ABSTRACT

BAKER, SUSAN SHACKELFORD. The Infant Feeding Decision: A Survey of Limited-Resource Women in North Carolina. (Under the direction of Dr. Robert David Mustian.)

The purpose of this study was to identify factors affecting the infant feeding decisions of limited-resource women in North Carolina. Additionally, the study examined the relationships between these demographic and familial factors and maternal perceived barriers on the infant feeding decision.

Three research questions guided the study: 1) Do the influences on the infant feeding decision differ according to these demographic factors? (race/ethnicity, place of residence, level of education, age, marital status); 2) Do the following familial factors influence the infant feeding decision and, if so, to what extent? (infant feeding method by which the respondent herself was fed, respondent’s previous infant feeding experiences, infant feeding methods of family members and friends, presence of the respondent’s romantic partner, and the number of people living in the home); and 3) Do the following perceived barriers influence the infant feeding decision and, if so, to what extent? (attitudes of prenatal healthcare providers, attitudes of postpartum healthcare providers, plans for returning to work or school, maternal beliefs/perceptions about infant feeding methods, and attitudes of family members/friends toward infant feeding methods).

Among the respondents, the majority of the breastfeeding mothers were white, married, over 20 years of age, and held at least a high school diploma or GED.
Data analysis revealed that a majority of respondents either “always knew” how they would feed their babies, or they made their infant feeding decisions during pregnancy; a small percentage made their infant feeding decisions while hospitalized. A significant relationship was observed between ethnicity and the infant feeding method choice, with Caucasians being more likely than other groups to breastfeed exclusively. Respondents who reported having “some college” or a “college degree” were significantly more likely to exclusively breastfeed than were respondents who reported having “some high school” or “high school graduate/GED.” The relationship between the infant feeding decision and maternal attitudes was significant. Respondents who chose to breastfeed exclusively, as well as respondents who fed their infants a combination of breast milk and formula, expressed positive influences on their infant feeding decision.
THE INFANT FEEDING DECISION:
A SURVEY OF LIMITED-RESOURCE WOMEN
IN NORTH CAROLINA

by

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A dissertation submitted to the Graduate Faculty of North Carolina State University in partial fulfillment of the requirements for the Degree of Doctor of Education

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DEDICATION

To the Paraprofessionals of the In-Home Breastfeeding Support Program, whose work is so important in helping women to breastfeed successfully.

To my husband, Charles, “the wind beneath my wings.”

To my daughter, Sarah Sutton, who encouraged me in this endeavor—all the while wanting to have her Mommy back.

To my parents, Jerry and Evelyn Shackelford, who have always believed in me.

To my extended family, friends and colleagues, whose support, prayers and encouragement gave me hope.

To my advisor, Dr. David Mustian, whose patience with me was endless.

To my colleagues and special friends: Deborah Dee, Jam Gourley, Karen Konzelmann, Joye Norris, Mary Overfield and Ngaire van Eck, who both inspired and encouraged me.
BIOGRAPHY

Susan Shackelford Baker was born in Kinston, North Carolina, the younger of two children of Jerry and Evelyn Shackelford, and was reared on a farm in Lenoir County. She attended school in Kinston, graduating from Arendell Parrott Academy. In 1980 she received the Bachelor of Science degree (Foods and Nutrition) from Meredith College, Raleigh, North Carolina.

After several years managing commercial foods operations in Raleigh, Baker accepted an appointment as a supervising Extension Agent for EFNEP (the Expanded Food and Nutrition Education Program) in Wake County and, while there, piloted the In-Home Breastfeeding Support Program. Resuming studies on a part-time basis, she earned the Master of Education degree (Adult and Community College Education) in 1994 at North Carolina State University, and then continued to pursue academic interests, specializing in the area of Training and Development.

In 1995, the author was appointed to Extension special nutrition programs at North Carolina State University, where she worked to design and implement innovative food-and-nutrition education programming for limited-resource audiences. She also continued to develop the In-Home Breastfeeding Support Program in conjunction with statewide EFNEP programming and, in 1998 was named EFNEP Coordinator at North Carolina State University. Additionally, in 1998 she co-authored a book *Maximizing Paraprofessional Potential* which addressed the selection, hiring and training processes that are unique to paraprofessional employees.

Baker continues to be interested in issues related to breastfeeding and nutrition education for limited-resource audiences, particularly in the training and
development needs of nutrition program paraprofessionals and the unique staff development concerns of the individuals who supervise paraprofessional personnel.
ACKNOWLEDGEMENTS

The process of completing a terminal degree while employed full-time is a lengthy, complex, and often daunting pursuit. Along the way, however, there have been many who provided valuable counsel, constructive criticism and invaluable encouragement as I struggled to bring this work to a successful conclusion, and I wish to acknowledge some very special individuals who participated in the process.

Thanks are in order to the members of my advisory committee. Dr. David Jenkins was a steady source of encouragement who consistently pointed me toward the goal of completing this project, for which I am especially grateful. Dr. Carolyn Lackey provided extremely valuable feedback when reviewing the manuscript; moreover, I would like to thank her for the ability to alternate between multiple roles as my colleague, mentor, professor/advisory committee member and, most especially, as my friend. Dr. Ron Shearon, who modeled effective teaching strategies and who clearly embodies the highest degree of personal dedication to the teaching profession, has been an inspiration to me as someone whom I should hope to emulate by always putting forth my best efforts as an educator. Finally, special appreciation goes to the chair of my committee, Dr. David Mustian, for his unwavering support, encouragement, guidance and direction, and particularly for always helping me to believe that I could see this work through to a successful end. My respect for his technical expertise, as well as his professional integrity, has continued to increase throughout the process. Now, at the end, I consider him to be more than my advisor; indeed, he is my friend.
I wish to acknowledge the members of my immediate family, including my husband, Charles, who never doubted that I could finish this project, and who continually encouraged me during the inevitable ebbs and flows as the venture developed. He gave up countless nights and weekends to assist with the drudgery of library work, typing and editing, and continually believed in me even when I sometimes did not. His patience, love and support sustained me through difficult times. And for my precious daughter, Sarah Sutton, special words of heartfelt acknowledgement and praise are reserved. She, perhaps more than anyone else, sacrificed valuable—indeed, forever irretrievable—time with her Mommy, yet she encouraged me in special ways as only a 10-year-old could. I hope that someday she may come to understand that she is one of the reasons I undertook this project and determined to complete it.

Others, too, are deserving of particular thanks. Linda Cahoon, with whom I have worked closely since 1989, whom I hold dear to my heart, and of whose loyalty probably I am most undeserving, has been and continues to be “my right arm and my left arm.” Dwayne Watson helped to create and re-create the data tables and other important instruments integral to this work. His technical expertise and encouragement are very much appreciated.

When the In-Home Breastfeeding Support Program (IH BSP) first was piloted in Wake County, Dr. Ngaire van Eck was the EFNEP Coordinator in North Carolina. It was her inspiring vision of implementing a breastfeeding program which ultimately translated into the reality of the IH BSP. Thanks to Ngaire van Eck for reviewing the
Questionnaire, for helping to organize and compile the data and, on certain occasions, for willingly lending a shoulder for me to cry on.

I would like to recognize and thank my colleague and friend, Jam Gourley, for reviewing the Questionnaire and for providing valuable input. Yet another colleague and friend, Deborah Dee, participated in the process by brainstorming research possibilities, contributing to the development of the research instrument, tutoring me in statistics, reviewing the manuscript as it developed, and always encouraging me.

An immeasurable debt of gratitude I owe to my friend and colleague, Mary Overfield. With infinite, loving patience she translated and interpreted medical terminology, thus helping to determine if certain material was worthy of inclusion. Moreover, she repeatedly edited the work as it progressed through various stages, refining and honing my grammar. Always she instilled in me the hope that this project would ultimately come to a successful conclusion.

Finally, I wish to recognize Dr. Jim Burrow for sharing his passion for Training and Development, and for helping me to see that this discipline was the right course of graduate study for me.
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Chapter 1

INTRODUCTION

Recent scientific discoveries regarding the benefits of human milk and breastfeeding provide the rationale for the promotion of breastfeeding education (Goldman, 1993, p. 664). In its 1997 position statement, the American Dietetic Association (ADA) strongly encouraged “the promotion and advocacy of activities that support longer duration of successful breastfeeding, in order to optimize the indisputable nutritional, immunological, psychological, and economic benefits” (American Dietetic Association [ADA], 1997, p. 1).

In response to the low initiation and duration of breastfeeding in North Carolina, the North Carolina Cooperative Extension Service (NCCES), located at North Carolina State University (NCSU), and the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) collaborated to design and implement the In-Home Breastfeeding Support Program (IHBSP). Breastfeeding support program assistants (Extension paraprofessionals with personal breastfeeding experience) visit mothers in the hospital and make home visits within 72 hours after hospital discharge. Support (via telephone and additional home visits) continues as needed as long as the mother breastfeeds.

Background

The Cooperative Extension System in the United States was established in 1914 as a nationwide educational network. This network is a “partnership of the U.S. Department of Agriculture, state land-grant universities, and county governments,”
combining the resources of federal, state and local governments (U.S. Department of Agriculture [USDA], no date/ no page number). Locally, Cooperative Extension serves as a conduit between researchers and community citizens. In North Carolina, the mission statement of Extension reads as follows: “North Carolina Cooperative Extension is an educational partnership helping people put research-based knowledge to work for economic prosperity, environmental stewardship and an improved quality of life” (NCSU, no date, http://www.ces.ncsu.edu/AboutCES/mission.html).

Cooperative Extension strives to achieve “excellence in its educational programs by providing relevant, informative, user-appropriate, and timely programs” based upon issues and needs identified by the audience Extension serves (NCCES, 1993, p. 1).

