the remainder of the experimental group (n = 33). Marginal to significant differences were found in the sociodemographic variables in this group as compared with the remainder of the experimental group who completed the intervention. Subjects who did not complete the self-monitoring intervention tended to be single, younger, had an income less than $20,000, and were enrolled in WIC. These findings suggest that these variables my impact the acceptability of this type of intervention to promote breastfeeding duration. Subjects who did complete the intervention (n = 33) had significantly longer breastfeeding duration and were three times as likely to breastfeed longer as compared with the remainder of the subjects who did not complete the intervention (n = 53).

Subjects who completed the breastfeeding logs had very positive accolades regarding the intervention. Their comments included "the logs are great", "the logs helped a

lot, makes me not worry", "I really like the logs a lot," "it is nice keeping track, it lets me know what I need to do", "I have a positive feeling when I complete the logs, it seems we are succeeding", "it is very satisfying to me that I am able to meet my baby's needs", "it looks as it I am satisfying her needs according to her number of diapers", "I need to get him to eat longer at each feeding since by the log he is only feeding 10 minutes", "I feel somewhat assured by the number of wet and dirty diapers still being at six," and "the logs helped a lot, it helps my husband to be involved and to know that the baby is getting enough". One negative comment was reported by one of the subjects, "it is hard to keep up the logs, I am just so busy".

Relationship Between the Timing of the Initial Breastfeeding and Return to Work/School to Breastfeeding Duration

The relationship between timing of the initial breastfeeding and the return to work/school to breastfeeding duration was measured on the BEI administered at Time 1.

Research Question and Hypothesis #2

The second research question addressed the relationship between the length of time to breastfeeding weaning and the timing of the initial breastfeeding session and the return

to work/school. It was hypothesized that primiparous breastfeeding mothers who have an earlier initial breastfeeding session or who return to work in more than 8 weeks postpartum would have a longer length of time to breastfeeding weaning as compared with mothers who have a delayed initial breastfeeding session or who return to work in 8 weeks or less postpartum.

Findings.

Table 25 compares the mean breastfeeding duration of the sample and the groups based on the variable of returning to work/school. A return to work in more than 2 months was not a significant predictor of breastfeeding duration [Cox LR (1, n = 84) = .0000, p = .2831, Hazard Ratio: 1.26].

The timing of the initial breastfeeding session and the relationship to breastfeeding duration was also examined. Table 26 outlines the breastfeeding duration means for the groups based on the timing of the initial breastfeeding session. This variable was not a significant predictor of breastfeeding duration [Cox LR (1, n = 84) = .0000, p = .4338, Hazard Ratio: 1.29]. Therefore, hypothesis #2 was not supported in that an earlier breastfeeding session or a return to work in > 8 weeks were not significant predictors

Table 25

Breastfeeding Duration for Overall Sample and Groups Based on Plans to Return to Work/School

Plans to Return to Work/School	Overall Sample (n = 84)	Treatment Group (n = 41)	Control Group (n =43)
≤ 2 months			
M	11.49	15.18	10.41
SD	9.25	9.28	8.90
> 2 months			
M	13.70	16.25	13.66
SD	9.94	9.18	10.74

of breastfeeding duration. Subjects who had an earlier initial breastfeeding session or returned to work later did not breastfeed significantly longer.

Effect of the Self-Regulation Intervention in Relation to Timing of the Initial Breastfeeding Session and Return to Work/School in the Experimental Group

The timing of the initial breastfeeding and the return to work/school to breastfeeding duration for the

Table 26

Breastfeeding Duration in Total Sample (Experimental Group and Control Group)Based on Timing of the Initial Session

Initial Breastfeeding Session After Delivery	Overall Sample (n = 84)	Treatment Group (n = 41)	Control Group (n = 43)
2 hours or <			
M	13.87	15.04	12.76
SD	9.58	8.88	10.84
n	48	23	22
3 to 6 hours			
M	11.57	9.90	13.77
SD	9.49	9.04	9.98
n	30	17	13
7 to 12 hours			
M	10.58	12.50	9.63
SD	11.63	16.26	11.57
n	6	2	4
> 12 hours			
M	9.65	24.00	9.65
SD	9.47	-	9.47
n	5	1	4

Note. Mean duration in weeks.

experimental group was measured on the BEI administered at baseline.

Research Question and Hypothesis #3

The third research question addressed the relationship between the response of the intervention and the timing of the initial breastfeeding session and the return to work/school to breastfeeding duration. It was hypothesized that primiparous breastfeeding mothers receiving the self-regulation intervention, who have a later initial breastfeeding session or who return to work/school in less than 8 weeks, would have a longer length of time to breastfeeding weaning as compared with similar mothers not receiving the intervention.

Findings. The mean breastfeeding duration for subjects in the control group, experimental group completing the self-regulation intervention, the experimental group not completing the self-regulation intervention and plans to return to work are compared in Table 27. The Cox proportional hazards regression was not significant (X^2 = .4342, p = .2164) indicating that the timing of the return to work and the timing of the initial breastfeeding session were not statistically significant predictors of

Table 27

Breastfeeding Duration for Groups Based on Plans to Return to Work/School

Return to Work/School	Experimental Group Receiving Self-Monitoring Intervention (n=33)	Experimental Group Not Receiving Self-Monitoring Intervention (n=10)	Control Group (n=43)
Return to Work/School in ≤ 8 weeks			
M	15.18	3.25	10.41
SD	9.28	2.80	8.90
Return to Work/School in > 8 weeks			
M	16.25	5.80	13.66
SD	9.18	2.86	10.74

Note: Mean breastfeeding duration in weeks.

breastfeeding duration in the experimental group, therefore Hypothesis #3 was not supported.

Relationship Between Social Support and Breastfeeding Duration

Social support was measured using the HBSS administered at baseline and at 6 months postpartum. The HBSS instrument

measures informational, instrumental, and emotional support related to breastfeeding. The total HBSS score and the individual sub-scores on informational, instrumental, and emotional support were compared for each group and evaluated for any effect on breastfeeding duration.

Research Question and Hypothesis #4

The fourth research question investigated the relationship between perceived social support and breastfeeding duration. It was hypothesized that the perceived social support of primiparous breastfeeding mothers would be positively correlated with the length of time to breastfeeding weaning.

Findings. There were no statistically significant differences in social support scores between the experimental and control groups at baseline or at 6 months. The total mean scores for each group are summarized in Table 28. From baseline to 6 months postpartum both groups had a similar decline in overall HBSS scores as depicted in Figure 8. A repeated measure test of with subjects effect was significant in the total HBSS score (F (83, N = 84)= 14.937,

Table 28

Comparison of HBSS Scores and Sub-Scale Scores by Group

	Total HBSS		Emotional Sub-Score		Instrumental Sub-Score		Informational Sub-score	
Group	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2
Treatment Group (n = 41)								
M	108.53	101.49	37.23	36.07	36.23	31.71	35.07	33.71
SD	12.35	18.25	4.34	5.52	4.89	7.37	5.52	7.23
Control Group (n = 43)								
M	111.56	105.47	38.42	36.72	37.23	33.81	35.91	34.93
SD	9.72	18.25	2.55	5.44	3.44	6.28	5.05	6.62
Statistic (p value)	t = -1.261 df = 82 (p = .211)	t = -1.051 df = 82 (p = .297)	t = -1.547 df = 82 (p = .127)	t = -.541 df = 82 (p = .590)	t = -1.098 df = 82 (p = .276)	t = -1.407 df = 82 (p = .163)	t = .734 df = 82 (p = .465)	t = -.807 df = 82 (p = .422)

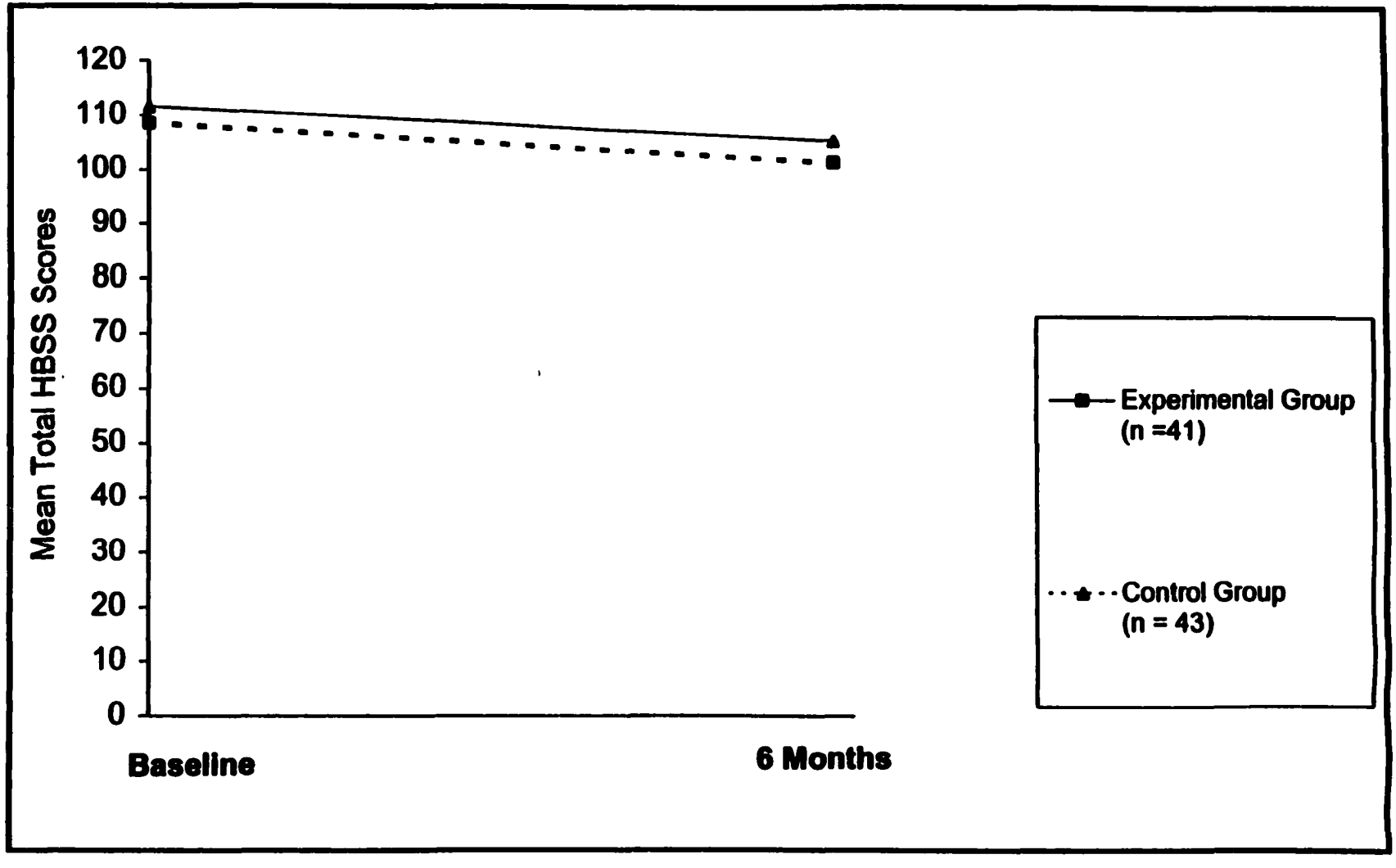


Figure 8

Mean Total HBSS Scores at Baseline and at 6 Months for Experimental Group (Education with Self-Regulation) and the Control Group (Education Only)

p = .000), emotional sub-score (F (83, n = 84) = 6.76, p = .011), and instrumental sub-score (F (83, n = 84) = 34.0, p = .000).

Cox proportional hazards regression procedure was used to examine any relationship of the overall social support scale on breastfeeding duration. The total social support score at baseline was not a significant predictor of breastfeeding duration [Cox LR (1, N = 86) = .0000, p = .6410, Hazard Ratio: 1.00], therefore Hypothesis #4 was not supported.

Secondary Findings

WIC Status

Total subjects enrolled in the WIC program (n = 35) had a shorter breastfeeding duration as compared with subjects not enrolled in WIC (n = 51), 9.06 weeks (SD = 9.19) and 15.07 weeks (SD = 9.21), respectively. WIC (Special Supplemental Food Program for Women, Infants, and Children) is a government food program funded by the United States Department of Agriculture and the Food and Nutrition Service. Enrollment in the program is determined by income level. Mothers and their infants qualify for enrollment if their income level is at or above 185% of the poverty level.

This program is targeted to low-income pregnant and breastfeeding women, and their infants and children up to five years of age.