A hallmark of the Cooperative Extension System is its focus on providing educational programs based upon locally-identified needs. In every state, Cooperative Extension utilizes an advisory leadership system comprised of a representative sample of the clients served by the organization. In North Carolina, “in addition to a State Advisory Council, each county Extension office has a local advisory group” (U.S. General Accounting Office [USGAO], 1981, p. 4). The concept of issues programming suggests that “Extension works with local groups to identify needs and develop intervention programs” (Meyers & Pigg, 1990, p. 42). The philosophy of issues programming underlies the fact that “external needs dictate internal response” (Meyers & Pigg, p. 42). In other words, Extension alters its programming focus as local needs change.

Changes in program focus have “largely mirrored national trends or have reflected changes in the demographic, economic and social characteristics of the
population” (USGAO, 1981, p. 10). “Many of the newer, more socially-oriented extension programs are in the home economics field. The home economics field has changed from the traditional activities of sewing, canning and quilting to that of family planning, psychological counseling, and home management subjects” (USGAO, p. 16). A national Extension steering committee determined the combined areas of food, nutrition and health to be one of four primary programming areas in the field of home economics in 1980 (USGAO, p. 16). Moreover, to reflect the ever expanding areas of research and the practical application of technologies within homes and families, home economics has been re-named family and consumer sciences.

In 1968, Congress authorized legislation creating an “Extension Service-managed nutrition education program–the Expanded Food and Nutrition Education Program–for low-income families” (USGAO, 1981, p. 10). The mission with which the Expanded Food and Nutrition Education Program (EFNEP) was charged from its inception remains the program’s mission today: “to help families living in or near poverty–especially those with young children–to acquire knowledge, skills and changes in behavior to achieve adequate diets providing normal nutrition” (USDA, 1974, p. iii). The cornerstone of EFNEP is the delivery strategy of the program. The program model is based on hiring paraprofessionals to deliver nutrition education to low-income homemakers by “telling, showing and doing with them” in a “working visit method of teaching” (USDA, 1975, p. 30).

At the federal level, Extension regulates and evaluates the efforts of EFNEP and offers supportive services to the state programs. At the state level, EFNEP is
administered by program coordinators housed at the land-grant universities. These professionals develop training and curriculum materials for county program professionals (supervising agents) and paraprofessionals (program assistants) (USDA, 1984, p. 2). The supervising agent at the county level is responsible for hiring, training and supervising paraprofessionals who work directly with families participating in the program (USDA, 1977).

Interagency coordination is promoted at every level of EFNEP. For program clientele, this cooperative atmosphere enhances the probability of agency referrals (USDA, 1974). Essential interagency cooperation and coordination begins at the federal level and is strengthened by memoranda of understanding between key agencies at the state level. EFNEP professionals at the state and local levels work to establish relationships with program leaders from agencies offering services to low-income clientele, with the goal of establishing a method by which EFNEP will be able to assist the prospective agency in achieving its mission and goals (W. Willis, personal communication, March 13, 2002).

In 1974, national guidelines for EFNEP were revised. To address the pervasiveness of malnutrition among young children, program leaders were asked to redirect program delivery toward families with young children. Additionally, the scope of the program was clarified to include all aspects of normal nutrition, including pregnancy and lactation (N. van Eck, personal communication, March 15, 2002).

As a result of EFNEP educational efforts in maternal and infant nutrition and strengthened interagency relationships with WIC, EFNEP paraprofessionals in North
Carolina during the 1980s received substantial numbers of referrals to work with pregnant women. Local WIC nutritionists were pleased with the positive changes in behavior achieved by their clients as a result of their involvement with EFNEP (M. Peterson, personal communication, March 15, 2002). Consequently, greater numbers of pregnant women were referred to EFNEP by WIC nutritionists.

In 1990, EFNEP paraprofessionals in one North Carolina county were asked to target their programming efforts toward pregnant and breastfeeding WIC clients (N. van Eck, personal communication, March 15, 2002). This innovative pilot project was carefully evaluated and revealed significant increases in breastfeeding duration. As a result, the IHBSP was created (N. van Eck, personal communication, March 15, 2002). Currently, the program exists in 38 North Carolina counties and has seen consistent programmatic success since 1990 (Baker, Gourley, & Watson, 2001, no page number).

Locally, the IHBSP is a county-level partnership between Cooperative Extension, WIC programs, and local hospitals. Offered free of charge to participating clientele, the program is designed to assist mothers who desire to breastfeed their infants. IHBSP paraprofessionals are trained to demonstrate respect for each mother’s choice of infant feeding method. These trained paraprofessionals visit new mothers in the hospital following the births of their newborns and make home visits within 72 hours after mothers are discharged from the hospital. Support continues on an as-needed basis as long as the mother breastfeeds. This support includes hands-on assistance, education, and guidance concerning options for breastfeeding while mothers are employed, and assisting with the weaning process when mothers have
reached their breastfeeding goals. In addition, paraprofessionals telephone program participants at designated intervals to ascertain their breastfeeding status and to offer anticipatory guidance.

Research evidence indicates that to be successful at breastfeeding, many mothers need information about breastfeeding, support, and encouragement (ADA, 1997, p. 209; World Health Organization [WHO], 1998, p. 82). During the initial home visit, subsequent visits and telephone contacts, IHBSP program assistants provide information about breastfeeding, support via hands-on assistance, and encouragement (North Carolina State University, 1997, p. 2).

As the IHBSP has expanded in North Carolina, program leaders have become interested in areas of research focused upon the factors involved in the infant feeding decision, as well as the perceived barriers to breastfeeding success. This study explores those research interests.

**Purpose of the Study**

The U.S. Surgeon General describes breastfeeding as “one of the most important contributors to infant health” (U.S. Department of Health and Human Services [USDHHS], 2000a, p. 3). The American Academy of Pediatrics (AAP, 1997) documents the compelling advantages of using human milk for infant feeding. Specifically, AAP cites the health, nutritional, immunologic, developmental, psychological, social, economic, and environmental benefits of breastfeeding (AAP, p. 109).

Although the benefits of breastfeeding are widely recognized, “the rates of breastfeeding in the United States are low, with a marked decline at 6 months
postpartum. In 1998 (the year for which the most recent statistics are available), only 29% of all mothers breastfed at 6 months postpartum” (USDHHS, 2000a, p. 3). However, the 2002 year-end report of the IHBSP revealed that 65% of program participants continued to breastfeed at six months. The national figures represent all mothers—both breastfeeding and formula feeding. The breastfeeding duration figures for IHBSP participants represent women who chose to participate in the program, therefore electing to breastfeed.

The purpose of this study was to identify factors that influence the infant feeding decisions among limited-resource women in North Carolina who were participating in a postpartum breastfeeding support program. The research questions pursued in this study were:

1. Do the influences on the infant feeding decision differ according to the following demographic factors?

   - Race/ethnicity
   - Place of residence (rural/urban)
   - Level of education
   - Age
   - Marital status

2. Do the following familial factors influence the infant feeding decision and, if so, to what extent?

   - Infant feeding method by which the respondent herself was fed
   - Respondent’s previous infant feeding experiences
   - Infant feeding methods of family members and friends
• Presence of the respondent’s romantic partner
• Number of people living in the home

3. Do the following perceived barriers influence the infant feeding decision and, if so, to what extent?
• Attitudes of prenatal healthcare providers
• Attitudes of postpartum healthcare providers
• Plans for returning to work or school
• Maternal beliefs/perceptions about infant feeding methods
• Attitudes of family members/friends toward infant feeding methods

An understanding of the impact of these factors will enable agencies involved in promoting and supporting breastfeeding to more successfully allocate limited program resources toward specific barriers. Specifically, the IHBSP will incorporate the research findings into educational programming efforts with limited-resource women in North Carolina.

**Significance of the Study**

The IHBSP is committed to providing research-based information to pregnant women in order to assist them in their infant feeding decision process. From this commitment comes a desire to identify factors affecting the infant feeding decision and to discover which of these factors are perceived barriers to breastfeeding for program participants.

Understanding the barriers to breastfeeding for women of limited resources in North Carolina would provide a foundation for appropriate counseling and the basis for effective prenatal promotion of breastfeeding. Moreover, knowledge of the
perceived barriers to breastfeeding would provide program administrators with the research-based information needed to improve teaching materials and strategies. This critical set of knowledge would better equip program paraprofessionals to provide families with the information they need to make well-informed infant feeding decisions. If successful, more program participants would overcome common barriers and would realize the many benefits associated with longer breastfeeding duration. As noted by the Surgeon-General of the United States, “Together we can shape a future in which mothers can feel comfortable and free to breastfeed their children without societal hindrances” (USDHHS, 2000a, p. 4).

Definitions of Terms

The terms utilized throughout this study are common to the literature in adult education, nutrition education, public health and the biological sciences. The principal terms are treated extensively in the chapters that follow. However, selected terms are defined here in order to enhance the clarity of this study.

**Adult-Onset Diabetes (Type II):** Refers to *non-insulin-dependent diabetes mellitus* (*NIDDM*), a condition in which the pancreas produces some insulin for carbohydrate (sugar) transport from the bloodstream into the cells, but not enough for the body’s entire needs. This form of diabetes usually manifests gradually after 40 years of age, is typically controlled through diet, and may also require oral medication.

**AFDC:** Aid to Families with Dependent Children. A program created in 1935 to provide assistance to needy, dependent children, as part of the Social Security Act. Replaced in 1996 with the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA).
**Amylase**: A class of enzymes that split starch.

**Antiprotozoan**: Acts against parasites.

**Atheromatous vascular changes**: Referring to changes in the walls of the larger arteries, i.e., involving fatty degeneration or thickening of the walls of the larger arteries.

**Atopic children**: Children with allergic symptoms.

**ß-lymphocytes**: Living white blood cells present in human milk that create antibodies.

**Breastfeeding**: Feeding a human infant with human breast milk, typically by positioning the baby at the breast for the baby to nurse or extract the milk from the breast.

**Breastfeeding duration**: The length of time a mother provides breast milk for her infant, typically defined in terms of weeks or months.

**Breastfeeding dyad**: The breastfeeding mother and her infant.

**Breast milk**: Milk produced by the breast of the human female.

**Breast milk substitute**: Liquids provided as sustenance to the infant in lieu of human breast milk, typically commercially prepared formulas that are “formulated” to simulate some properties of human breast milk.

**Bilirubin**: The fat-soluble product of the breakdown of hemoglobin molecules which, if not effectively excreted in the infant stool, may cause a baby to take on a yellowish cast to the skin and sclera, and can indicate conditions including liver malfunction or may rarely result in brain damage with serum bilirubin levels exceeding 20 mg/dl.
**Body Mass Index (BMI):** The ratio of weight (in kilograms) over height squared (in meters).

**Casein:** The principal protein of human milk.

**Celiac Disease:** Intestinal malabsorption syndrome characterized by diarrhea, malnutrition, bleeding tendency and abnormally low blood calcium.

**Colostrum:** Fluid in the breast at the end of pregnancy and in the early postpartum, containing a higher content of proteins (many of which are immunoglobulins), fat-soluble vitamins and minerals.

**Complementation:** Adding formula *in addition to* breast milk during the course of a feeding session.

**Contraindicate:** To indicate the inappropriateness of a form of treatment considered otherwise advisable.

**Cytokines:** Chemicals involved with growth regulation.

**Demand feeding:** The unrestricted pattern of breastfeeding characterized by *ad libitum* day and night feedings, facilitated by close contact between mother and infant.

**Discharge packs:** Packages of free information and product samples distributed to new mothers upon discharge from the hospital, typically including free samples of infant formula, as well as coupons for infant formula.

**Enteric:** Pertaining to the small intestine.

**Enteropathogens:** Microorganisms that cause intestinal disease.

**Exclusive breastfeeding:** Providing breast milk as the sole nutrient source for an infant.
**Feeding techniques:** Methods of delivery of sustenance to an infant. Breastfeeding, bottle feeding and cup feeding are typical feeding techniques.

**Genetically modified foods:** Foods that are produced by means of genetic modification in order to achieve a specific result (such as resistance to disease, or increased yield due to larger size).

**Human milk:** Nutritionally complete fluid produced by the human female’s mammary glands, and is appropriate for human infant sustenance.

**IgA:** *immunoglobulin gamma A.* The principal protein found in breast milk and capable of acting as an antibody (a substance produced by the body in response to a specific foreign or antagonistic substance).

**IHBSLP:** In-Home Breastfeeding Support Program.

**Immunology:** The study of immunity to diseases.

**Infant-feeding methods:** See *Feeding Techniques*.

**Initiation:** The incidence of breastfeeding in the hospital or within the first week of life.

**Institute of Medicine:** An organization of the National Academy of Sciences which provides objective, timely, authoritative information and advice concerning health and science policy to government, corporate sector, professions, and to the public. The mission of the Institute of Medicine is to advance and disseminate scientific knowledge to improve human health.

**Insulin-dependent diabetes mellitus:** IDDM. A condition in which the pancreas produces very little or no insulin for transport of carbohydrates (sugars) out of the
bloodstream into body cells and, therefore, requires administration of insulin via one or more daily injections or via continuous administration through an insulin pump.

**International Code of Marketing of Breastmilk Substitutes:** A recommendation by the World Health Assembly (May 1981) for all governments to regulate marketing practices that promote artificial feeding (formula and other breast milk substitutes) as well as the use of artificial feeding devices, such as bottles and rubber nipples.

**Juvenile-Onset Diabetes (Type 1):** Refers to insulin-dependent diabetes mellitus (see definition above) which first manifests abruptly prior to 25 years of age, requiring dietary regulation and insulin injections via syringe or insulin pump due to complete or near-complete lack of insulin production.

**Lactational Amenorrhea Method (LAM):** Suppression or absence of menstruation associated with breastfeeding.

**Lactobacilli or Lactobacillus bifidus:** The principal beneficial bacteria that live in the gastrointestinal tract of the breastfed infant and discourage the proliferation of *E. coli* and other harmful bacteria.

**Lactose:** The principle carbohydrate (sugar) in human milk.

**Latch-on:** The technique by which an infant attaches to the female human breast to extract breast milk.

**Ligands:** Components of human milk that protect the infant from infection by binding or deactivating bacteria and viruses.

**Lipase:** Enzyme that aids in the digestion (break-down) of fat.

**Low birth weight (LBW):** A term applied to infants weighing less than 2500 grams (5 pounds, 8 ounces) at birth.
**Lysozyme**: An enzyme in human milk that disintegrates bacteria cell walls.

**Macrophage**: Living white blood cells present in human milk that activate other components of the infant's immune system, kill microbes outright, and produce lysozyme that disintegrates bacteria cell walls.

**MCHB**: The Maternal and Child Health Bureau is a part of the Health Resources and Services Administration, Public Health Service, U.S. Department of Health and Human Services. The MCHB was established in 1912. In 1935, the U.S. Congress enacted Title V of the Social Security Act, which authorized the Maternal and Child Health Services programs and provided a foundation and structure for assuring the health of American mothers and children.

**Medicaid**: Medicaid is a jointly-funded, Federal-State health insurance program for certain low-income and needy people. It covers approximately 36 million individuals including children, the aged, blind, and/or disabled, and people who are eligible to receive federally assisted income maintenance payments.

**Medi-Cal**: Medicaid healthcare program in California. This program pays for a variety of medical services for children and adults with limited income and resources. Medi-Cal is supported by federal and state taxes.

**Memorandum of Understanding**: A formal written statement describing an agreement between agencies, providing the details each agency agrees to uphold to achieve a desired result or common goal.

**National Maternal and Infant Health Survey (NMIHS)**: Survey designed to explore numerous factors that cause negative pregnancy outcomes. Conducted in 1988, with longitudinal follow-up in 1991.
**Necrotizing enterocolitis**: Inflammation of the intestinal tract which may cause tissue to die.

**Neonate**: A newborn infant up to six weeks of age.

**Neonatal hyperbilirubinemia**: Excessive amount of bilirubin in the blood of an infant up to six weeks of age. See Bilirubin.

**Neutrophils**: Living white blood cells present in human milk that act as phagocytes and ingest bacteria in the infant's digestive system.

**NICU**: Neonatal Intensive Care Unit. A specially equipped hospital unit that cares for seriously ill or high-risk infants.

**Nursing mother**: A mother who breastfeeds her baby.

**Oligosaccharides**: A compound made up of units of simple sugars.

**Oxytocin**: A hormone released during breastfeeding that causes a woman’s breast milk to eject (“let down”), and also causes uterine contractions.

**Paraprofessional**: An individual who is indigenous to the population or clientele s/he serves, who is employed by Cooperative Extension, to extend the efforts of Extension professionals through direct contact with clientele in implementing Extension education programs.

**Partial Breastfeeding**: Using a combination of at least two sources of nutrition for an infant, with one source being breast milk.

**Pathogens**: Microorganisms or substances capable of producing a disease.

**Phagocyte**: A cell (such as a white blood cell) that engulfs and absorbs foreign bodies in the bloodstream and tissues.
**Primaparous**: Pertaining to a woman who has produced one infant of 500 grams or of 20 weeks gestation, regardless of the outcome of the pregnancy.

**Prolactin**: Hormone produced in the pituitary gland of the brain; stimulates development of the breast and controls the production of breast milk.

**Prolactin receptors**: Sites located in the breast receptive to prolactin (see *Prolactin*); the number of receptors increases during the first few weeks of lactation from stimulation of the breast provided by breastfeeding, with the number of receptors remaining constant thereafter. Frequent stimulation of the breast (via breastfeeding) during the first weeks of breastfeeding, therefore, increases the prolactin receptors which help to ensure an adequate production of breast milk throughout the duration of breastfeeding.

**Renal solute load**: The amount of work required of the kidneys to filter the blood.

**Rooming-in**: The practice of having an infant remain with its mother on a 24-hour basis during hospitalization.

**Sequela**: A condition following and resulting from a disease.

**Supplemental Bottle Feeding**: The replacement of an entire feeding with infant formula.

**T-lymphocytes**: Living white blood cells present in human milk that increase in the presence of organisms capable of causing serious illness and kill invading cells directly or mobilize other defenses.

Nations Children’s Fund as a permanent part of the United Nations system to assist children living in poverty in developing nations (but retained the acronym UNICEF).

**USDA:** United States Department of Agriculture. Founded in 1862 under President Abraham Lincoln. Currently contains components for: Farm and Foreign Agricultural Services; Food, Nutrition and Consumer Service; Food Safety; Marketing and Regulatory Programs; Natural Resources and Environment; Rural Development; Research, Education, and Economics; and Departmental Administration.

**USDHHS/HHS:** United States Department of Health and Human Services (or simply, Health and Human Services) is the principal agency charged with protecting the health of all United States citizens, with responsibilities that include public health, biomedical research, Medicare and Medicaid, welfare, and social services.

**WIC:** The Special Supplemental Nutrition Program for Women, Infants and Children – a Federal (USDA) program that provides food, nutrition counseling, and access to health services for limited-resource women, infants and children.