In a further evaluation of WIC status among the control and experimental groups, subjects who were enrolled in WIC and completed the self-regulation intervention had a longer breastfeeding duration than the control group and the sub-group within the experimental group that did not complete the self-regulation intervention, 15.11 weeks (n = 9, SD = 9.65), 8.05 weeks (n = 20, SD = 9.02), and 3.38 weeks (n = 6, SD = 2.75), respectively. A Cox proportional hazards regression procedure found that WIC enrollment was a significant predictor of breastfeeding duration [Cox LR (1, n = 84) = .0031, p = .047, Hazard Ratio = 1.56]. Subjects enrolled in the WIC program weaned earlier than subjects not enrolled in the program.

Planned Duration of Breastfeeding

The variable of planned breastfeeding duration was measured on the PDF. The planned duration of breastfeeding was collapsed into two categories for comparison, decided

and undecided. Each subject was coded '0' if they were decided on a planned breastfeeding length and '1' if they indicated they were undecided about how long they planned to breastfeed. The indicator variable was coded as '1'. This variable was a marginally statistically significant variable [Cox LR (1, n = 84) = .0022, p = .07, Hazard Ratio: .65]. This suggest that mother's intention to breastfeed marginally impacts breastfeeding duration, mothers who are undecided on a planned breastfeeding length tend to wean sooner than mothers who are decided on their plans.

Feeding Frequency and Length

Average total feedings and total length of feedings were compiled from the daily breastfeeding logs from the experimental group. The average number of daily feedings for week one through six were 7.18, 8.05, 7.61, 7.88, 7.75, and 7.37, respectively. The average feedings stayed fairly constant, however these estimates were below the recommended 8 to 12 feedings a day. The daily average total length of feedings (in minutes) for week one through six were 159.02, 192.38, 181.56, 177.07, 152.78, respectively. This supports the literature that reports that breastfeeding length decreases at approximately 3 weeks postpartum as the infant

becomes more efficient at feeding. Cox proportional hazards regression analysis concluded that three of the variables were marginally to significantly predictive of breastfeeding duration. Average feedings at 1 week [Cox LR (1, *n* = 31) = -.0077, *p* = .065, Hazard Ratio: .79], average feedings at 3 weeks [Cox LR (1, *n* = 84) = -.0407, *p* = .003, Hazard Ratio: .67), and average length at 1 week [Cox LR (1, *n* = 84) = -.0153, *p* = .029, Hazard Ratio: .99], were significant variables.

Summary of Results

Subjects in the experimental group did not breastfeed significantly longer than the control group. Some subjects in the experimental group chose not to complete the self-monitoring component of the intervention and demonstrated a significantly lower breastfeeding duration as compared with subjects who completed the self-monitoring intervention. Income status, WIC status, and marital status were variables in this group, subjects who chose not to complete the self-monitoring, that were statistically different from the other subjects in the experimental group. The influence of these variables may impact the acceptability of the self-regulation intervention for some breastfeeding mothers.

However, subjects who completed the full self-regulation intervention per protocol breastfed significantly longer than those subjects who did not complete the intervention.

Marginal to statistically significant predictors of breastfeeding duration included WIC status, planned breastfeeding duration, feeding length and frequency at 1 week, and feeding frequency at 3 weeks. Non-WIC subjects and subjects with a planned breastfeeding duration breastfed longer than subjects enrolled in WIC or who were undecided about their breastfeeding length. Social support scores, returning to work, timing of the initial breastfeeding session and mode of delivery were not statistically significant predictors of breastfeeding duration.

CHAPTER VI

DISCUSSION

SUMMARY AND CONCLUSIONS

This final chapter will discuss the findings of the study in relation to previous research and propose implications for research and practice for health promotion of breastfeeding mothers. The long-term objective of this research study was to promote the health of mothers and their infants by examining an intervention developed to improve breastfeeding duration outcomes.

Breastfeeding Duration

The discussion of the research findings in relation to breastfeeding duration will be presented according to some of the predictors for breastfeeding duration as developed by Duckett, Henly, and Garvis (1993). This taxonomy of potential predictors for breastfeeding duration are categorized as maternal antecedents, external resources, and interferences.

Maternal Antecedents

Age, education, ethnicity, and parity are the maternal antecedents that have been related to breastfeeding duration in the literature. Generally, women who are older, well-

educated, and Caucasian tend to breastfeed longer than women who are of African descent or who are women with less education (Barnes, Leggett, & Durham, 1993; Hill, 1991; Matich & Sims, 1992; Matthews, 1993; Piper & Parks, 1996; Richardson & Champion, 1992). The overall population at the research site tended to be older, well-educated, and Caucasian which impedes a thorough evaluation of the maternal antecedents on breastfeeding duration. As compared with the literature, the majority of the subjects in this sample were well-educated with 75.5% reporting having some college education to college degree. The mean age of the total sample was 25.9 years, however there was a significant difference in the age of subjects who breastfeed $\leq$ 8 weeks and those who breastfed > 8 weeks. Subjects who breastfed > 8 weeks were significantly older than those subjects who breastfeed $\leq$ 8 weeks, 27.64 years and 23.66 years, respectively [t = -4.273 (84, N = 86), p = .000]. This supports the existing literature that mothers who are older breastfeed longer.

External Resources

External resources that have been shown to impact breastfeeding duration included in this discussion are

information from health care providers and sources of social support. Studies to examine the effect of specific interventions to promote breastfeeding have centered on educational programs, follow-up home visits and telephone contacts, and contact with lactation consultants. Interventions which demonstrate the most promise in breastfeeding promotion are contact with a lactation consultant, follow-up contacts, and peer counselors.

Various forms of educational programs, such as booklets and classes, have been examined for their effect on breastfeeding initiation and duration. Generally these studies have concluded that breastfeeding mothers exposed to these interventions have increased their knowledge about breastfeeding, however the majority of the studies have failed to demonstrate a significant impact on initiation and duration (Curro, Lanni, Scipione, Grimalda, & Mastroiacovo, 1997; Hill, 1987; Reifsnider & Eckhart, 1997; Schy, Magalgyi, Mendelson, Race, & Ludwig-Beymer, 1996). One study did find significant difference in breastfeeding initiation in two groups of women who were involved in prenatal classes or prenatal individual educational sessions as compared with a control group. This study of low-income,

African American women (N = 159) found prenatal education was associated with increased breastfeeding initiation rates, 50%, 45%, 22%, in the individual session, prenatal class group session and control groups, respectively (p < .05). Women who had either of the interventions were four times more likely to breastfeed as compared with the control group (Odds Ratio: 4.26, CI: 2.59 - 7.03, p = .004). However the study did not find a consistent significant effect of prenatal education on breastfeeding duration beyond 2 weeks postpartum.

The role of the lactation consultant as an external resource impacting breastfeeding duration has been examined in several studies. The majority of the studies reveal a significant impact on breastfeeding duration (Brent, et al., 1995; Quarles, et al., 1994). Additional research is needed in this area to examine what specific interventions by the lactation consultant may contribute to this impact on duration. This research study examined the effect of an educational program, conducted by a lactation consultant, and a self-regulation intervention on breastfeeding duration in an experimental group, as compared with a control group only participating in the educational program.

Subjects in the experimental group did not breastfeed significantly longer than subjects in the control group, therefore, hypothesis I was not supported. However, subjects who completed the complete self-regulation intervention per protocol breastfed significantly longer than subjects in the control group and the subjects in the experimental group who did not complete the self-monitoring. The intervention in the experimental group tended to more acceptable and beneficial to the older, married, higher income mother. Additional research needs to be completed in this population of older, married, higher income mothers after strengthening the reinforcement component of the intervention and changing the initial phone call contacts to within 4 days of delivery instead of at 7 days from delivery to evaluate the effect of this intervention for this type of population. During this research study, subjects frequently reported that questions surfaced before the initial phone call to the experimental group and by calling sooner after discharge many of the questions could be answered and reinforcement in completing the self-regulation intervention could be given sooner. An additional modification to a future research study would be to have the subjects complete

the intervention, Daily Breastfeeding Log, for only the first 3 weeks instead of for 6 weeks. Further research could also explore the degree of breastfeeding, partial and full, in relation to the self-regulation intervention.

Some subjects (n = 10) in the experimental group elected not to complete the self-monitoring component of the intervention, specifically the Daily Breastfeeding Logs, as designed in the study and weaned significantly sooner than the remaining subjects in the experimental group (n = 33) and in the control group (n = 43). Factors were analyzed to determine any predictor variables that may have influenced the acceptability of this intervention for these subjects. Predictor variables identified that may lead to decreased acceptability of the intervention included age, income, marital status, and WIC status. Subjects choosing not to complete the self-monitoring tended to be younger, single, less educated and low-income.

Efforts to improve breastfeeding initiation and duration among low-income women have addressed prenatal education, peer counselors, and partner supported interventions. The peer counselor intervention appears to show the most promise in fostering breastfeeding in the low-

income mother (Caulfield, Gross, Bentley, Bronner, Kessler, Jensen, Weathers, & Paige, 1998; Kistin, Abramson, & Dublin, 1994; Long, Funk-Archuleta, Geiger, Mozar, & Heins, 1995). A peer counselor is defined as "a woman who has experience with breastfeeding and who role is to provide information, counseling and support to WIC prenatal and postpartum participants to assist them in their breastfeeding experience" (Long et al., 1995). Peer counselors are women from the same sociocultural background as the client population and serve as a role model and support source to a population who often lacks the support systems to promote and reinforce their breastfeeding efforts.

Kistin, Abramson, & Dublin (1994) evaluated the effect of peer counselors on breastfeeding duration in low-income, urban women. Subjects who were assigned to the peer counselor group (n = 59) had statistically significant higher initiation rates, higher exclusive breastfeeding rates, and longer breastfeeding duration rates at all data points as compared with a control group (n = 43) who had no contact with a peer counselor, 93% and 70% ($p < .05$), 77% and 40% ($p < .05$), and 15 weeks and 8 weeks ($p < .05$), respectively. A few methodological concerns noted in this

study were a lack of randomization, inconsistency in the implementation of the intervention in that follow-up was not consistent for all subjects, and lack of a detailed description of the intervention. This study relied on volunteer peer counselors rather than a paid-position as a counselor which the author suggests may have impacted the consistency of the intervention. It is worthy to note that a large number of the subjects in the control group requested a peer counselor demonstrating a desire for these low-income mothers to have this form of support, however the research sites lacked a sufficient number of counselors.

The peer counselor program was evaluated in a Utah Native American population with a marginal to statistically significant higher rate of breastfeeding initiation and duration at 3 months postpartum, 84% and 70% ($p = .05$) and 49% and 36%, $p = .08$). Similar methodological concerns were noted in this study as compared with others, including a lack of randomization, a large amount of missing data, and a lack of control in the sample and the treatment.

A different design was implemented in four WIC clinics to evaluate four different approached to peer counselor and education interventions in low-income African American women

(Caulfield, et al., 1998). The four interventions studied were an educational video, peer counselor, educational video and peer counselor, and a control group. Subjects who participated in the peer counselor group were more likely to initiate breastfeeding as compared with the other groups (Odds Ratio: 3.84, CI: 1.44 - 10.21) however the effect on breastfeeding duration was not significant. Limitations to this study were a high attrition rate (56%); statistically significant differences in groups in regard to education, parity, and employment; lack of randomization; and lack of clear description of what was different in the education programs as compared with the usual care at the WIC clinic. Replications studies with more control in the sample and treatment are needed to evaluate the effect of a peer-counselor program on breastfeeding duration in low-income mothers.

Focus interview of mothers recruited through WIC agencies and clinics offer insightful suggestions and recommendations for health care providers of breastfeeding women (Coreil, Bryant, Westover, Bailey, 1995). In these interviews clients identified some barriers to education which include an over-dependence on written materials,

limited personalized attention, lack of information on what to expect with breastfeeding, and conflicting, inconsistent information from health care providers about breastfeeding management techniques. These authors also interviewed health care providers who identified a significant gap between the promotion of breastfeeding and the support processes available to the breastfeeding mother. Health care providers reported a lack of knowledge on lactation management and the lack of effective counseling skills. These interviews underscore the need for health care providers to individualize nursing interventions, implement a standard of care that is consistent, and work in interagency work groups or coalitions to foster a consistent standard of practice. In addition, the health care provider needs to use different approaches to teaching and counseling that is consistent with the clients' needs and may include discussion, demonstration, validation of experiences through various interventions, and peer instruction.