**WHO:** World Health Organization. Created in 1948 to address world health issues, WHO defined health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”
Chapter 2

CONCEPTUAL FRAMEWORK AND
REVIEW OF RELATED LITERATURE

Conceptual Framework

The purpose of this study is to ascertain, through statistically evaluated data, some of the apparent influences of specific demographic and familial factors, as well as maternal perceived barriers, on the infant feeding decisions of limited-resource women in North Carolina who were participating in a postpartum breastfeeding support program. The demographic factors that were investigated include race/ethnicity, place of residence, level of education, age, and marital status. The familial factors that were investigated include: the infant feeding method by which the respondents themselves were fed, the respondents’ previous infant feeding experiences, presence of the respondents’ romantic partners, the number of people living in the home, and the infant feeding methods of family members and friends. The possible barriers that were investigated include: the perceived attitudes of prenatal healthcare providers, the perceived attitudes of postpartum healthcare providers, maternal beliefs/perceptions relative to infant feeding methods, the perceived attitudes of family members and friends, and whether the mother plans to return to work or school.

Most often the infant feeding decision is reached prior to the birth of an infant. However, some mothers reach their decision only at the time of admission to the hospital, when hospital personnel inquire about the mother’s plan for feeding her
baby. The infant feeding choices available to women are to formula feed, breastfeed exclusively, or offer the infant a combination of formula and breast milk.

Individually, women are affected differently by the combination of demographic and familial factors, as well as the perceived barriers unique to their experiences. This study seeks to determine if relationships exist between specific combinations of these factors and perceived barriers and the infant feeding decision.

Factors that affect the infant feeding decision are the primary concern of this study. A review of the related literature provided the concepts that are central to this study. Those concepts, combined with the factors discussed from the literature, comprise the conceptual schema.

**Variables**

Figure 1.0 represents the conceptual schema of the relationship among variables in this study. The dependent variable in this inquiry is the infant feeding decision. Categories of independent variables include demographic factors (race/ethnicity, place of residence, level of education, age, and marital status) and familial factors (how the respondent was fed, previous infant feeding experiences, infant feeding methods of family/friends, presence of romantic partner, and the number of people living in the home). The intervening variable (perceived barriers) includes: the attitudes of prenatal healthcare providers toward infant feeding methods the attitudes of postpartum healthcare providers toward infant feeding methods the mother’s plans to return to work or school, maternal beliefs/perceptions, and the attitudes of family members and friends.
The demographic and familial factors included in the conceptual schema provide a profile of selected characteristics of respondents. These personal descriptors are concurrent with the demographic and familial factors included in a number of studies related to the infant feeding decision (including: Alexy & Martin; Arora, McJunkin, Wehrer, & Kuhn; Baisch, Fox, Whitten, & Pajewski; Bevan, Mosley, Lobach, & Solimano; Danner; Dix; Duerbeck; Ford & Labbok [1990]; Goodine & Fried; Isabella & Isabella; Libbus [2000]; Scott & Binns).

Perceived barriers are included in the conceptual schema as an intervening independent variable. These barriers are consistent with the barriers identified in a number of studies related to the infant feeding decision (including: Abramson; Alexy & Martin; Arora, McJunkin, Wehrer, & Kuhn; Bagwell, Kendrick, Stitt, & Leeper; Baisch, Fox, Whitten, & Pajewski; Bevan, Mosley, Lobach, & Solimano; Bocar; Brosseau; De La Mora, Russell, Dungy, Losch, & Dusdieker; Dix; Dracup & Sanderson; Duerbeck; Scott & Binns; Sarrett, Bain, & O’Leary).

The three options of infant feeding decisions that are available to women include: breastfeeding exclusively, feeding a combination of breast milk and formula, and formula feeding exclusively. As participants in the In-Home Breastfeeding Support Program, all respondents provided some breast milk to their infants. For the purposes of this study, therefore, the infant feeding decision (the dependent variable) options were limited to two: breastfeeding exclusively, and feeding a combination of breast milk and formula.

The set of relationships which support this research was illustrated in the conceptual schema (Figure 1.0). The independent variables (demographic factors and
familial factors) were perceived to be related to the intervening variables (perceived barriers) and to the dependent variable (the infant feeding decision).
The Infant Feeding Decision: A Survey of Limited Resource Women in North Carolina

Demographic Factors:
• Race/Ethnicity
• Place of residence
• Education level
• Age
• Marital Status

Familial Factors:
• How respondent was fed
• Previous infant feeding experiences
• Infant feeding methods of family/friends
• Presence of partner
• Number of people living in the home

Perceived Barriers:
• Prenatal providers’ attitudes
• Postpartum providers’ attitudes
• Return to work/school
• Maternal beliefs/perceptions
• Attitudes of family/friends

Infant Feeding Decision

Figure 1.0 Conceptual Schema
Review of Related Literature

Benefits of Breastfeeding

Recognizing the advantages of breastfeeding, many health and professional organizations have adopted breastfeeding policies, including the American Academy of Pediatrics, the American College of Obstetricians and Gynecologists, the American Academy of Family Physicians, the American Dietetic Association, the American College of Nurse-Midwives, the National Medical Association, the American Public Health Association, the American Academy of Breastfeeding Medicine, and the International Lactation Consultant Association. Understanding the importance of breastfeeding to our nation, the U.S. Surgeon General asked the Office on Women’s Health to create a subcommittee on breastfeeding. The result of their work is the Health and Human Services Blueprint for Action on Breastfeeding, a comprehensive breastfeeding policy for the United States. Amassing evidence from 175 studies, the conclusion of the Blueprint is succinctly stated: “Extensive research on the biology of human milk and on the health outcomes associated with breastfeeding has established that breastfeeding is more beneficial than formula feeding” (USDHHS, 2000a, p. 10).

Breastfeeding has numerous advantages for mothers and infants. These advantages include the prevention of illnesses, as well as optimizing health. While infants receive immediate benefits from breastfeeding, they also enjoy life-long positive effects (Cunningham, Jelliffe & Jelliffe, 1992, p. 1). The advantages of breastfeeding are addressed through the following discussions of the economic, infant and maternal benefits.
Economic Benefits

“In addition to the individual health benefits, breastfeeding may provide significant economic benefits, both to the individual, families and to the Nation” (Weimer, 1999, p. 32). The economic benefits include individual/family savings, societal savings, and employer savings (Heinig, 1998, p. 87).

Individual/family economic savings

“Apart from being the safest and healthiest infant feeding method, breastfeeding is also the least expensive. For many poor households, the prohibitive cost of breast milk substitutes puts this option completely out of reach. For others, the impact of formula purchases on the household budget can be crippling” (León-Cava, Lutter, Ross & Martin, 2002, p. 4). The Special Supplemental nutrition Program for Women, Infants and Children (WIC) provides free formula to many low-income families. However, this formula is meant to be a supplement and rarely provides enough formula to meet an infant’s total nutritional needs. In addition to the cost of infant formula, families also incur the expense of purchasing bottles, nipples and bottle brushes (Schwartz, Popkin, Tognetti, & Zoohori, 1995, p. 729).

A major benefit of breastfeeding to families is found in the decreased cost of providing infant formula for the infant (Weimer, 2001, p. 24). In 1993, the cost to U.S. families was an average of $855 to purchase formula for an infant for the first six months. Maternal caloric intake for breastfeeding and formula feeding mothers is similar during the first six weeks of lactation. After the first six weeks, however, the food and fluid requirements of the breastfeeding mother do increase, though not substantially (Institute of Medicine [IOM], 1991, p. 6), so that additional food
requirement expenses for breastfeeding mothers are minimal. In their most recent
guidelines, the National Research Council (NRC) recommended an average of 2,700 kcal/day for lactating women (Heck & de Castro, 1992, p. 642). However, this caloric increase represents approximately half the expense of purchasing formula for the infant, or a savings of more than $400 per child during the first year (AAP, 1997, p. 2). The most obvious economic advantage is the cost savings afforded to families who do not have to purchase formula (Hoey & Ware, 1997, p. 861). Even after allowing for the cost of additional food for the breastfeeding mother and the cost of a breast pump, several hundred dollars per year can be saved by families who choose to breastfeed instead of formula-feed (USDHHS, 20001, p. 11).

“Perhaps the strongest evidence to date is available from a WIC and Medicaid program where statistically significant savings were realized in lower cost of the food package for lactating women compared with the cost of formula (even after adjusting for the substantial manufacturers’ rebates) and from lower Medicaid pharmacy cost during the first 6 months in breastfed compared with formula-fed infants” (ADA, 1997, p. 4). Specifically, the Montgomery and Splett (1997) study compared exclusively breastfed and exclusively formula-fed infants enrolled in both WIC and Medicaid. Both cohorts were tracked for six months to compare WIC and Medicaid expenditures. Each infant that was breastfed exclusively for six months saved WIC $473, or $161 after the formula manufacturer’s rebate. Medicaid cost savings also were realized--$112 per infant among the breastfed group. Additionally, Medicaid pharmacy reimbursement costs for the breastfeeding cohort were “half that of formula-fed infants” (Montgomery & Splett, p. 379).
Reduced medical bills and diminished overall healthcare costs are notable benefits of breastfeeding for families (Dermer, 1996, p. 19; Heinig, 1998, p. 87). Hoey and Ware (1997) conducted a pilot study in North Carolina investigating the financial savings for individual families that result from breastfeeding. The study considered mothers from a wide range of socioeconomic groups who were enrolled in a health maintenance organization (HMO). The researchers compared the medical costs for the first 12 months of life between formula-fed infants and infants who were breastfed for at least the first six months. Results of the study indicated that infants who were breastfed for at least the first six months had fewer hospitalizations and, on average, their medical costs averaged $200 less than the medical costs of the formula-fed infants (Hoey & Ware, p. 863). Their findings were not statistically significant, perhaps attributable to the small sample size (41 breastfed infants and 107 formula-fed infants) of this pilot study. Nevertheless, the cost savings, when extrapolated, are substantial. For example, Hoey and Ware estimated that if the Health People 2000 six-months breastfeeding goal of 50% were achieved among the entire HMO infant cohort in North Carolina, healthcare savings of up to $140,000 would have been realized.