Motivational factors for the low-income breastfeeding mother include the nutritional benefits to the infant, and the desire to form a relationship with the baby (Bryant, Coreil, D'Angelo, Bailey, & Lazarov, 1992). However, far

more barriers to breastfeeding are identified by low-income women. Among these are a lack of confidence in the ability to handle all new responsibilities of being a parent, lack of confidence to produce enough milk, lack of confidence in maintaining adequate nutrition and eliminating caffeine and nicotine, loss of freedom, embarrassment, and lack of support from families and friends. These barriers are often seen as insurmountable and the decision is made not to initiate or to terminate breastfeeding.

The transition to the maternal role is largely influenced by external resources (Rubin, 1984; Mercer, 1981, 1986, 1990). Particularly during the first 6 to 8 weeks postpartum role behaviors are largely guided by others and social supports (Mercer, 1990). The majority of research studies have identified that social support is a variable that has a significant impact in determining the duration of breastfeeding (Baranowsksi, et al., 1983; Barron et al., 1988; Bottorff, 1990; Duckett, Henly, & Garvis, 1993; Matich & Sims, 1992). Positive social support attitudes regarding breastfeeding were reported by the majority of the sample in this study. The scores on the HBSS support scale decreased in both research groups fairly consistently from baseline to

6 months postpartum suggesting that anticipated support was higher than the support actually received following delivery, however they were not predictive of breastfeeding duration. These findings represent similar research studies that have been somewhat inconclusive in correlating social support with breastfeeding duration. Social support is a variable that has been examined from different theoretical perspectives and the tools used to measure the variable have often been investigator-developed and lack supportive reliability and validity. Limitations which may have impacted the results in this research study are the limited reliability and validity for the instrument and the homogeneity of the overall sample. Further research can assist in defining the variable and developing reliable, valid measurements.

An evaluation of support groups for the breastfeeding mother need addressed in research. Can the support group process be an effective means of social support for the breastfeeding mother? Would this form of support be most helpful to the middle to upper class mother? The benefits of a support group include a feeling and sense of affiliation, revitalization, dissipation of tension and

guilt, renewal of sense of identity, social outlet, empowerment of individual and family, opportunity to vent pent-up feelings and emotions, validation of care-giving experiences, affirmation and development of coping abilities, exploration of alternative behaviors, mutual support, and reintroduction of feelings of normality into situation (Ryan, 1997).

Interferences

Reasons cited for termination of breastfeeding in this research study are very comparable to those cited in the literature (Barron, et al., 1988; Chapman, et al., 1985; Cornett, 1989; Duckett, eta al. 1993; Hill, Humencik, Argubright, & Aldag, 1997; Hillewik-Linquist, 1991; Lawson & Tulloch, 1995; Rentschler, 1991; Watters & Kristiansen, 1995). Table 29 lists the reasons cited for termination of breastfeeding for all subjects in this study who terminated breastfeeding before 6 months postpartum. The "baby not satisfied" and "low milk supply" were the predominant reasons cited for early termination. A comparable number of mothers in the experimental group reported these reasons for termination as compared to the control group suggesting that the Daily Breastfeeding Logs did not provide the type of

Table 29

Reasons Cited for Termination of Breastfeeding

Reasons for Termination of Breastfeeding	Frequency n (%)
Baby not satisfied	38 (69%)
Low milk supply	31 (56%)
Return to work	13 (24%)
Recommended by doctor	12 (22%)
Sore nipples	8 (15%)
Recommended by family	7 (13%)
Planned to stop then	5 (9%)
Engorgement	4 (7%)
Plugged duct/mastitis	1 (2%)

Note. Some subjects reported more than one reason for termination of breastfeeding. n = 55.

reassurance that these mothers need to confirm adequate intake of milk in the infant. Breastfeeding mothers tend to be sensitive to any signals in the baby that indicate that they do not have enough milk, such as "he wants to feed very often", "all he seems to want to do is eat", and "he seems very hungry". "Even mothers who are breastfeeding without

problems and whose infants are thriving and gaining weight occasionally express doubts" (Chute, 1992, p. 579). The educational session presented to all the subjects incorporated content on how to know the baby is getting enough milk and to expect growth spurts which are characterized by the need for frequent feedings, however when the baby is crying or fussy the breastfeeding mother's first thought is to perceive that her milk supply must not be meeting the baby's needs. Subjects in the experimental group often expressed concerns and doubts during the telephone contacts that the baby was "not getting enough to eat" and often may have started formula supplementation before contacting her physician or receiving the call from the investigator. The introduction of formula supplementation has been attributed to decreased milk supply and eventual termination of breastfeeding (Hill, 1992). Health care professionals need to anticipate these concerns and doubts from the breastfeeding mother and incorporate additional education on these feelings to be expected and stress that infant behavior isn't just a result of feeding needs but also other needs. Further research could investigate the use of more intensive follow-up contacts

with breastfeeding mothers. Would contacts at 3 days and 5 days postpartum, at more frequent intervals and with additional support, decrease the reports of low milk supply? Would an earlier weight check of the infant decrease the perception of low milk supply, at 5 to 7 days postpartum rather than at 2 weeks? Would a pre- and post-feeding weight check at 5 to 7 days postpartum decrease the perception of low milk supply?

Additional Breastfeeding Predictors

Predictor variables specifically evaluated in this research study were the timing of the initial breastfeeding session, return to work/school, WIC status, income, educational level, social support, and feeding frequency and length. It was hypothesized that the timing of the initial breastfeeding session, return to work/school, and social support would be predictors of breastfeeding duration. However, these hypotheses were not supported. This research study examined only the plan or intent to return to work/school rather than the actual return to work/school. Research has demonstrated that mothers working part-time may have longer breastfeeding duration as compared with mothers who return to work full-time (Gielen, Faden, O'Campo, Brown,

Paige, 1991,; Ryan & Martinez, 1989). Future research should evaluate the actual return to work/school and impact of working part-time or full-time.

WIC enrollment was demonstrated to be a significant predictor of early breastfeeding weaning in the overall sample and also a marginally significant predictor in those subjects in the experimental group electing not to complete the self-regulation intervention. Also, income was a significant predictors in the experimental group electing not the complete the intervention. These findings support the research by Hill (1991) and Barnes, Leggett, and Durham (1993). Further research could evaluate factors influencing the decision not to complete the intervention and evaluate the impact of social support and reinforcement on the efficacy of the intervention.

In the experimental group, feeding frequency and length the first week and feeding frequency the third week were significant predictors of breastfeeding duration. Limited data was obtained to validate the relationship between supplementation during these time frames and the relationship to breastfeeding duration. Formula supplementation has been identified as a predictor of

breastfeeding duration (Coreil & Murphy, 1988; Hill, Humenick, Brennan, & Woolley, 1997). Further research could examine whether mothers with decreased frequency and length during the early weeks begin supplementation which results in early weaning.

An additional variable that has been noted to be somewhat inconclusive in predicting breastfeeding duration is the mode of delivery. Bruce, Khan, and Olsen (1991) and Kurinij and Shioni (1991) found that mothers having a cesarean delivery terminated breastfeeding earlier, whereas, Kearney, Cronenwett, and Reinhardt (1990) found no significant relationships between delivery type and breastfeeding duration. The findings from this research study (25.6% cesarean delivery) found that delivery mode was not predictive of breastfeeding duration and thus support Kearney, Cronenwett, and Reinhardt's (1990) results.

Sample Characteristics

In general, the overall sample was a homogenous group in regard to age, race, marital status, degree of social support, smoking status. The sample was older, predominantly Caucasian, and the majority were married and reported a higher social support and few reported smoking.

These homogenous sample characteristics do limit the generalizability of the findings.

Conclusions

The self-regulation intervention guided by social cognitive learning theory received many positive accolades from the research subjects and demonstrated that it may improve breastfeeding outcomes particularly in the breastfeeding mother who is older, higher-educated, with a higher income and who are more strongly motivated to succeed. Health care providers working with breastfeeding mothers can utilize this tool in the early weeks during the transition to breastfeeding to provide self-monitoring to regulate experiences and provide reinforcement. This research supports the need for individualizing nursing interventions dependent on the client's sociodemographic factors. The findings from the study suggest that the breastfeeding log is a valuable tool for health-care providers who work with breastfeeding mothers but its acceptability may be impacted by WIC enrollment, marital status, and income. Low-income, single mothers who are less certain and indecisive about breastfeeding may benefit from

external resources that offer peer education and support through peer counselors.

Recommendations for Future Research and Practice

1. Replication studies that strengthen the self-regulation intervention and modify the follow-up phone call time in the older, better educated, higher income breastfeeding mother.
2. Replication studies in more varied clinical settings to evaluate the acceptability of the intervention in different populations.
3. Further research to define the social support variable and develop reliable and valid measurements.
4. Further research to examine the influence of partial and full breastfeeding on duration.
5. Further research to examine the effect interventions on the perception of low milk supply such as follow-up contacts at 3 days and 5 days postpartum; a pre- and post-feeding weight check at 5 to 7 days postpartum; increased education on anticipated perception of low milk supply, growth spurts, and typical feeding patterns of the newborn; and/or contact with a breastfeeding mother by 5 to 7 days postpartum.

6. Replications studies with more control in the sample (randomization) and treatment (well-defined) are needed to evaluate the effect of a peer-counselor program on breastfeeding duration in low-income mothers.
7. Research the effect of a breastfeeding support group on breastfeeding duration in the middle to upper class mother.
8. Establish inter-agency work groups or coalitions to foster consistent education and standards of practice for lactation management techniques and support services.

APPENDIX A

Letters of Support

WHEELING HOSPITAL
1 MEDICAL PARK
WHEELING WV 26003-0300
304-243-3000
FAX 304-243-3066

April 26, 1996

Debbie Pollard, R.N.C, M.S.N. IBCLC
[redacted]

Dear Debbie,

I am pleased to advise, upon recommendation of the Medical /Dental Staff Executive Committee, the Board of Directors has approved your research project, **"Effects of Self-Regulation Strategies on Breast-Feeding Duration in Primiparous Mothers."**

Wheeling Hospital and The Institutional Research and Review Committee are looking forward to the results of your research project.

Thank you for your participation and continue support of our research program at Wheeling Hospital.

Sincerely,

[redacted]

Donald H. Hofreuter, M.D.
Administrator/C.E.O.

ele

medela

October 29, 1996

University of Pittsburgh
School of Nursing
Center for Nursing Research
3500 Victoria Street
Pittsburgh PA 15261

Subject: Research Project
"The Effect of Self-Regulation Strategies on Breastfeeding"
Debbie Pollard, RNC, MSN, IBCLC

TO WHOM IT MAY CONCERN:

This letter will confirm that Medela Inc. is supporting the subject research project in the amount of $3,818.

Since our sponsorship guidelines dictate that we support breastfeeding and breastfeeding education first and foremost, we are happy to support Debbie Pollard in her project.

Please let me know if you need anything further.

[redacted]
Sharon Koguic
Admin. Asst. to the President

University of Pittsburgh

School of Nursing

Center for Nursing Research
360 Victoria Building
3500 Victoria Street
Pittsburgh, Pennsylvania 15261
412-624-0368
Fax 412-624-1508

PROPOSAL REVIEW VERIFICATION FORM

The attached proposal,

TITLE: **Effect of Self-Regulation Strategies on Breastfeeding Duration in Primiparous Mothers**

PRINCIPAL INVESTIGATOR: **Debbie Pollard**

has been reviewed for scientific merit and approved for submission to the University of Pittsburgh Institutional Review Board.

Mary E. Kerr, RN, PhD
Assistant Professor
Acting Director, Center for Nursing Research

Date

Transforming the Present — Discovering the Future

University of Pittsburgh

School of Nursing

Center for Nursing Research
360 Victoria Building
3500 Victoria Street
Pittsburgh, Pennsylvania 1526[illegible]
412-624-485[illegible]
Fax 412-624-120[illegible]

PROPOSAL REVIEW VERIFICATION FORM

The attached proposal,

TITLE: "Effect of Self-Regulation on Breastfeeding Duration in Primiparous Mothers"

PRINCIPAL INVESTIGATOR(S): Debbie Pollard

has been reviewed for scientific merit and approved for submission to the University of Pittsburgh Institutional Review Board.

Mary Kerr, RN, PhD
Director, Center for Nursing Research

Date

Transforming the Present — Discovering the Future

HEALTH EDCO • CHILDBIRTH GRAPHICS • HEALTH IMPRESSIONS • WRS PUBLISHING • WRS SPORTSMED

April 9, 1996

Deborah L. Pollard, RNC, MSN, IBCLC
Assistant Professor of Nursing
Wheeling Jesuit College
[redacted]

Dear Ms. Pollard:

Thank you for your recent request to use the various Childbirth Graphics materials in your educational session for your research studies. Childbirth Graphics is pleased to grant permission for your stated use.

Description of proposed usage: Educational session for research study

Products in reference: Items #GB64524, GB38543, GB38545

There is no fee involved for your stated use.

Thank you for respecting our copyright. We wish you success in your project and look forward to working with you again in the future.

Sincerely,

[redacted]

Pam Schreiber
Limited Rights

P.O. BOX 21297 WACO, TX 76702-1297 817-776-6461

EXECUTIVE: 701 N. NEW ROAD, FAX: 817-757-1484 • WAREHOUSE/MANUFACTURING: 624 TEXAS CENTRAL PARKWAY FAX 817-776-2722
SALES: 5046 FRANKLIN, FAX: 817-761-6221 • ADMINISTRATIVE: 5045 FRANKLIN, FAX: 817-776-6321

APPENDIX B

Institutional Review Board Approval

University of Pittsburgh

Health Sciences
Institutional Review Board

219 Nese Barkan Building Annex
c/o WPIC 3811 O'Hara Street
Pittsburgh Pennsylvania 15213
412-647-7844

MEMORANDUM

TO: Deborah L. Pollard, RNC, MSN, IBCLC

FROM: Robert M. Wettstein, M.D., Chair

DATE: February 5, 1996

SUBJECT: IRB #96017: Effect of Self-Regulation Strategies on Breastfeeding Duration in Primiparous Mothers: A Pilot Study

Thank you for complying with the suggestions of the Psychosocial Institutional Review Board. As modified, your protocol and consent form(s) have been approved.

Please type the approval date (approved: February 5, 1996, Psychosocial IRB, University of Pittsburgh) on the upper right corner of the consent form(s) before copies are made for subject's signature. Please be sure that each subject sign two copies: one for your file and one for the subject to keep. If the consent form is more than one page, please be sure that each page is signed or initialed.

If any untoward events occur, please report them at once to the Board. Please refer to the above IRB number on all correspondence or telephone inquiries.

Any modifications made throughout the approval year are subject to review by the IRB and must be submitted for approval before research is continued. See page 34 of the Guidelines to the Use of Human Subjects for instructions.

The protocol and consent form(s) together with a brief progress report must be resubmitted within a year for annual review as required by the General Assurance No. M1259 given to the DHHS by the University of Pittsburgh.

Two copies of your protocol and consent form(s) will be filed in our office, 219 Nese-Barkan Annex.

RMW:kjf

University of Pittsburgh

Health Sciences
Institutional Review Board

219 Nese Barnan Building Annex
c/o WPIC, 3811 O'Hara Street
Pittsburgh, Pennsylvania 15213
412-647-7644

MEMORANDUM

TO: Deborah L. Pollard, RNC, MSN, IBCLC

FROM: Dennis P. Swanson, M.S., Administrative Vice Chair [redacted]

DATE: July 16, 1996

RE: IRB #96017: Effect of Self-Regulation Strategies on Breastfeeding Duration in Primiparous Mothers: A Pilot Study

The Institutional Review Board has reviewed the recent modifications to your protocol and consent form(s) and find them acceptable for expedited review. These changes, noted in your memo of 7/12/96, are approved.

The approval date on your consent form(s) should remain the same 2/5/96. Therefore, the protocol and consent form(s) together with a brief progress report must be resubmitted within a year from that time for annual review as required by the General Assurance No. M1259 given to DHHS by the University of Pittsburgh.

If your research proposal involves an investigational drug, it is necessary for you to forward a copy of this approval letter along with a copy of the Cover Sheet, protocol, consent form(s) and drug brochure to Anna Giordano, R.Ph., Coordinator, Investigational Drug Service, PUH Pharmacy.

DPS/daw

University of Pittsburgh

Health Sciences
Institutional Review Board

219 Nese Barsan Building Annex
c o WPIC 3811 O Hara Street
Pittsburgh Pennsylvania 15213
412-647-7644

MEMORANDUM

TO: Deborah Pollard. RNC. IBCLC. Ph.D.

FROM: Dennis P. Swanson. M.S.. Administrative Vice Chair [redacted]

DATE: November 7. 1996

RE: IRB #96017: Effect of Self-Regulation on Breastfeeding Duration in Primiparous Mother

The Institutional Review Board reviewed the recent modifications to your protocol and consent form(s) at their meeting on 11/5/96. These modifications are now approved.

The approval date on your consent form(s) should remain the same 2/5/96. Therefore. the protocol and consent form(s) together with a brief progress report must be resubmitted within a year from that time for annual review as required by the General Assurance No. M1259 given to DHHS by the University of Pittsburgh. In the event the project is not renewed by that date. all research must be suspended until approval is secured. Please notify the IRB in writing when the project is complete so the file can be terminated

A provision of this approval is that you will permit audits of this research study to be conducted on a periodic basis by the Office of Research, Health Sciences.

As a reminder. please use the reference number in all your correspondence and telephone inquiries.

DPS/dw

University of Pittsburgh

Health Sciences
Institutional Review Board

219 Nese Barkan Building Annex
c o WPIC 3811 O'Hara Street
Pittsburgh Pennsylvania 15213
412-647-7644

MEMORANDUM

TO: Deborah L. Pollard, Ph.D.

FROM: Barbara DeRiso, M.D., Vice Chairman [redacted]

DATE: January 27, 1997

SUBJECT: IRB #970160: Effect of Self-Regulation on Breastfeeding Duration in Primiparous Mothers

The Institutional Review Board met on 1/21/97, to consider your proposal as noted above. The members had the following comment(s):

In General:

1. Please clarify the number of subjects, since the Renewal Report Form states that approval was given for 16 subjects and then states that 105 have been entered into the study. The consent form and cover sheet state that there will be 86 participants.

If you will address these comments in the same format as this memo, highlight the correction(s), and send 2 copies of the complete submission including Cover Sheet, Protocol Summary, and Consent Form(s) within the next four weeks, I have been empowered by the Board to grant approval.

Please refer to the above IRB protocol number when submitting any/all correspondence.

BD/tjw

University of Pittsburgh

Health Sciences
Institutional Review Board

219 Nese Barkan Building Annex
c.o WPIC. 3811 O'Hara Street
Pittsburgh Pennsylvania 15213
412-647-7644

MEMORANDUM

TO: Deborah L. Pollard. Ph.D.

FROM: Samuel Gershon. M.D., Chairman [redacted]

DATE: February 11. 1997

SUBJECT: IRB #970160: Effect of Self-Regulation on Breastfeeding Duration in Primiparous Mothers

Your renewal has been approved by the Institutional Review Board.

Approval Date: 2/11/97

Expiration Date: 2/11/98

Please type the approval date on the upper right corner of the consent form before copies are made for patient/normal subject's signature. Please be sure that each patient/subject signs three copies: one for your file. one for the patient's chart. and one for the patient/subject to keep.

Any **serious or unexpected** adverse event involving drugs or devices must be reported to the IRB within 10 days of their observation at a University-affiliated site or within 30 days of receipt of notification of such event from the study sponsor. Please see the guidelines for further information on how to report such events.

The protocol and consent forms. along with a brief progress report must be resubmitted at least **one month prior** to the expiration date noted above for annual review as required by Assurance No. M1259. given to DHHS by the University of Pittsburgh. In the event the project is not renewed by that date. all research must be suspended until approval is secured. Please notify the IRB in writing when the project is complete so the file can be terminated.

Please be advised that your research study may be audited periodically by the Office of Research. Health Sciences.

As a reminder. please use the new IRB number in all your correspondence and telephone inquiries.

SG/tjw

University of Pittsburgh

Health Sciences
Institutional Review Board

219 Nese Barnan Building Annex
c o WPIC 3811 O Hara Stree
Pittsburgh Pennsylvania 15213
412-647-7844

MEMORANDUM

TO: Deborah L. Pollard, Ph.D.

FROM: Dennis P. Swanson, M.S., Administrative Vice Chairman [redacted]

DATE: July 3, 1997

RE: IRB #970160: Effect of Self-Regulation on Breastfeeding Duration in Primiparous Mothers

The Institutional Review Board has reviewed the recent modifications to your protocol and consent form(s) and find them acceptable for expedited review. These changes, noted in your submission of 6/20/97, are approved.

The approval date on your consent form(s) should remain the same 2/11/97. Therefore, the protocol and consent form(s) together with a brief progress report must be resubmitted within a year from that time for annual review as required by the General Assurance No. M1259 given to DHHS by the University of Pittsburgh.

If your research proposal involves an investigational drug, it is necessary for you to forward a copy of this approval letter along with a copy of the cover sheet, protocol, consent form(s) and drug brochure to Patricia Peters, R.Ph., Coordinator, Investigational Drug Service, PUH Pharmacy.

Please be advised that your research study may be audited periodically by the Office of Research, Health Sciences.

DPS/tjw

cc: Susan Albrecht

University of Pittsburgh

Health Sciences
Institutional Review Board

219 Nese Barkan Building Annex
c/o WPIC 3811 O'Hara Street
Pittsburgh Pennsylvania 15213
412-647-7644

MEMORANDUM:

TO: Deborah L. Pollard, Ph.D.

FROM: Dennis P. Swanson, M.S., Administrative Vice Chairman [redacted]

DATE: January 15, 1998

SUBJECT: IRB #970160: Effect of Self-Regulation on Breastfeeding Duration in Primiparous Mothers

Your renewal of the above-referenced proposal has been approved by expedited review by the Institutional Review Board. **This approval is for analysis of data only. In the event that recruitment is reinstituted, please submit a modification request.**

Approval Date: **1/15/98**

Expiration Date: **1/15/99**

Please type the approval date on the upper right hand corner of the consent form before copies are made for patient/normal subject's signature. Please be sure that each patient/subject signs three copies: one for your file, one for the patient's chart, and one for the patient/subject to keep.

Any **serious or unexpected** adverse event involving drugs or devices must be reported to the IRB within 10 days of their observation at a University-affiliated site or within 30 days of receipt of notification of such event from the study sponsor. Please see the guidelines for further information on how to report such events.

The protocol and consent forms, along with a brief progress report must be resubmitted at least **one month prior** to the expiration date noted above for annual renewal as required by Assurance No. M1259, given to DHHS by the University of Pittsburgh. In the event the project is not renewed by that date, all research must be suspended until approval is secured. Please notify the IRB in writing when the project is complete so the file can be terminated.

Please be advised that your research study may be audited periodically by the Office of Research, Health Sciences.

Please use the IRB number noted above in all correspondence and telephone inquiries.

DPS/tjw

cc: Susan Albrecht

APPENDIX C

Consent Form

University of Pittsburgh

School of Nursing

3500 Victoria Street
Pittsburgh, Pennsylvania 15261
Fax 412-624-2401

Approved: 2/5/96
Institutional Review Board
University of Pittsburgh
IRB Number: 970160

CONSENT TO ACT AS A SUBJECT IN A RESEARCH STUDY

TITLE OF STUDY: Effect of Self-Regulation on Breastfeeding Duration in Primiparous Mothers

INVESTIGATOR: Deborah L. Pollard, RNC, IBCLC, Ph.D.(c)
Doctoral Student
[redacted]

SOURCE OF SUPPORT: Medela, Inc.

The University of Pittsburgh and Wheeling Hospital are currently conducting a research study to evaluate the effectiveness of a program developed to promote breastfeeding duration. Because you are a breastfeeding mother, you are being asked to participate in this research study. A total of 210 breastfeeding mothers will participate in this study at Wheeling Hospital.

If you agree to participate in this research study, you will undergo the following procedures which are not part of your routine medical care:

1) You will participate in an educational program on breastfeeding.
2) You will be assigned to one of two groups by a method similar to a coin toss. Depending on your group assignment, you may be asked to complete daily breastfeeding logs for 6 weeks and receive phone calls from the lactation consultant at 1 week, 2 weeks, and 3 weeks following delivery.
3) You will be asked to complete questionnaires about yourself and your feeding experiences during your hospital stay and then again at 6 months following delivery by telephone.
4) You will be asked to complete a Feeding Instrument at 3 weeks, 6 weeks, 3 months, and 6 months by mail.
5) Your baby's physician will be asked to complete a Feeding and Weight Pattern Instrument for the 6 months following birth.

_____

Subject's Initials

6) Your completion of the educational program, questionnaires, and research instruments will require you to spend some time. The educational program will take approximately 40 minutes and the questionnaires approximately 10 minutes. If you are assigned to complete the daily logs, the completion of the daily logs will take approximately 2 minutes at each feeding.

RISKS AND BENEFITS: Participation in this study may result in fatigue and anxiety. The benefits to you include receiving educational materials on breastfeeding and increased contact with a nurse experienced in the care of breastfeeding women and their infants after your discharge from the hospital. The information obtained from this study may assist health care providers in providing effective programs for other breastfeeding mothers.