**Societal economic benefits**

“when the cost of medical care is borne by the health system or insurers, the economic impact is felt at that level. When infant illness requires mothers to miss work, employers and the economy are also affected” (León-Cava et al., 2002, p. 4). While it is generally believed that the greatest economic effect of not breastfeeding is
felt by poor households and poor countries, the effect upon developed countries is serious, as well (León-Cava et al., 2002, p. 4).

Low breastfeeding rates are expensive for U.S. taxpayers because the federal government provides funding for WIC. In 1991, the cost of formula through WIC for the year was estimated at $404 million. The cost of supporting a breastfeeding mother through WIC is 55% that of a formula feeding mother (Ball & Wright, 1999, p. 875).

Tuttle and Dewey (1996) conducted a cost-benefit analysis of breastfeeding with a group of Hmong women in California. Decreases in infant morbidity, maternal fertility and formula costs when women breastfed for at least six months were the basis for savings estimated for Medi-Cal (Medicaid-California), AFDC (Aid to Families with Dependent Children), Food Stamps and WIC. Assuming the family participated in all four programs, the savings to taxpayers per infant would range from $459-$659 annually (Tuttle & Dewey, 1996, p. 888).

Multiple potential economic advantages exist for breastfeeding families and the healthcare system serving them (Heinig, 1998, p. 88; Hoey & Ware, 1997, p. 861; Slusser & Powers, 1997, p. 112). Breastfed children have fewer illnesses, doctor visits and hospital admissions compared to formula-fed infants (American College of Obstetricians and Gynecologists [ACOG], 2001, p. 218). From the perspective of a healthcare system, fewer visits to physicians’ offices due to a decrease in the number of infections would result in lower expenses for prescription drugs and costs for hospitalizations (Hoey & Ware, p. 861), which would result in an approximate 20% reduction in healthcare costs for fully breastfed infants as compared with formula-fed infants (USDHHS, 2000a, p. 11).
A study by the USDA Economic Research Service (ERS) found that a minimum of $3.6 billion per year in the United States could be saved if the incidence of exclusive breastfeeding were to increase from current levels to those recommended by the U.S. Surgeon General. “This $3.6 billion is based on reduced incidences of only three childhood illnesses and reflects savings in terms of medical expenditure, wages lost by parents attending to an ill child, and the prevention of premature deaths” (Weimer, 2001, p. 23). When compared with formula feeding, he ERS found breastfeeding to result in a net benefit of $478 during the first six months of the infant’s life--$102 in Medicaid savings and $376 in WIC savings. The WIC savings decreased to $59 after considering the rebate given to USDA by the formula manufacturer” (Weimer, 2001, p. 25). The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) “spent $587.8 million after a $1.3 billion rebate on formula in 1998” (Walker, 2001, p. 39). If the breastfeeding rates of WIC participants reached the rates recommended by Health People 2010, national WIC cost-savings would be approximately $9 million or more per month” (Walker, p. 39). Moreover, societal economic benefits are realized when the costs of healthcare services (financed by taxpayers) are reduced.

In addition to having fewer illnesses, breastfed infants save money for the healthcare system; thus, promoting and supporting exclusive breastfeeding can assist healthcare plans in realizing significant savings. Ball and Wright (1999) compared the frequency of healthcare utilization by parents for their infants during the first year of life to the duration of exclusive breastfeeding. Specifically, they analyzed data from two large studies in which all infants were healthy at birth and “represented
nonselected, population-based samples” (Ball & Wright, p. 870). They concluded that “for each 1,000 infants never breastfed, there is an excess of 2.033 office visits, greater than 200 days of hospitalization, and greater than 600 prescriptions, compared with infants breastfed exclusively for at least 3 months” (Ball & Wright, p. 874). On average, between $331 and $475 more per infant is spent on healthcare services related to three common infant illnesses (otitis media, lower respiratory tract infections, and gastrointestinal infections) for formula-fed infants than for breastfed infants (Ball & Wright, p. 874).

Breastfed infants have been found to have higher IQ scores than their formula-fed counterparts. While a small increase in IQ score may not be significant individually, the implications for a society are profound. For example, a reduction in the incidence of developmental disability would lead to significant reductions in educational costs. The average cost for special education for a single child in the United States is $5,808 per year (National Center for Education Statistics, 1999, p. 5). Currently, special education costs associated with only 20% of term infants being mostly breastfed at five months are $4.5 billion. If breastfeeding could be increased to 50 percent of infants being mostly breastfed at five months, national special education costs would decrease to approximately $3.9 billion (Drane & Logemann, 2000, p. 355).

One of the societal benefits of breastfeeding is the protection of the environment through decreased use of non-renewables associated with formula manufacture, transport, home preparation and packaging. Nationally, the disposal of bottles, bottle liners and infant formula cans is an ecological concern (ACOG, 2001,
Over 70,000 tons of metal are discarded for every 450 million cans of formula sold (Palmer, 1993, p. 285). Bottle nipples, made from either rubber or silicone, use valuable resources and, when discarded, add to the landfill burden. In the United States, approximately 1,230 tons of paper are used for infant formula labels, in addition to the huge quantities of glossy paper used for advertising (International Women Count Network [IWCN], 2000, p. 50).

León-Cava et al. (2002) summarized 188 research articles in Quantifying the Benefits of Breastfeeding: A Summary of the Evidence. This annotated bibliography “attests to the enormous benefits of breastfeeding in terms of infant health, intellectual and motor development, later chronic disease risk, and maternal health. As the research base expands, and as the understanding of this subject grows, the superiority of breastfeeding over alternative feeding methods for all of these outcomes becomes ever clearer. These benefits come not at a price, but with additional economic benefits for the household, the health system, employers and society” (León-Cava et al., 2002, p. 3).

In summary, when families choose to breastfeed their infants, healthcare dollars are saved through the decreased incidence of acute illness and chronic disease. In addition, tax dollars are saved as Medicaid and WIC expenses are lowered.

Employer savings

Employers also are positively affected by breastfeeding. The absentee rate for mothers of breastfed infants is lower than their formula feeding counterparts because their infants are ill less often (Cohen, Mrtek & Mrtek, 1995, p. 148). Cohen et al. (1995) conducted a quasi-experimental study of 101 mothers (59 breastfeeding and
formula feeding), in which participant diaries provided data relative to infant illnesses as well as related absenteeism from work. “Of 40 illnesses causing 1 day’s absence, 25% occurred in breast-fed babies and 75% in formula-fed babies. This rate difference is significant (p < .05) on the basis of an expectation of equal percentage occurrence in the two groups” (Cohen et al., p. 152).

“There are few parallels for such underuse of a recognized cost-effective and socially beneficial health practice” as breastfeeding (ADA, 1997, p. 4). When infants are healthy, the results are that mothers are away from work fewer days caring for sick infants, fewer claims are filed with health insurance companies, and employee morale is higher (ACOG, p. 219; O’Keefe & Henly, 1998, p. 5; Weimer, 1999, p. 34).

Additionally, employer medical costs are lower and employee productivity is higher in companies where breastfeeding is supported. A large insurance company, AETNA, implemented an employee lactation support program. After tracking healthcare costs, AETNA “estimated that it saved $1,435 in medical claims per breastfed infants and three days of employee sick leave per breastfed infant in the first year” of the program (Walker, 2001, p. 39).

“The improvement in productivity may be significant for society as well, because women now constitute a large portion of the workforce” (ACOG, 2001, p. 218). “In 1900, 20% of the labor force was female; in 1950, 29%; and in 1992, almost 50%. Women with children under 6 years old are the fastest-growing segment of the female work force reaching 59% in 1992” (Lawrence, 1994, p. 387). Employers who support breastfeeding “demonstrate sensitivity to family and work issues, an important public relations concern” (O’Keefe & Henly, 1998, p. 5).
“Supporting women in continuing to breastfeed after they return to work is not only a viable strategy for increasing the duration of breastfeeding, but also can be vital for the mother’s productivity at work and the health and well-being of her infant” (Slusser & Powers, 1997, p. 118).

“Employers also benefit when their employees breastfeed. Breastfed infants are sick less often; therefore, maternal absenteeism from work is significantly lower in companies with established lactation programs. In addition, employer medical costs are lower and employee productivity is higher” (USDHHS, 2000, p. 11).

**Benefits to the Infant**

Extensive research has documented the multiple advantages of breastfeeding to human infants. These advantages include: nutritional, health, developmental and psychological benefits.

**Nutritional Benefits**

“Breast milk is the most complete form of nutrition for infants” (USDHHS, 2000a, p. 8). Human milk is species-specific and many of the nutrients are delivered as “bound components…(that) facilitate absorption and utilization” (Picciano, 2001, p. 53). “Human milk provides optimal nutrition for infants with its dynamic composition and the appropriate balance of nutrients provided in easily digestible and bioavailable forms” (ADA, 1997, p. 3).

**Proteins**

The protein content of human milk, sufficient for nurturing infants, is appropriately low (in contrast with infant formulas) and, therefore, “presents a relatively modest nitrogen load to the immature kidney. The form of protein in human
milk, mainly whey, forms a soft, easily digestible curd” (ADA, 1997, p. 3), compared to the tough, relatively indigestible curd formed from casein found in infant formula. The ratio of whey-to-casein proteins in mature human milk is 3:2. In contrast, the whey-to-casein ratio in cow milk, the primary ingredient used to make most infant formula, is 5:2 (Hertz, 2001, p. 2).