COSTS AND PAYMENTS: Your participation in this study will not cause any increase in cost, nor will you receive any payment for study participation.

CONFIDENTIALITY: You understand that any information obtained from this research, including answers to questionnaires and interviews, will be kept confidential. Your identity on these records will be indicated by a case number. Information will be kept in locked files and will only be accessible to the investigator listed on the first page of this informed consent document. You understand that this information will be treated in a confidential manner consistent with other hospital medical records. This information will not be released to anyone including family, physicians, employers, other research investigators, commercial companies, or insurance providers without your written permission. You will not be specifically identified in any publication of the research results. However, in unusual circumstances, your research records may be inspected by appropriate government agencies or released in response to an order from a court of competent jurisdiction. You understand that the investigator may contact the primary care physician for either yourself or your infant during my participation in the research study.

_____

Subject's Initials

RIGHT TO REFUSE OR WITHDRAW: You understand that you do not have to take part in this research study, and should you change your mind, that you can withdraw from the study at any time. Your other care and benefits will be the same whether you participate in this research study or not. You also understand that you may be withdrawn from the study at any time by the investigator.

****

VOLUNTARY CONSENT: All of the above has been explained to me and all of my questions have been answered. I understand that any future questions I have about this research will be answered by the investigator listed on the first page of this consent document at the telephone numbers give. Any questions I have about my rights as a research subject will be answered by the Office of the Senior Vice Chancellor for Health Sciences, University of Pittsburgh [redacted]. By signing this form, I agree to participate in this research study.

_____ _____
Subject's Signature Date

INVESTIGATOR CERTIFICATION: I certify that the nature and purpose, the potential benefits, and possible risks associated with participation in this research study have been explained to the above individual and that any questions about this information have been answered. I have witnessed the above signature.

_____ _____
Investigator's Signature Date

APPENDIX D

Personal Data Form (PDF)

ID NUMBER _____
DATE OF VISIT _____

PERSONAL DATA FORM

	For Office Use Only
1. Group: _____Experimental _____Control	_____
2. Birthdate:_____	_____
3. Type of Delivery: _____Vaginal _____Cesarean	_____
4. Sex of Infant: _____Male _____Female	_____
5. Birth Weight: _____	_____
6. Discharge Weight: _____	_____
7. Have you had any complications during hospital stay: _____Yes _____No	_____
8. Please answer "yes" to the following if you have had the following problem following delivery, or check "no" if you have not had the problem.	
Excessive bleeding _____ _____	_____
Infection _____ _____	_____
Fever _____ _____	_____
Other:_____ _____ _____	_____
9. Current Marital Status: _____single _____married _____separated _____divorced _____widowed	_____

ID NUMBER _____
DATE OF VISIT _____

10. Educational level (check one):
_____Less than High School
_____High School Diploma
_____Some College
_____College Degree
_____Master Degree
_____Doctorate

11. Your occupation:
_____Homemaker
_____Sales/Management
_____Teacher
_____Health care worker
_____Other:_____

12. Are you presently employed?
_____Yes
_____No

13. Do you plan to return to work/school after delivery?
_____Yes (Go to 13a)
_____No (Go to 14)

a. When do you plan to return to work/school?
_____Before 6 weeks
_____7 weeks to 2 months
_____3 months to 4 months
_____5 months to 6 months
_____After 6 months

14. Do you smoke, answer "yes" if you smoke more than 1 cigarette a day or more than 5 cigarettes per week:
_____Yes
_____No

For Office Use Only

ID NUMBER _____
DATE OF VISIT _____

15. Family Income Level:
_____less than $10,000
_____$10,000 - $20,000
_____$21;000 - $30,000
_____$31,000 - $40,000
_____$41,000 - $50,000
_____more than $50,000

16. Race:
_____American Indian
_____Hispanic
_____Oriental
_____African American
_____Caucasian

17. When did you decide to breastfeed?
_____Prior to becoming pregnant
_____During the first five months of pregnancy
_____After the fifth month of pregnancy

18. How long do you plan to breastfeed?
_____Less than one month
_____1 to 3 months
_____4 to 6 months
_____7 to 9 months
_____10 to 12 months
_____More than a year
_____Undecided

19. Do you plan to supplement with formula or solids?
_____yes (Go to 19a)
_____no (Go to 20)

For Office Use Only

ID NUMBER _____
DATE OF VISIT _____

a. How soon do you plan to supplement with formula?
_____Immediately
_____1 to 2 weeks
_____3 to 4 weeks
_____5 to 6 weeks
_____After 6 weeks
_____Undecided

b. How much do you plan to breastfeed?
_____Exclusively (Providing only breastmilk for the first 6 weeks after delivery with the exception of vitamins, water, juice, not to exceed more than once or twice per day)
_____Partially (Planning supplementation with formula feedings)

c. How soon to you plan to supplement with solids?
_____Immediately
_____1 to 2 weeks
_____3 to 4 weeks
_____5 to 6 weeks
_____After 6 weeks
_____Undecided

20. How would you describe your commitment to breastfeeding?
_____strongly committed
_____moderately committed
_____slightly committed
_____uncommitted

For Office Use Only

ID NUMBER _____
DATE OF VISIT _____

21. Please answer "yes" to the following if they influenced your decision to breastfeed and "no" if they did not influence you to breastfeed.

	YES	NO	For Office Use Only
Yourself	____	____	
Obstetrician	____	____	_____
Pediatrician	____	____	_____
Nurse	____	____	_____
Husband	____	____	_____
Family (such as mother, aunt, sister, etc.)	____	____	_____
Friend	____	____	_____
			_____

22. How would you describe your husband's or closest support person's attitude toward your decision to breastfeed?

_____Very positive (really wants you to breastfeed)
_____Positive (is in favor but has not pushed it)
_____Somewhat negative (prefers bottle feeding but would not interfere)
_____Negative (does not want you to breastfeed) _____

ID NUMBER _____
DATE OF VISIT _____

23. Please answer "yes" if the following were information sources for you for breastfeeding and "no" if they were not information sources for you for breastfeeding.

	YES	No	For Office Use Only
Childbirth Classes	____	____	_____
Obstetrician	____	____	_____
Pediatrician	____	____	_____
Nurse	____	____	_____
Husband	____	____	_____
Family (such as mother, aunt, sister, etc.)	____	____	_____
Friend	____	____	_____
La Leche League meetings	____	____	_____
Books	____	____	_____
Pamphlets	____	____	_____

24. Please list your physician:

_____ _____

25. Please list the physician for your baby:

_____ _____

26. Are you enrolled in WIC?

_____Yes
_____No _____

Adapted from Personal Data Inventory (Rentschler, 1988, 1991)

APPENDIX E

Breastfeeding Experience Instrument (BEI)

ID NUMBER _____
DATE OF VISIT _____
VISIT _____

BREASTFEEDING EXPERIENCE INSTRUMENT

	For Office Use Only
1. Tell me how your baby is feeding.	
2. Are you still breastfeeding? _____Yes (Go to 3) _____No (Go to 9)	_____
3. How many times in 24 hours is your baby breastfeeding? _____5 or less _____6 to 8 _____9 to 12 _____More than 12	_____
4. How long is your baby feeding at each breastfeeding? _____10 minutes or less _____11 to 20 minutes _____21 to 30 minutes _____More than 30 minutes	_____
5. Please answer "yes" to the following if you have experienced the problem with breastfeeding and "no" if you have not experienced the problem with breastfeeding.	

	Yes	No	
Sore nipples	_____	_____	_____
Engorgement	_____	_____	_____
Plugged duct/mastitis	_____	_____	_____
Low milk supply	_____	_____	_____
Difficult latch-on	_____	_____	_____
Other:_____	_____	_____	_____

ID NUMBER _____
DATE OF VISIT _____

For Office Use Only

6. Are you supplementing with any formula?
   _____Yes (Go to 6a)
   _____No (Go to 7)

   a. How often are you supplementing with formula?
      _____Once a day
      _____Twice a day
      _____Three or more times a day

7. Are you supplementing with any solids or other fluids?
   _____Yes (Go to 7a)
   _____No (Go to 8)

   a. How often are supplementing with any solids or other fluids?
      _____Once a day
      _____Twice a day
      _____Three or more times a day

   b. Please indicate which of the following you are supplementing with.

	Yes	No
Cereal	_____	_____
Fruit	_____	_____
Juice	_____	_____
Vegetables	_____	_____

8. Which of the following best describes how you feel about your breastfeeding experiences?
   _____That it was easy
   _____That it was relatively easy
   _____That it was easy with ups and downs
   _____That it was difficult with ups and downs
   _____That it was very difficult

(Go to 10)

ID NUMBER _____
DATE OF VISIT _____

9. How many total weeks did you breastfeed?

_____

For Office Use Only

_____

a. Please answer "yes" to the following if they influenced your decision to stop breastfeeding and "no" if they did not influence your decision to stop breastfeeding.

	Yes	No	For Office Use Only
Sore nipples	_____	_____	_____
Engorgement	_____	_____	_____
Plugged duct/ mastitis	_____	_____	_____
Low milk supply	_____	_____	_____
Baby not satisfied	_____	_____	_____
Recommended by family	_____	_____	_____
Recommended by doctor	_____	_____	_____
Planned to stop then	_____	_____	_____
Return to work	_____	_____	_____
Other:_____	_____	_____	_____

b. Now that you have stopped breastfeeding, which of the following best describes your feeling about weaning?

_____Very disappointed(didn't want to)
_____Disappointed (but knew it was best for baby)
_____Somewhat disappointed(wanted to breastfeed longer)
_____Wanted to wean (still have some conflict about decision)
_____Wanted to wean (felt relieved) _____

ID NUMBER _____
DATE OF VISIT _____

c. Which of the following best describes how you feel about your breastfeeding experiences?

_____That it was easy
_____That it was relatively easy
_____That it was easy with ups and downs
_____That it was difficult with ups and downs
_____That it was very difficult

For Office Use Only _____

10. During your breastfeeding experience, answer "yes" to the following if they provided you with assistance and "no" if they did provide you with assistance.

	Yes	No	For Office Use Only
Husband/significant other	_____	_____	_____
Mother/sister/aunt	_____	_____	_____
Friend	_____	_____	_____
Obstetrician	_____	_____	_____
Pediatrician	_____	_____	_____
Nurse	_____	_____	_____
Support group	_____	_____	_____
Books, articles	_____	_____	_____

ID NUMBER _____
DATE OF VISIT _____

			For Office Use Only
11. During your breastfeeding experience, answer "yes" to the following if they would have been helpful to have during breastfeeding and "no" if they would not have been helpful to have during breastfeeding.			
	Yes	No	
More assistance from staff in the hospital	_____	_____	_____
More information on breastfeeding while in the hospital	_____	_____	_____
More support from husband/significant other	_____	_____	_____
More support from family	_____	_____	_____
More support from physician	_____	_____	_____

12. How many hours after delivery did you have your first breastfeeding session?

_____2 hours or less
_____3 to 6 hours
_____7 to 12 hours
_____more than 12 hours

_____

13. Current Marital Status:

_____single
_____married
_____separated
_____divorced
_____widowed

_____

ID NUMBER _____
DATE OF VISIT _____

14. Family Income Level:

_____less than $10,000
_____$10,000 - $20,000
_____$21,000 - $30,000
_____$31,000 - $40,000
_____$41,000 - $50,000
_____more than $50,000

For Office Use Only
_____
_____

14. Do you smoke, answer "yes" if you smoke more than 1 cigarette a day or more than 5-7 cigarettes per week.

_____Yes
_____No

15. Do you have any additional comments or suggestions?

_____Yes (please describe)
_____No

Describe:

16. Do you have any questions?

_____Yes (please describe)
_____No

Describe:

Thank you for your time in completing this questionnaire.

(Adapted from the Breastfeeding Experience Questionnaire (Rentschler, 1988, 1991)

UNIVERSITY OF NEW HAMPSHIRE

Department of Nursing
School of Health and Human Services
Hewitt Hall
Durham, NH 03824-3563
(603) 862-2260

September 15, 1995

Debbie Pollard, RNC, MSN
Wheeling Jesuit College
[redacted]

Dear Ms. Pollard:

Thank you for your recent inquiries on my breastfeeding study. I apologize for not returning your telephone call in August but I am glad you followed up with a letter. I remember as a doctoral student how difficult it was to find tools, resources, etc. so I am happy to assist you in your request.

Enclosed you will find a copy of each questionnaire you requested. You have my permission to use them and revise them to meet the objectives of your study.

After you have reviewed the tools please fell free to call me with any questions you might have. Presently, I am developing a study with a nursing staff to look at the effect of early discharge and success in breastfeeding and would be interested in hearing about your study.

Best of luck with your study.

[redacted]
Dorothy Rentschler, RN,PHD

APPENDIX F

Hughes Breastfeeding Support Scale (HBSS)

ID Number _____
Date of Visit _____
Visit _____

HUGHES BREASTFEEDING SUPPORT SCALE

Most new mothers need help and support for a period of time after they have a baby. This support is often given by the baby's father, relatives, friends, and professional people such as nurses, doctors, or social workers. The purpose of this questionnaire is to ask about the amount of support you received from all of these people after your baby arrived.

Directions: Place a circle around the number that best describes the amount of help you received in each of the following areas after your baby arrived.

1=No help at all
2=A small amount of help
3=A moderate amount of help
4=As much help as I wanted

		1	2	3	4	For Office Use Only
1.	Reassured me that I was doing well caring for my baby.	1	2	3	4	_____
2.	Took care of the house.	1	2	3	4	_____
3.	Took me to the store, church, and other places I needed to go.	1	2	3	4	_____
4.	Answered my questions about breastfeeding.	1	2	3	4	_____
5.	Took care of the new baby.	1	2	3	4	_____
6.	Made me feel confident even when I made mistakes.	1	2	3	4	_____
7.	Prepared meals.	1	2	3	4	_____
8.	Answered the telephone.	1	2	3	4	_____
9.	Listened to me talk about the new baby.	1	2	3	4	_____
10.	Did my laundry.	1	2	3	4	_____
11.	Entertained visitors.	1	2	3	4	_____
12.	Showed concern when I felt blue.	1	2	3	4	_____

ID Number _____
Date of Visit _____

	1	2	3	4	For Office Use Only
13. Did correspondence I usually do myself.	1	2	3	4	_____
14. Shopped for needed items.	1	2	3	4	_____
15. Believed that I am a good mother.	1	2	3	4	_____
16. Lent or gave me money for baby things.	1	2	3	4	_____
17. Was there when I felt lonely.	1	2	3	4	_____
18. Praised me for my efforts to care for the baby.	1	2	3	4	_____
19. Made me feel that I am still an attractive person.	1	2	3	4	_____
20. Showed concern about my physical condition.	1	2	3	4	_____
21. Gave me tips about breast-feeding.	1	2	3	4	_____
22. Told me about sources of help (i.e. social services, breast-feeding groups, etc.)	1	2	3	4	_____
23. Showed me how to nurse my baby.	1	2	3	4	_____
24. Showed me how to bathe my baby.	1	2	3	4	_____
25. Showed me how to diaper my baby.	1	2	3	4	_____
26. Answered my questions about my baby.	1	2	3	4	_____
27. Helped me to understand my baby's cries.	1	2	3	4	_____
28. Taught me how to take care of myself.	1	2	3	4	_____
29. Showed me how to hold my baby.	1	2	3	4	_____
30. Praised me for my efforts to breastfeed.	1	2	3	4	_____
					_____
Emotional (1,6,9,12,15,17,18,19,20,30)				_____	_____
Instrumental (2,3,5,7,8,10,11,13,14,16)				_____	_____
Informational (4,21,22,23,24,25,26,27,28,29)				_____	_____
TOTAL				_____	

College of Nursing

DEPARTMENT OF NURSING SCIENCE

CLEMSON UNIVERSITY

May 2, 1995

Ms. Debbie Pollard, RNC, MSN
[redacted]uit College
[redacted]

Dear Ms. Pollard:

Thank you for your inquiry about using the Hughes Breastfeeding Support Scale (HBSS) in your dissertation. I am always delighted to share the use of this instrument, provided you credit me with its development and also send me a copy of your study results. The instrument is published in Issues in Comprehensive Pediatric Nursing, 7, 141-153.

A modified version of the HBSS was used in McNatt and Freston's study (1992) which is found in the Journal of Human Lactation 8(2):73-77. It was also compared to another tool developed by Match and Sims (1992) which was reported in Social Science Medicine 34(8):919-927.

The two tools were compared as part of a thesis requirement for a graduate student I supervise. The two surveys had overall similar social support scores; Pearson's Product Moment, v = 0.82136.

Feel free [redacted]

[redacted]

Robbie B. Hughes, Ed.D., R.N.,C.
Professor

nlc

ROBERT COOK EDWARDS HALL • BOX 341703 • CLEMSON, SOUTH CAROLINA 29634-1703 • TELEPHONE [redacted]

APPENDIX G

Feeding Instrument (FI)

FEEDING INSTRUMENT

ID #_____ WEEK/MONTH:_____

1. WHICH OF THE FOLLOWING FOODS IS YOUR BABY CURRENTLY EATING. ANSWER "YES" OR "NO" TO EACH OF THE FOLLOWING AND THE AGE WHEN THE FOOD WAS STARTED.

	YES	NO	AGE WHEN STARTED
SOLIDS	___	___	_____
FORMULA	___	___	_____
BREAST MILK	___	___	_____
JUICES	___	___	_____

2. HOW MANY WEEKS HAVE YOU BREASTFED YOUR BABY? _____

3. IF NO LONGER BREASTFEEDING, WHICH OF THE FOLLOWING INFLUENCED YOUR DECISION TO STOP BREASTFEEDING. ANSWER "YES" OR "NO" TO EACH OF THE FOLLOWING.

	YES	NO		YES	NO
SORE NIPPLES	___	___	BABY NOT SATISFIED	___	___
ENGORGEMENT	___	___	PLANNED TO STOP THEN	___	___
PLUGGED DUCTS	___	___	HAD TO RETURN TO WORK	___	___
LOW MILK SUPPLY	___	___	OTHER:_____	___	___
RECOMMENDED BY DOCTOR	___	___	RECOMMENDED BY FAMILY	___	___

THANK YOU FOR TAKING THE TIME TO FILL OUT THIS POST-CARD.
SINCERELY,
DEBBIE POLLARD

Thank You

APPENDIX H

Feeding and Weight Pattern Instrument (FWPI)

FEEDING AND WEIGHT PATTERN INSTRUMENT: BIRTH TO 6 MONTHS

Subject ID Number_____

	2 week visit	1 month visit	2 month visit	4 month visit	6 month visit
1. Is infant still breastfeeding?	Yes:_____ No: _____	Yes:_____ No: _____	Yes:_____ No: _____	Yes:_____ No: _____	Yes:_____ No: _____
2. Is infant being supplemented with formula?	Yes:_____ No: _____	Yes:_____ No: _____	Yes:_____ No: _____	Yes:_____ No: _____	Yes:_____ No: _____
3. Is infant being supplemented with solids?	Yes:_____ No: _____	Yes:_____ No: _____	Yes:_____ No: _____	Yes:_____ No: _____	Yes:_____ No: _____
4. Infant's height					
5. Infant's weight					

DP/96

APPENDIX I

Breastfeeding Daily Log

MOTHER'S BREASTFEEDING DAILY LOG

ID NUMBER:____ WEEK:____ DATE:_____

FEEDING	TIME	LENGTH LEFT	LENGTH RIGHT	SWALLOW YES/NO	URINE COLOR	STOOL COLOR	SUPPLEMENT TYPE/AMT	PUMPING TYPE/AMT	MOTHER'S FEELINGS	INFANT'S BEHAVIOR
1									Please describe your feelings today by answering the following questions: 1. How did you feel the breastfeeding is going? 2. List a positive feeling about your breastfeeding. 3. Describe any problems you feel you are having with breastfeeding.	Please describe your baby's behavior by answering the following questions: 1. What was your baby's behavior before, during and after the feeding? 2. Describe how often your baby sleeps and how long your baby sleeps. 3. Describe a new behavior your baby showed today.
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
TOTAL										

CODE:

URINE
-P (Pale yellow)
-D (Dark yellow)

STOOL
-MEC (Dark, black, meconium)
-GB (Green-brown)
-YS (Yellow-seedy)
-YP (Yellow-pasty)

DP/6/96

APPENDIX J

Subject Recruitment Script

SUBJECT RECRUITMENT SCRIPT

My name if Debbie Pollard, and I am a clinical nurse specialist on the maternity department and a faculty member at Wheeling Jesuit University. I am completing doctoral studies at the University of Pittsburgh. I am completing a research project on the differences in the length of breastfeeding in new mothers who are assigned to two different groups. In order to complete this project, I am asking mothers like yourself to participate in the study. Mothers participating in the study will be followed during their breastfeeding for 6 months following delivery. If you consent to participate, you will be assigned to one of two groups using a method similar to a coin toss. Depending on the group you are assigned to, one group of mothers will be asked to read booklets, watch a videotape, and complete daily records of your breastfeeding experiences for 6 weeks. In addition, some mothers will receive calls from me at 1 week, 2 weeks, 3 weeks and 6 months following delivery to discuss your breastfeeding experiences, while some mothers will be asked to send in a completed postcard about their breastfeeding experiences. All mothers will be asked to complete a postcard about their breastfeeding experiences at 3 weeks, 6 weeks, 3 months, and 6 months following delivery. Also, you would be asked to complete a series of questionnaires during your hospital stay and again over the telephone at 6 months following delivery. These questionnaires cover questions regarding breastfeeding, your general feelings, and questions about people and resources that were most helpful to you. Following your baby's six-month checkup, your baby's doctor will also be asked to complete a questionnaire to provide information on your baby's height, weight, and feeding patterns. Your decision will not affect the care that your receive. Your answers will be kept strictly confidential. It will take approximately twenty minutes to complete the questionnaires each time. If your are assigned to the group of mothers that has to keep daily records of your breastfeeding experiences, you will be asked to take several minutes at each feeding to complete the daily record. If you feel you want to participate, please read the consent form, ask any questions, and then sign it. You may keep one copy.

APPENDIX K

Telephone Reinforcement Log

EXPERIMENTAL GROUP SEMI-STRUCTURED INTERVIEW FOR 1 WEEK, 2 WEEK, AND 3 WEEK FOLLOW-UP PHONE CALLS

TELL ME HOW THE BABY IS FEEDING.

IF HAS STOPPED BREASTFEEDING

HOW DO YOU FEEL NOW THAT YOU HAVE STOPPED BREASTFEEDING?

POSITIVELY REINFORCE EFFORTS WITH BREASTFEEDING.

IF BREASTFEEDING

LET'S GO OVER THE LAST 24 HOURS OF YOUR DAILY LOG.

HOW MANY TIMES ARE YOU FEEDING IN 24 HOURS?

HOW LONG AT EACH FEEDING?

HOW MANY STOOLS AND VOIDS HAS THE BABY HAD IN THE LAST 24 HOURS?

ARE YOUR HEARING THE BABY SWALLOW?

ARE YOU GIVING THE BABY ANY OTHER FOODS?

ARE YOU PUMPING?

POSITIVELY REINFORCE BREASTFEEDING EFFORTS/ ACCOMPLISHMENTS.

REINFORCE CONTINUING THE LOGS AND RETURNING THEM IN THE MAIL.

DO YOU HAVE ANY QUESTIONS/PROBLEMS/CONCERNS?

INFORM OF NEXT CONTACT.

THANK FOR PARTICIPATION AND ENCOURAGE TO CALL IF ANY QUESTIONS/PROBLEMS/CONCERNS ARISE.

APPENDIX L

Research Logs

SUBJECT TRACKING SHEET
"EFFECT OF SELF-REGULATION ON BREASTFEEDING DURATION IN PRIMIPAROUS MOTHERS"

EXPERIMENTAL GROUP

ID NUMBER	DELIVERY DATE/TIME	TIME 1	1 WK PC	2 WK PC	3 WK PC	3WK FI	6WK FI	3MO FI	6MO FI	FWPI	6MO INTERV	1 WK LOG	2 WK LOG	3 WK LOG	4WK LOG	5 WK LOG	6 WK LOG	PHY LET	LC REF	COMMENTS	DURATION
						S- R-	S- R-	S- R-	S- R-	S- R-											
						S- R-	S- R-	S- R-	S- R-	S- R-											
						S- R-	S- R-	S- R-	S- R-	S- R-											
						S- R-	S- R-	S- R-	S- R-	S- R-											
						S- R-	S- R-	S- R-	S- R-	S- R-											
						S- R-	S- R-	S- R-	S- R-	S- R-											

SUBJECT TRACKING SHEET
"EFFECT OF SELF-REGULATION ON BREASTFEEDING DURATION IN PRIMIPAROUS MOTHERS"

CONTROL GROUP

ID NUMBER	DELIVERY DATE/TIME	TIME 1	3WK FI	6WK FI	3MO FI	6MO FI	FWPI	6MO INTERVIEW	PHYSICIAN LETTER	REFERRAL TO LC	COMMENTS	DURATION
			S- R-	S- R-	S- R-	S- R-	S- R-					
			S- R-	S- R-	S- R-	S- R-	S- R-					
			S- R-	S- R-	S- R-	S- R-	S- R-					
			S- R-	S- R-	S- R-	S- R-	S- R-					
			S- R-	S- R-	S- R-	S- R-	S- R-					
			S- R-	S- R-	S- R-	S- R-	S- R-					
			S- R-	S- R-	S- R-	S- R-	S- R-					

RESEARCH LOG
"EFFECT OF SELF-REGULATION ON BREASTFEEDING DURATION IN PRIMIPAROUS MOTHERS: A PILOT STUDY"

CONTACT DATE	NAME/DELIVERY DATE	VAG	BF	PRIM	AGE 18-40	PCBE	> 38 WEEKS	BF 2 HR	AGREES	DECLINED

DP/96

Page _____of_____

References

Abramson, R. (1992). Cultural sensitivity in the promotion of breastfeeding. NAACOG's Clinical Issues in Perinatal and Women's Health Nursing, 3(4), 717-722.