“Besides providing essential amino acids for growth, the protein constituents of human milk also provide protective factors (e.g., immunoglobulins, lysozyme and lactoferrin), carriers for vitamins (e.g., folate, vitamin D and vitamin B₁₂ binding proteins), and for hormones (e.g., thyroxine and corticosteroid-binding proteins), enzymatic activity (e.g., amylase and bile-salt-stimulated lipase) and other biological activities (e.g., insulin, epidermal growth factor and prolactin)” (Picciano, 2001, p. 59). None of these species-specific protective factors can be found in cow milk-based formulas or soybean-based formulas (Picciano, 2001, p. 59).

Lipids

The major energy-yielding fraction of human milk is composed of lipids, 98% of which are triglycerides that also serve to facilitate calcium absorption. “The assimilation of fatty acids by young infants is crucial not only for energy to support growth, but also for the synthesis and development of retinal and neural tissues. Human milk is a rich source of the essential fatty acids (FAs)...and their long-chain derivatives (Picciano, 2001, p. 59). “Long-chain polyunsaturated fatty acids (LC-PUFAs), especially docosahexaenoic acid (DHA), promote optimal development of the central nervous system” (ADA, 1997, p. 3).
Breast milk has higher cholesterol content than infant formulas and the serum cholesterol concentration of breastfed infants is higher than that among formula fed infants. However, “…unlike triglycerides, the cholesterol content of breast milk is independent of maternal diet. Medical researchers have theorized that the cholesterol content of breast milk may play an important role in neural development. There is no evidence that the increased cholesterol levels of breast milk contribute to future atheromatous vascular changes” (Duerbeck, 1998, pp. 310-311).

**Carbohydrates**

Lactose helps provide for energy/growth needs, facilitates the absorption of calcium, and is second only to water as a primary constituent of human milk (Duerbeck, 1998, p. 310). In addition to lactose and glucose, human milk contains galactose, nucleotide sugars, glycolipics, glycoproteins and oligosaccharides. Oligosaccharides inhibit the binding of pathogens to their receptors and promote the growth of several species of beneficial bacteria in the intestine (Picciano, 2001, p. 60).

**Minerals**

“Minerals in breast milk are largely protein-bound and balanced to enhance bio-availability. This mineral composition allows provision of iron, zinc and calcium to meet infant needs with minimal demand on maternal supply” (ADA, 1997, p. 3). The sodium content of breast milk is low compared to the sodium content of formula. As a result, the fluid requirements of the infant who is breastfed can be met while keeping the renal solute load low and putting less stress on the infant’s kidneys (ADA, p. 3).
Enzymes

Breast milk is easily digested and assimilated. A newborn has an immature pancreas that results in “low pancreatic lipase levels and the absence of amylase for as many as two months after a full-term delivery. Milk bile salt-dependent lipase and amylase are secreted into human milk and are active in infants, providing to breastfed, premature and full-term infants better digestive potential than that of formula-fed infants” (Hamosh, 2001, p. 79).

Health Benefits

Breast milk provides myriad short- and long-term health benefits for infants (Schoensiegel, 1996, p. 2), including the reduction in risk of infectious and non-infectious diseases. The discussion that follows, while not exhaustive, addresses the principal documented health benefits of breastfeeding for infants.

Protective factors

In human milk there are numerous factors that are active against infection. An infant’s immune system is not fully mature until about two years of age, so transferring these factors by breastfeeding provides advantages that are not possible by formula feeding (Goldman, 1993, p. 668). Many of the major nutrients in human milk serve multiple functions. For example, certain carbohydrates and lipids act as microbial and viral binding ligands to protect the infant from specific microorganisms, and free fatty acids (produced from triglyceride during fat digestion in the stomach and intestine) have anti-infective properties against viruses, bacteria and parasites (Hamosh, 2001, p. 75).
“The major milk proteins, lactoferrin and secretory IgA, which are important host defense factors, remain at least partly un-degraded after ingestion” (Hahn-Zoric, Fulconis, Miloni, Moro, et al., 1990, p. 1137). Lactoferrin binds iron (needed by many bacteria in order to survive), and B$_{12}$-binding protein reduces the amount of the vitamin B$_{12}$ (also needed by many bacteria to survive), thereby thwarting the growth of many pathogenic bacteria (Newman, 1995, p. 78). Secretory IgA is the most abundant antibody molecule in human milk and bins up microorganisms. Unlike most other antibodies, however, secretory IgA is able to ward off disease without causing inflammation. (Inflammation is a process whereby various chemicals destroy microbes, while simultaneously harming an infant’s extremely delicate, healthy tissue) (Newman, pp. 76-77).

Human milk contains living white blood cells:

- $\beta$-lymphocytes that create antibodies targeted against specific microbes in the infant’s environment;
- macrophages that activate other components of the infant’s immune system, kill microbes outright and produce lysozyme that disintegrates bacteria cell walls
- neutrophils that act as phagocytes and ingest bacteria in the infant’s digestive system
- $T$-lymphocytes that increase in the presence of organisms capable of causing serious illness. They kill invading cells directly or mobilize other defenses; additionally, they manufacture compounds that strengthen the infant’s own immune responses (Newman, 1995, p. 78).
Unique to human milk is “the great array of bioactive factors, which provide infants with protection from infection by various microorganisms, hormones and growth factors that affect development, agents that modulate immune function, and anti-inflammatory components” (Hamosh, 2001, p. 69). Nucleotides “enhance intestinal repair after injury, and potentiate the immune response to some vaccines. Some nucleotides also may promote the growth of Lactobacillus bifidus, which suppresses the growth of enteropathogens in newborns’ intestines” (Hamosh, p. 78). Several enzymes also play important roles in protecting breastfed infants from disease through antibacterial and antiprotozoan, as well as anti-inflammatory, activities (Hamosh, p. 72). Unique among them is macrophage-produced lysozyme. Unlike the other protective proteins whose levels decrease during lactation, lysozyme concentration increases with prolonged breastfeeding (Hamosh, p. 74). Protection from disease increases over time as the infant’s exposure to pathogens increases.

**Hormones and growth factors**

The composition of human milk changes to meet the specific needs of the infant at each stage of growth. For example, colostrums, the nutritive fluid produced by the breast during pregnancy and available immediately following birth, provides significant immune protection (ACOG, 2001, pp. 217-218). “In addition to the right balance of nutrients and immunologic factors, human milk contains factors that act as biologic signals for promoting cellular growth and differentiation” (ACOG, p. 218). “Because many of these hormones and growth factors affect growth, differentiation, and functional maturation of specific organs, they may, on ingestion by the infant, affect various aspects of development” (Hamosh, 2001, p. 80). “Hormones and
hormone-like substances, including insulin and epidermal growth factor, enhance maturation of the infant gastrointestinal tract” (ADA, 1997, p. 3).

**Immunologic benefits**

Breast milk protects infants from infection (Duerbeck, 1998, p. 311; Gorrín-Peralta & Parrilla-Rodríguez, 2000, p. 375). “The skin to skin contact that occurs during breastfeeding exposes the mother to the same bacteria and viruses that are in the baby’s environment, thus allowing the mother to form specific immunoglobulins to pathogens to which her newborn is exposed” (Duerbeck, p. 311). Cushing, Samet, Lambert et al. (1998) followed a cohort of 1,202 healthy infants for the first six months of life, contacting mothers every two weeks to track breastfeeding status and respiratory illnesses. “After adjustment for potential confounding factors, full breastfeeding was associated with a reduction in lower respiratory illness risk (odds ration = 0.81, 95% confidence interval 0.68-0.96)” (Cushing et al., p. 863).

**Enhanced immune system development**

“Two things compensate for the immature immune system of the newborn: placental transfer of maternal antibodies and the transmission of antibodies and infection-fighting cells through breastfeeding. While the effects of placental transfer wane by 6 months of age, the delivery of immune support from breast milk is available to the child the entire time he is breastfed and the benefits appear to last even beyond the age of weaning” (Hertz, 2001, p. 1). Compared to formula feeding, there is “evidence that breastfeeding results in earlier development of the infant immune system” (USDHHS, 2000a, p. 10). Certain immune cells (phagocytes) in human milk produce “chemicals that invigorate the infant’s own immune response”
Clinical observations suggest that the ability of human milk to modulate the development of the infant’s own mucosal and systemic immune systems may be associated with immunoregulatory agents present in colostrums and in more mature milk” (Garofalo & Goldman, 1999, p. 362). Numerous cytokines and other immune modulating agents that affect the development of newborns’ immune systems continue to be identified (Hamosh, 2001, p. 76).

**Enhanced response to immunizations and exposure to illness**

Compared with formula-fed infants, breastfed infants produce enhanced immune responses to polio, tetanus, diphtheria, and influenza immunizations (USDHHS, 2000a, p. 10). Similarly, breastfed infants produce enhanced immune response to respiratory syncytial virus infection (RSV), a common, but serious, infant respiratory infection (Hahn-Zoric et al., 1990, p. 1137).

**Decreased illness**

“For the vast majority of infants and young children throughout the world, breastfeeding saves lives, prevents morbidity, promotes optimal physical and cognitive development, and reduces the risk of some chronic diseases. Evidence of the benefits of breastfeeding for mothers is growing as well” (León-Cava et al., 2002, Forward). Infants receiving human milk have stronger immune systems and, therefore, experience fewer cases of infectious diseases (Hoey & Ware, 1997, p. 861; Janke, 1993, p. 22). When they do experience infectious diseases, those diseases are less severe and the duration is shorter (Bocar, 1997, p. 24; Dewey, Heinig, & Nommsen-Rivers, 1995, p. 696). Infants who are breastfed experience “fivefold fewer
gastrointestinal illnesses, threefold fewer respiratory illnesses, and at least half the episodes of otitis media” than formula fed infants (ADA, 1997, p. 4).

In the early 1990s, research was published that substantiated the protection that breastfeeding affords against infections in the United States and other industrialized countries. Cunningham et al. (1991) reviewed numerous studies conducted in the 1980s addressing the relationship between infant feeding methods and the incidence of infections in both Europe and North America. These studies demonstrated that even in industrialized countries, breastfeeding is associated with a reduced incidence of lower respiratory tract infection, otitis media, bacteremia and meningitis (Cunningham et al., 1991, p. 660; Dewey et al, 1995, p. 696; Janke, 1993, p. 22).

Raisler, Alexander and O’Campo (1999) analyzed data from 7,092 infants from the 1988 National Maternal and Infant Health Survey “to determine whether breastfeeding has a dose-related protective effect against illness and whether it confers special health benefits to poor infants” (Raisler et al., p. 25). The study looked at seven common illnesses: diarrhea, cough or wheeze, ear infection, runny nose or cold, fever, vomiting, and pneumonia. Potential confounders were controlled, including maternal education, race, Hispanic ethnicity, education, poverty status, infant’s birth weight, siblings, day care, maternal and household smoking, household crowding, and maternal recall interval. The researchers concluded that “full breastfeeding has a significant protective effect against common childhood illnesses but minimal breastfeeding does not. These findings were consistent among all
economic groups, even in the United States’ environment of clean water, good sanitation, and readily available hygienic infant formula” (Raisler et al., p. 29).

Dewey et al. (1995) collected morbidity data on matched cohorts of infants from affluent families who were either breastfed (n = 46) or formula-fed (n = 41) until at least 12 months of life. Data were collected through weekly monitoring until the infants were two years old. “In the first year of life the incidence of diarrheal illness among breastfed infants was half that of formula-fed infants; the percentage with any otitis media was 19% lower and with prolonged episodes (> 10 days) was 80% lower in breastfed compared with formula fed infants” (Dewey et al., 1995, p. 696).

**Anemia**

Anemia is less likely among children receiving breast milk compared to those receiving infant formula. Formula-fed infants experience anemia at higher rates often due to a loss of “thermolabile ascorbic acid and folate, and in some instances because of iron loss from intestinal micro-hemorrhages due to sensitivity to cow’s milk protein” (Ziegler, Fomon, Nelson et al., 1990, p. 11).

**Respiratory infections**

The *HHS Blueprint for Action on Breastfeeding* (USDHHS, 2000a) summarizes the evidence from six research studies and concludes that respiratory tract infections are lower in incidence and/or severity among breastfed infants than in formula-fed infants (Beaudry, Dufour & Marcoux, 1995, p. 191); Cushing et al, 1998, p. 863; Howie, Forsyth, Ogston et al., 1990, p. 11; Raisler et al., 1999, p. 25; Scariati et al., 1997, p. 5; USDHHS, 2000a, p. 10; Wright et al., 1989, p. 947). Two studies
support a similar conclusion that pneumonia is lower in incidence or severity in breastfed infants than in formula-fed infants (Gessner et al., 1995, p. 123; Levine et al., 1999, p. 28; USDHHS, 2000a, p. 10).

**Inner ear infection (otitis media)**

Cases of otitis media are reported less frequently among breastfed infants and, when reported, are less severe than among infants receiving formula (AAP, 1997, p. 2; Beaudry et al., 1995, p. 197). In their 1995 study, Beaudry et al. investigated the effect of infant feeding method on otitis media, respiratory and gastrointestinal illness during the first six months of life among 776 infants. With regard to otitis media, results of a self-administered, standardized questionnaire revealed a significant protective effect of breastfeeding (Incidence Density Ratio [IDR] = 0.44; 95% confidence interval [95% CI], 0.22 to 0.87). After adjusting for potential confounders (infant and maternal age, birth weight, month of birth, daycare status, maternal cigarette consumption and socioeconomic status), the “Mantel-Haenszel adjusted IDR[s] (and 95% CI[s]) varied from 0.42 (0.20 to 0.87) to 0.57 (0.28 to 1.18) for ear infection” (Beaudry et al., p. 194).

To evaluate the relationship between breastfeeding and frequency of otitis media during the first year of life, Duncan, Ey, Holberg, Wright et al., (1993) studied 1,013 infants enrolled in a health maintenance organization in Arizona. “The cumulative incidence of acute otitis media by 12 months of age in those who were exclusively breastfed for 4 months was 56.0% compared with 68.3% for those infants who were not exclusively breastfed up to 4 months of age (p < .0001)” (Duncan et al., p. 869). Both breastfeeding exclusivity and increased breastfeeding duration were
associated with a decrease in the frequency of recurrent otitis media. The reduction in risk of otitis media is sustained through the duration of breastfeeding and for several months after the infant is weaned (Gessner et al., 1995, p. 125; Levine et al., 1999, p. 28).

**Influenza and meningitis**

“*Haemophilus influenzae* type be is the leading cause of bacterial meningitis in the United States and accounts for an estimated 12,000 cases per year, primarily in children <5 years of age” (Cochi, Fleming, Hightower, Limpakarnjanarat, Facklam, Smith, et al., 1985, p. 887). Heinig (2001) cites six studies when she writes: “*H. influenzae* has been shown to cause sepsis and meningitis among infants… Several studies have shown reduced risk for these illnesses among breastfed infants (particularly among those breastfed for longer than 6 months) compared with formula-fed infants” (Heinig, 2001, p. 117). In addition, breastfed infants experience meningitis with less frequency and severity than formula-fed infants (AAP, 1997, p. 2).

**Diarrhea**

Diarrhea is one of several gastrointestinal infections with reduced incidence, severity and duration among breastfed infants (AAP, 1997, p. 2; Bocar, 1997, p. 24). “Most studies…conducted in industrialized countries have shown a protective effect of breastfeeding on diarrheal disease, even among populations in which exposure to enteric pathogens is relatively low” (Heinig, 2001, p. 107).

Scariati et al. (1997) analyzed data from the Food and Drug Administration’s *Infant Feeding Practices Study*. Using data from 1,743 mother-infant pairs, they
established a dose-response association between the development of diarrheal and ear infection: as the amount of breast milk an infant received decreased, the risks for diarrhea and ear infection increased. Compared with exclusively breastfed infants, those who were fed only formula had an 80% increased risk of diarrhea and a 70% increased risk of ear infection (p = 0.001) (Scariati, p. 7).

**Urinary tract infections**

The incidence and severity of urinary track infections is dramatically reduced among breastfed infants (AAP, 1997, p. 2; Bocar, 197, p. 24; Piscane, Graziano, Mazzarella et al., 1992, p. 87). Breastfeeding increases the urinary level of lactoferrin, an antimicrobial constituent of milk. Microorganisms that multiply and result in urinary tract infections require iron in order to grow, but investigators have identified that a function of lactoferrin is to bind free iron in the gut to decrease the availability of iron to microorganisms (Lawrence, 1994, p. 166).

**Cancer**

“Six case-control studies have found an association between artificial feeding and increased risk for childhood cancer” (Davis, 2001, p. 133). While the long-term effects of breast milk consumption on the incidence of childhood cancers has not been exhaustively studied, trial investigations have suggested that breastfeeding confers a “protective effect against Hodgkin’s disease” (Shu et al., 1999, p. 1). Infection has been proposed as a risk factor for leukemia and Hodgkin’s disease, but “because of extensive antimicrobial and anti-inflammatory activity present in human milk, breastfed infants have a less severe experience with infection” (Davis, p. 134).
Formula-fed infants, lacking this immunomodulatory protection provided by breast milk, “may be less able to handle carcinogenic insults after infancy” (Davis, p. 134).

Lymphoma is known to be more common in children with immunodeficiencies, and several researchers have found that breastfeeding provides infants with protection against certain lymphomas (AAP, 1997, p. 2; Gorrín-Peralta & Parrilla-Rodríguez, 2000, p. 375; Shu et al., 1999, p. 1). Additionally, breastfeeding is associated with a reduced risk of acute leukemia—the most common type of childhood cancer, representing over one third of all cancers diagnosed among children under the age of 15 (Shu et al., p. 1). Human milk affects the development of the infant’s immune system in ways that cow’s milk and soybean-based formulas cannot. These differences apparently play a role in how an infant’s body is capable of responding to cancers.

**Sudden Infant Death Syndrome (SIDS)**

Sudden Infant Death Syndrome is a rare and complex diagnosis, and since its underlying etiology is unknown, the establishment of risk factors is difficult. Among a number of medical conditions and diseases with which SIDS is known to be associated (such as acute upper respiratory and diarrheal infection), however, breastfeeding provides protective effects (McVea, Turner & Peppler, 2000, p. 19). Furthermore, fewer cases of SIDS are reported among breastfed infants (AAP, 1997, p. 2).

Ford et al. (1993) investigated risk factors associated with SIDS. Upon examining the relationship between breastfeeding and SIDS, they found that infants who were exclusively breastfed at the time of hospital discharge “had a significantly
lower risk of SIDS” than did formula-fed infants (Ford et al., p. 885). McVea et al. (2000) conducted a qualitative literature review and a meta-analysis of 23 studies. Their combined analysis “indicated that bottle-fed infants were twice as likely to die from SIDS” (McVea, p. 13).