Afifi, A.A. & Clark, V. (1996). Computer-aided mulitvariate analysis. (3rd edition). London, England: Chapman & Hall.

American Academy of Pediatrics. (1982). The promotion of breastfeeding (Policy statement based on task force report). Pediatrics, 69(5), 654-661.

American Academy of Pediatrics. (1997). Breastfeeding and the use of human milk. Pediatrics, 100(6), 1035-1039.

American Dietetic Association. (1993). Position of the American Dietetic Association: Promotion and support of breast-feeding. Journal of the American Dietetic Association, 93(4), 467-469.

American Dietetic Association. (1997). Position of the American Dietetic Association: Promotion of breastfeeding. Journal of the American Dietetic Association, 97(6), 662-666.

Auerbach, K.G. (1985). The influence of lactation consultant contact on breastfeeding duration in a low-income population. Nebraska Medical Journal, September, 341-346.

Baisch, M.J., Fox, R.A., Whitten, E., & Pajewski, N. (1989). Comparison of breastfeeding attitudes and practices: Low-income adolescents and adult women. Maternal-Child Nursing Journal, 18(1), 61-71.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191-215.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1988). Self-efficacy. In R. Evans (Ed.), Albert Bandura: The man and his ideas: A dialogue (pp. 51-85). NY: Praeger.

Bandura, A. (1991). Social cognitive theory of self-regulation. Organizational Behavior and Human Decision Processes, 50, 248-287.

Baranowksi, T., Bee, D.E., Rassin, D.K., Richardson, J.C., Brown, J.P., Guenther, N., & Nader, P.R. (1983). Social support, social influence, ethnicity, and the breastfeeding decision. Social Science Medicine, 17, 1599-1611.

Barnes, J.E., Leggett, J.C., & Durham, T.W. (1993). Breastfeeders versus bottlefeeders: Differences in femininity perceptions. Maternal-Child Nursing Journal, 21(1), 15-19.

Barron, S.P., Lane, H.W., Hannan, T.E., Struempler, B., & Williams, J.C. (1988). Factors influencing duration of breast-feeding among low-income women. Journal of the American Dietetic Association, 88(12), 1557-1561.

Bolane, J. & Predmone, P. (1991). Breastfeeding (charts and teaching notes). Waco, TX: Childbirth Graphics.

Bottorff, J.L. (1990). Persistence in breastfeeding: A phenomenological investigation. Journal of Advanced Nursing, 15, 201-209.

Brent, N.B., Redd, B., Dworetz, A., D'Amico, F., & Greenberg, J.J. (1995). Breast-feeding in a low-income population. Archives of Pediatrics & Adolescent Medicine, 149(7), 798-803.

Bruce, N.G., Khan, Z., & Olsen, N.D. (1991). Hospital and other influences on the uptake and maintenance of breastfeeding: the development of infant feeding policy in a district. Public Health, 105(5), 357-368.

Bryant, C.A., Coreil, J., D'Angelo, S.L., Bailey, D.F.C., & Lazarov, M. (1992). A strategy for promoting breastfeeding among economically disadvantaged women and adolescents. NAACOG's Clinical Issues in Perinatal and Women's Health Nursing, 3(4), 723-730.

Burman, M.E. (1995). Health diaries in nursing research and practice. Image, 27(2), 147-152.

Burns, N. & Grove, S. (1997). The practice of nursing research. Philadelphia: W.B. Saunders Company.

Buxton, K.E., Gielen, A.C., Faden, R.R., Brown, C.H., Paige, D.M., & Chwalow, A.J. (1991). Women intending to breastfeed: Predictors of early infant feeding experiences. American Journal of Preventive Medicine, 7(2), 101-106.

Caplan, G. (1976). The family as a support system. In G. Caplan & M. Killilea (Eds.), Support systems and mutual help: multidisciplinary explorations. New York: Grune & Stratton.

Caulfield, L.E., Gross, S.M., Bentley, M.E., Bronner, Y., Kessler, L., Jensen, J., Weathers, B., & Paige, D.M. (1998). WIC-Based interventions to promote breastfeeding among African American women in Baltim ore: Effects on breastfeeding initiation and continuation. Journal of Human Lactation, 14(1), 15-22.

Chapman, J.J., Macey, M.J., Keegan, M., Borum, P., & Bennett, S. (1985). Concerns of breast-feeding mothers from birth to 4 months. Nursing Research, 34(6), 374-377.

Chen, C. (1993). Effects of home visits and telephone contacts on breastfeeding compliance in Taiwan. Maternal-Child Nursing Journal, 21(3), 82-90.

Chick, N. & Meleis, A.I. (1986). Transitions: A nursing concern. In P. Chinn (Ed.), Nursing Research Methodology (pp. 237-257). Boulder, CO: Aspen.

Chute, G. (1992). Promoting breastfeeding success: An overview of basic management. NAACOG's Clinical Issues in Perinatal and Women's Health Nursing, 3(4), 570-582.

Clark, N.M., Janz, N.K., Dodge, J.A., & Sharpe, P.A. (1992). Self-regulation of health behavior: The "take PRIDE" program. Health Education Quarterly, 19(3), 341-354.

Clark, N.J., Tullo, J., & Bolane, J.E. (1996). Breastfeeding basics. Waco, TX: Childbirth Graphics.

Cobb, S. (1976). Social support as a moderator of life stress. Psychosomatic Medicine, 38, 349-354.

Cobb, S. (1978). Social support and health through the life course. In M.W. Riley (Ed.), Aging from birth to death: Interdisciplinary perspectives (pp. 93-105). Boulder, CO: Westview Press.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences. Hillsdale, NJ: Lawrence Erlbaum Associates.

Coreil, J., Bryant, C.A., Westover, B.J., & Bailey, D. (1995). Health professionals and breastfeeding counseling: Client and provider views. Journal of Human Lactation, 11(4), 265-271.

Coreil, J. & Murphy, J.E. (1988). Maternal commitment, lactation practices, and breastfeeding duration. JOGNN, 17, 273-278.

Cornett, B.B. (1989). Postpartal mothers' perceptions of in-hospital breastfeeding information and affective support as related to breastfeeding status. (Doctoral Dissertation, Ohio State University).

Curro, V., Lanni, R., Scipione, F., Grimaldi, V., & Mastroiacovo, P. (1997). Randomised controlled trial assessing the effectiveness of a booklet on the duration of breast feeding. Archives Diseases in Children, 76(6), 500-504.

Danner, S.C. (1996). Nursing your baby for the first time. Waco, TX: Childbirth Graphics.

Davis, M.K., Savitz, D.A., & Graubard, B.I. (1988). Infant feeding and childhood cancer. Lancet, 13, 365-368.

Dewey, K.G., Heinig, M.J., & Nommsen-Rivers, L.A. (1995). Differences in morbidity between breast-fed and formula-fed infants. Journal of Pediatrics, 126(5), 696-702.

Dix, D.N. (1991). Why women decide not to breastfeed. Birth, 18(4), 222-225.

Duckett, L. (1992). Maternal employment and breastfeeding. NAACOG's Clinical Issues in Perinatal and Women's Health Nursing, 3(4), 701-712.

Duckett, L., Henly, S.J., & Garvis, M. (1993). Predicting breast-feeding duration during the postpartum hospitalization. Western Journal of Nursing Research, 12, 177-193.

Duncan, B., Ey, J., Holberg, C.J., Wright, A.L., Martinez, F.D., & Taussig, L.M. (1993). Exclusive breast-feeding for at least 4 months protects against otitis media. Pediatrics, 91(5), 867-872.

Ford, R.P.K., Taylor, B.J., Mitchell, E.A., Enright, S., Steward, A., Becroft, D., Scragg, R., Hassall, I., Barry, D., & Allen, E. (1993). Breastfeeding and the risk of sudden infant death syndrome. International Journal of Epidemiology, 22(5), 885-890.

Freed, G.L., Fraley, J.K., & Schanler, R.J. (1993). Accuracy of expectant mothers' predictions of fathers' attitudes regarding breast-feeding. Journal of Family Practice, 37(2), 148-152.

Gibbons, C. (1993). Maternal self efficacy and mother-preterm infant interaction. Unpublished doctoral dissertation, University of Pittsburgh.

Gielen, A.C., Faden, R.R., O'Campo, P., Brown, C.H., & Paige, D.M. (1991). Maternal employment during the early postpartum period: Effects on initiation and continuation of breast-feeding. Pediatrics, 87(3), 298-305.

Gielen, A.C., Faden, R.R., Paige, D.M., Buxton, K.E., Brown, C.H., & Chwalow, A.J. (1988). Breastfeeding promotion in obstetrical care practices: Limitations and opportunities. Parent Education and Counseling, 12, 5-12.

Grossman, L.K., Harter, C., Sachs, L. & Kay, A. (1990). The effect of postpartum lactation counseling on the duration of breast-feeding in low-income women. American Journal of Diseases in Children, 144(4), 471-474.

Hill, P.D. (1987). Effects of education on breastfeeding success. Maternal-Child Nursing Journal, 16, 145-156.

Hill, P.D. (1991). Predictors of breast-feeding duration among WIC and non-WIC mothers. Public Health Nursing, 8(1), 46-52.

Hill, P.D. (1992). Insufficient milk supply syndrome. NAACOG's Clinical Issues in Perinatal and Women's Health Nursing, 3(4), 605-612.

Hill, P.D. & Aldag, J.C. (1991). Potential indicators of insufficient milk supply syndrome. Research in Nursing and Health, 14, 11-19.

Hill, P.D. & Aldag, J.C. (1993). Insufficient milk supply among black and white breast-feeding mothers. Research in Nursing and Health, 16, 203-211.

Hill, P.D. & Aldag, J.C. (1996). Smoking and breastfeeding status. Research in Nursing & Health, 19, 125-132.

Hill, P.D. & Humenick, S.S. (1989). Insufficient milk supply. Image, 21(3), 145-148.

Hill, P.D., Humenick, S.S., Argubright, T.M., & Aldag, J.C. (1997). Effects of parity and weaning practices on breastfeeding duration. Public Health Nursing, 14(4), 227-234.

Hill, P.D., Humenick, S.S., Brennan, M.L., & Woolley, D. (1997). Does early supplementation affect long-term breastfeeding? Clinical Pediatrics, 36(6), 345-350.

Hillervik-Lindquist, C. (1991). Studies on perceived breast milk insufficiency. Acta Paediatrica Scandinavica Supplement, 376, 1-27.

Hills-Bonczyk, S., Tromiczak, K., Avery, M. Potter, S., Savik, K., & Duckett, L. (1994). Women's experiences with breastfeeding longer than 12 months. Birth, 21(4), 206-212.

Howie, P., Forsyth, J., Ogston, S., Clark, A., & Florey, C. (1990). Protective effect of breast feeding against infection. British Medical Journal, 300(6716), 11-16.

Hughes, R.B. (1984). The development of an instrument to measure perceived emotional, instrumental, and informational support in breastfeeding mothers. Issues in Comprehensive Pediatric Nursing, 7, 357-362.

Institute of Medicine. (1992). Nutrition during pregnancy and lactation. Washington, DC: National Academy Press.

Kearney, M.H. & Cronenwett, L. (1991). Breastfeeding and employment. JOGNN, 20, 471-480.

Kearney, M.H., Cronenwett, L.R., & Barrett, J.A. (1990). Breast-feeding problems in the first week postpartum. Nursing Research, 39(2), 90-95.

Kearney, M.H., Cronenwett, L.R., & Reinhardt, R. (1990). Cesarean delivery and breastfeeding outcomes. Birth, 17(2), 97-103.

Kessler, L.A., Gielen, A.C., Diener-West, M., & Paige, D.M. (1995). The effect of a woman's significant other on her breastfeeding decision. Journal of Human Lactation, 11(2), 103-109.

Kistin, N., Abramson, R., & Dublin, P. (1994). Effect of peer counselors on breastfeeding initiation, exclusivity, and duration among low-income urban women. Journal of Human Lactation, 10(1), 11-15.

Kistin, N., Benton, D., Rao, S., & Sullivan, M. (1990). Breast-feeding rates among black urban low-income women: Effect of prenatal education. Pediatrics, 86(5), 741-746.

Kurinij, N. & Shiono, P.H. (1991). Early formula supplementation or breast-feeding. Pediatrics 88(4), 745-750.

Kurinij, N., Shiono, P.H., Ezrine, S.F., & Rhoads, G.G. (1989). Does maternal employment affect breastfeeding? American Journal of Public Health, 79(9), 1247-1250.

Labbok, M. & Krasovec, K. (1990). Toward consistency in breastfeeding definitions. Studies in Family Planning, 21(4), 226-230.

Latham, G.P. & Locke, E.A. (1991). Self-regulation through goal setting. Organizational Behavior and Human Decision Processes, 50, 212-247.

Lawrence, R.A. (1994). Breastfeeding. St. Louis: Mosby.

Lawrence, R.A. (1997). A review of the medical benefits and contraindications to breastfeeding in the United States (Maternal and Child Health Technical Information Bulletin). Arlington, VA: National Center for Education in Maternal and Child Health.

Lawson, K. & Tulloch, M.I. (1995). Breastfeeding duration: Prenatal intentions and postnatal practices. Journal of Advanced Nursing, 22, 841-849.

Littman, H., Medendorp, S.V., & Goldfarb, J. (1994). The decision to breastfeed: The importance of fathers' approval. Clinical Pediatrics, 33(4), 214-219.

Long, D.G., Funk-Archuleta, M.A., Geiger, C.J., Mozar, A.J., & Heins, J.N. (1995). Peer counselor program increases breastfeeding rates in Utah Native American WIC population. Journal of Human Lactation, 11(4), 279-284.

Lutfiyya, M.N., Baker, M., Neuner, C., Legg, K., & Heitmeyer, D. (1997). The complexity of breastfeeding. Epidemiological Snapshot, 1(3). Charleston, WV: West Virginia Office of Maternal and Child Health.

Lynch, S.A., Koch, A.M., Hislop, T.G., & Coldman, A.J. (1986). Evaluating the effect of a breastfeeding consultant on the duration of breastfeeding. Canadian Journal of Public Health, 77, 190-195.

Martinez, G.A. & Dodd, D.A. (1983). 1981 milk feeding patterns in the United States during the first 12 months of life. Pediatrics, 71(2), 166-170.

Martinez, G.A. & Krieger, F.W. (1985). Milk-feeding patterns in the United States. Pediatrics, 76(6), 1004-1008.

Mason, T., Rabinovich, C., Fredrickson, D., Amoroso, K., Reed, A., Stein, L., & Kredick, D. (1995). Breast feeding and the development of juvenile rheumatoid arthritis. Journal of Rheumatology, 22(6), 1166-1170.

Matich, J.R. & Sims, L.S. (1992). A comparison of social support variables between women who intend to breast or bottle feed. Social Science Medicine, 34(8), 919-927.

Matthews, M.K. (1993). Experiences of primiparous breast-feeding mothers in the first days following birth. Clinical Nursing Research, 2(3), 309-326.

McNatt, M.H. & Freston, M.S. (1992). Social support and lactation outcomes in postpartum women. Journal of Human Lactation, 8(2), 73-77.

Mead, G.H. (1934). Mind, self, and society. Chicago: The University of Chicago Press.

Meleis, A. (1991). Theoretical nursing: Development and progress. Philadelphia: J.B. Lippincott.

Meleis, A.I. & Trangenstein, P.A. (1994). Facilitating Transitions: Redefinition of the nursing mission. Nursing Outlook, 42(6), 255-259.

Mercer, R.T. (1981). A theoretical framework for studying factors that impact on the maternal role. Nursing Research, 30(2), 73-77.

Mercer, R.T. (1986). Predictors of maternal role attainment at one year postbirth. Western Journal of Nursing Research, 8(1), 9-32.

Mercer, R.T. (1990). Parents at risk. New York: Springer Publishing Company.

Munro, B.H. (1997). Statistical methods for health care research. Philadelphia: Lippincott.

Neifert, M. (1995). Insufficient milk syndrome: Fact or fiction? Breastfeeding Update, Winter. Charleston, WV: WV Department of Health and Human Resources Bureau for Public Health, WIC Program.

Newcomb, P.A., Storer, B.E., Longnecker, M.P., Mittendorf, R., Greenberg, E.R., Clapp, R.W., Burke, K.P., Willett, W.C., & MacMahon, B. (1994). Lactation and a reduced risk of premenopausal breast cancer. The New England Journal of Medicine, 330(2), 81-87.

Nunnally, J.C. & Bernstein, I.H. (1994). Psychometric theory (3rd ed.). New York: McGraw-Hill.

O'Campo, P., Faden, R.R., Gielen, A.C., & Wang, M.C. (1992). Prenatal factors associated with breastfeeding duration: Recommendations for prenatal interventions. Birth, 19(4), 195-201.

Owen, M., Baldwin, C., Swank, P., Pannu, A., Johnson, D., & Howie, V. (1993). Relation of infant feeding practices, cigarette smoke exposure, and group child care to the onset and duration of otitis media with effusion in the first two years of life. Journal of Pediatrics, 123(5), 702-711.

Paradise, J.L., Elster, B.A., & Tan, L. (1994). Evidence in infants with cleft palate that breast milk protects against otitis media. Pediatrics, 94(6), 853-860.

Piper, P. (1989). Nutrition in infancy and childhood. St. Louis: C.V. Mosby.

Piper, S. & Parks, P.L. (1996). Predicting the duration of lactation: Evidence from a national survey. Birth, 23(1), 7-12.

Pocock, S.J. (1991). Clinical trials. New York: John Wiley & Sons.

Pocock, S.J. & Abdalla, M. (1998). The hope and the hazards of using compliance data in randomized controlled trials. Statistics in Medicine, 17(3), 303-317.

Polit, D. & Hungler, B. (1995). Nursing research. Philadelphia: J.B. Lippincott Company.

Public Health Service. (1991). Healthy People 2000: National Health Promotion and Disease Prevention Objectives. (DDHS Publication No. PHS 91-50212). Washington, DC: U.S. Government Printing Office.

Quarles, A., Williams, P.D., Hoyle, D.A., Brimeyer, M., & Williams, A.R. (1994). Mothers' intention, age, education and the duration and management of breastfeeding. Maternal-Child Nursing Journal, 22(3), 102-108.

Quinn, A.O., Koepsell, D., & Haller, S. (1997). Breastfeeding incidence after early discharge and factors influencing breastfeeding cessation. JOGNN, 26(3), 289-294.

Redland, A.R. & Stuifbergen, A.K. (1993). Strategies for maintenance of health-promoting behaviors. Nursing Clinics of North America, 28(2), 427-442.

Reifsnider, E., & Eckhart, D. (1997). Prenatal breastfeeding education: Its effect on breastfeeding among WIC participants. Journal of Human Lactation, 13(2), 121-125.

Rentschler, D.D. (1986). The relationship between pregnant women's achievement motivation, information about breast-feeding, and success in breast-feeding (Doctoral dissertation, New York University). Dissertation Abstracts International, 47(10), 4114-B. (University of Microfilm No1 Da8625659).

Rentschler, D.D. (1991). Correlates of successful breastfeeding. Image, 23, 151-154.

Richardson, V. & Champion, V. (1992). The relationship of attitudes, knowledge, and social support to breast-feeding. Issues in Comprehensive Pediatric Nursing, 15, 183-197.

Riordin, J.M. (1997). The cost of not breastfeeding: A commentary. Journal of Human Lactation, 13(2), 93-97.

Riordin, J. & Auerbach, K. (1993). Breastfeeding and human lactation. Boston: Jones-Bartlett Publishers.

Rogan, W.J. & Gladen, B.C. (1993). Breast-feeding and cognitive development. Early Human Development, 31, 181-193.

Ross Laboratories mother's survey. (1992). Columbus, OH: Ross Laboratories.

Ross Laboratories. Updated Breastfeeding Trend (1987-1995). (1995). Columbus, OH: Ross Laboratories.

Rubin, D.H., Leventhal, J.M., Krasilnikoff, P.A., Kuo, H.S., Jekel, J.F., Weile, B., Levee, A., Kurzon, M. & Berget, A. (1990). Relationship between infant feeding and infectious illness: A prospective study of infants during the first year of life. Pediatrics, 85, 464-471.

Rubin, R. (1967). Attainment of the maternal role: Part I. Nursing Research, 16, 237-245.

Rubin, R. (1975). Maternal tasks of pregnancy. Maternal-Child Nursing Journal, 4(3), 143-153.

Rubin, R. (1977). Binding-in to the postpartum period. Maternal-Child Nursing Journal, 6(2), 67-75.

Rubin, R. (1984). Maternal identity and the maternal experience. New York: Springer Publishing Company.

Ryan, A.S. & Martinez, G.A. (1989). Breast-feeding and the working mother. Pediatrics, 83(4), 524-531.

Ryan, A.S., Rush, D., Krieger, F.W., & Lewandowski, G.E. (1991). Recent declines in breast-feeding in the United States, 1984 through 1989. Pediatrics, 88(4), 719-727.

Ryan, K. (1997). The power of support groups: Influence on infant feeding trends in New Zealand. Journal of Human Lactation, 13(3), 183-190.

Sayers, G., Thornton, L., Corcoran, R., & Burke, M. (1995). Influences on breastfeeding initiation and duration. Irish Journal of Medical Science, 164(4), 281-284.

Schlossberg, N.K. (1984). Counseling adults in transition. New York: Springer Publishing Company.

Schumacher, K.L. & Meleis, A.I. (1994). Transitions: A central concept in nursing. Image, 26(2), 119-127.

Schy, D.S., Maglaya, C.F., Mendelson, S.G., Race, K.E., & Ludwig-Beymer, P. (1996). The effects of in-hospital lactation education on breastfeeding practice. Journal of Human Lacatation, 12(2), 117-122.

Sciacca, J.P., Dube, D.A., Phipps, B.L., & Ratliff, M.I. (1995). A breast feeding education and promotion program: Effects on knowledge, attitudes, and support for breast feeding. Journal of Community Health, 20(6), 473-490.

Sciacca, J.P., Phipps, B.L., Dube, D.A., & Ratliff, M.I. (1995). Influences on breast-feeing by lower-income women: An incentive-based, partner-supported educational program. Journal of the American Dietetic Association, 95(3), 323-328.

Sereika, S. & Clochesy, J. (1995). Survival analysis: A statistical methodology for nursing research. (Nursing Research Update, Volume VIII, No. 2, pp. 1-3). Pittsburgh, PA: University of Pittsburgh, School of Nursing.

U.S. Department of Commerce, Bureau of the Census. (1993). 1990 census of population and housing (West Virginia, 1990 CPH-2-50). Washington, DC: U.S. Government Printing Office.

Verbrugge, L.M. (1980). Health diaries. Medical Care, 18(1), 73-96.

Waltz, C., Strickland, O., & Lenz, E. (1991). Measurement in nursing research. Philadelphia: F.A. Davis Company.

Watters, N.E. & Kristiansen, C.M. (1995). Two evaluations of combined mother-infant versus separate postnatal nursing care. Research in Nursing and Health, 18, 17-26.

West, C. (1980). Factors influencing the duration of breastfeeding. Journal Biosocial Sciences, 12, 325-331.

West Virginia Bureau of Public Health. (1994). West Virginia Healthy People 2000. Update: achieving the State's health objectives. (Update #10). Charleston, WV.

Wheeling Hospital. (1997, January-July). OB monthly report. Wheeling, WV.

Wheeling Hospital. (1997a, January-July). Nursery daily log. Wheeling, WV.

Wiles, L.S. (1984). The effect of prenatal breastfeeding education on breastfeeding success and maternal perception of the infant. JOGNN, 253-257.

Worthington-Roberts, B. & Williams, S. (1989). Nutrition in pregnancy and lactation. St. Louis: C.V. Mosby.

Wright, A.L., Holberg, C.J., Martinez, F.D., Morgan, W.J., & Taussig, L.M. (1989). Breast feeding and lower respiratory tract illness in the first year of life. British Medical Journal, 299, 946-949.