**Necrotizing enterocolitis**

“Necrotizing enterocolitis (NEC) is the most common serious gastrointestinal disease seen in neonatal intensive care units, with a reported mortality in well-established cases of 20-40%” (Lucas & Cole, 1990, p. 1519). Research provides strong evidence that feeding human milk to infants (instead of infant formula) decreases the incidence and severity of necrotizing enterocolitis, a severe threat to the lives of preterm infants (AAP, 1997, p. 2). Lucas & Cole (1990) conducted a multi-center study of 926 preterm infants with differing early diets and found that NEC developed in 51 (5.5%) of the infants, with a mortality rate of 26%. Furthermore, NEC was 6-10 times more common among exclusively formula-fed infants, and three times more common in those who received both formula and breast milk (Lucas & Cole, p. 1519).

**Chronic diseases**

Infant formula has been etiologically linked to chronic diseases including “obesity, allergy, heart disease and Type 1 diabetes” (O’Keefe & Henly, 1998, p. 2). In addition, there is research-based evidence that human milk provides protection against diabetes, lymphoma, rheumatoid arthritis, inguinal hernia, eczema, wheezing, Crohn’s disease and multiple sclerosis (ACOG, 2001, p. 218; Bocar, 1997, p. 24).
Obesity

Obesity is the most common nutritional disorder in children and is an important risk factor for cardiovascular disease in adults. A reduced risk of obesity later in life is also associated with having been breastfed (Gillman, Rifas-Shiman, Carmargo, Berkey, Frazier, Rockett et al., 2001, p. 2466; USDHHS, 2000a, p. 11). The association between prolonged breastfeeding and reduced childhood obesity represents a compelling justification for promoting breastfeeding in industrialized countries (von Kries et al., 1999, pp. 147-150). Gillman et al. (2001) surveyed 8,186 girls and 7,155 boys, ages 9-14, in a nationwide cohort study. The investigators reported that 9,553 subjects (62%) were “only or mostly fed breastmilk” in the first six months of life (Gillman et al., p. 2461). For the same time period, 4,744 (31%) were “only or mostly fed infant formula” (Gillman et al., p. 2461). Using multivariate models, the investigators found that “adolescents who were mostly or only fed breastmilk vs. mostly or only fed infant formula in the first 6 months of life were at an approximately 22% lower risk of being overweight (OR in fully adjusted model, 0.78; 95% CI, 0.66 – 0.91)” (Gillman et al., p. 2463).

Allergic diseases

Breast milk affords infants a reduced risk of developing atopic diseases such as allergies, asthma and eczema (Saarinen, 1995, p. 1). “Prolonged breastfeeding is prophylactic against atopic disease up to 3 years of age” (Saarinen, p. 2). The positive relationship between breastfeeding and reduced incidence of atopic disease “is thought to be the result of binding of IgA-specific antibodies to foreign proteins” (Duerbeck, 1998, p. 312). High levels of secretory IgA in human milk protect the
immature gastrointestinal tract from foreign proteins (AAP, 1997, p. 2; ADA, 1997, p. 6).

Research suggests that this protection may extend for many years of a child’s life, that is, long after the child is no longer receiving breast milk (ADA, 1997, p. 4). Thus, in families with a strong history of allergic disease, children may derive advantage from extended breastfeeding. To receive the greatest protection against allergic disease, infants should receive breast milk for a minimum of six months, and the introduction of solid foods should be delayed until infants are past six months of age (Duerbeck, 1998, p. 311; Gorrín-Peralta & Parrilla-Rodríguez, 2000, p. 375).

Individuals who were breastfed report a lower incidence of skin allergies than individuals who were fed infant formula. This lower incidence of skin-positive allergies such as eczema holds true even when breastfeeding duration is as low as two to three months (Duerbeck, 1998, p. 312).

**Asthma and wheezing**

Breastfed infants experience a lower incidence of asthma than do formula-fed infants (Raisler et al., 1999, p. 27). Additionally, recurrent wheeze at age six years is less common among children who were breastfed as infants (Wright et al., 1995, p. 758).

**Inflammatory Bowel Disease (IBD)**

While some research studies have shown that breastfeeding offers infants protection from Crohn’s disease (AAP, 1997, p. 2; Cunningham et al., 1991, p. 662), others have shown no relationship (Davis, 2001, p. 135). Only three out of eight studies support the idea that permeation of the intestinal wall by the foreign proteins in infant formula increases the risk of ulcerative colitis, which could be avoided by feeding human milk (AAP, p. 2; Davis, 2001, p. 135). “Hypotheses to explain the
associations with infant feeding have included two related factors: 1.) breastfeeding protects infants from gastrointestinal infections in infancy and 2.) breastfeeding stimulates the early development and maturation of the infant gastrointestinal mucosa. More research is required to conclude that breastfeeding is an important determinant for the development of IBD” (Davis, 2001, p. 135).

**Diabetes**

Multiple epidemiologic studies have suggested that breastfeeding offers a protective effect against the onset of insulin-dependent diabetes mellitus (IDDM) during childhood. “Results demonstrate a clear relationship between lack of breastfeeding and IDDM in the first 7 years of life, or conversely a protective effect of breastfeeding, strongest when there has been at least 4 months of exclusive breastfeeding” (Lawrence, 1994, pp. 504-505).

Researchers also have been investigating the potential relationship of the early exposure to cow’s milk and the occurrence of diabetes. The hypothesized relationship between cow’s milk and diabetes is that early ingestion of cow’s milk may expose an infant’s immune system to a foreign protein that has cross-reactivity with an antigen present on pancreatic beta cells, causing destruction of these insulin-producing cells (Lawrence, 1994, p. 505). “Whatever the relationship between cow’s milk and early-onset IDDM, breastfeeding probably does not protect infants against the disease but may eliminate the risk of development of IDDM in susceptible infants as long as no cow’s milk products are given in addition to human milk” (AAP, 1997, p. 2).

**Celiac disease**

Celiac disease is an autoimmune illness that may occur when an individual has a genetic susceptibility and a dietary exposure to gluten, but there may be other factors to consider because not every individual with celiac disease becomes symptomatic. Six studies were reviewed by Davis (2001) that provided evidence that celiac disease is prevented or delayed by breastfeeding. These six studies found an

Challacombe et al. (1997) studied the dietary histories of 26 children (mean age = 16 months) diagnosed with celiac disease and 62 controls. They found that a declining incidence of celiac disease was associated with an increased incidence of initial breastfeeding. The investigators suggested that an increase in initial breastfeeding “may have protected the small intestinal mucosa” (Challacombe et al., p. 208).

Greco, Mayer, Grimaldi et al. (1985) led a retrospective study investigating the relationship between breastfeeding and gluten introduction to the onset of celiac disease. Their study involved 146 children with celiac disease (age range = four months to 11 years). The children who were breastfed three months or longer showed a marked delay in the onset of the disease. Multiple regression analysis revealed a correlation coefficient of 0.74 between onset of celiac symptoms and duration of breastfeeding (Greco, Mayer, Grimaldi et al., p. 54).

A 1988 case-controlled study of 201 children with celiac disease was conducted by Greco, Auricchio, Mayer and Grimaldi. They recruited 1,949 controls (ratio of case to controls of 1:9.6) to investigate the effect of formula feeding and early introduction of gluten on the incidence of celiac disease. They found that formula feeding was a stronger risk factor for celiac disease than early introduction of gluten. Breastfeeding was significantly less frequent in patients than controls.
regardless of the timing of the introduction of gluten (overall odds ratio is 4.8, significant at p<0.0001) (Greco, Auricchio, Mayer & Grimaldi, p. 397).

The infant feeding history of 72 children with celiac disease and 288 age-matched reference children was investigated by Fälth-Magnusson et al. (1996) utilizing a retrospective questionnaire study. The celiac patients were breastfed for a significantly shorter time than the controls. This pattern held true for both the exclusively breastfed (p<0.0004) and the partially breastfed (p < 0.002) (Fälth-Magnusson et al., p. 3).

In a matched case-control study, Auricchio et al. (1983) investigated the frequency and duration of breastfeeding in 216 children with celiac disease. Their healthy siblings served as the controls in this study. “Children formula-fed from birth, or breastfed for less than 30 days, were found to have a relative risk of developing symptoms of celiac disease four times higher than children breastfed for more than 30 days (p<0.0001)” (Auricchio et al., p. 428).

**Developmental Benefits**

The effect of breastfeeding on intellectual and motor development is well documented. Benefits include improved cognitive functioning and enhanced neurological development (León-Cava et al., 2002, p. 72).

**Cognitive development/ improved test scores**

Numerous studies report that breastfeeding provides infants with advantages in cognitive development. In 19 of the 24 studies they reviewed, Drane and Logemann (2000) found a statistically significant difference in the cognitive development of children who were partially or exclusively breastfed as infants when compared with children who were formula-fed as infants in (Drane & Logemann, p. 351). This advantage in cognitive development has long-reaching implications (Drane & Logemann, p. 353). The relationship between breastfeeding and cognitive development appears to be “durable, suggesting that formula-fed infants do not ‘catch
up’ to their breastfed counterparts” (Drane & Logemann, p. 354). “In term infants, effects on IQ in the range 2-5 points (0.2 – 0.3 SD) were found” (Drane & Logemann, p. 354). Low birthweight infants may experience a greater effect with preliminary studies detecting an 8 IQ point advantage (Drane & Logemann, p. 354).

The National Institute of Child Health and Human Development (NIH, 2002) recently reported results of a study they conducted addressing the cognitive development of 220 full-term small for gestational age (SGA) infants and 299 full-term appropriate for gestational age (AGA) children. They partnered with the Norwegian University of Science and Technology to gain access to Norwegian and Swedish women, because women in these countries tend to exclusively breastfeed their infants longer than women in the United States (NIH, p. 1). The researchers found that SGA children who were breastfed exclusively for the first 24 weeks of life scored approximately 11 points higher on intelligence tests at five years of age than did SGA children who were breastfed for 12 weeks (NIH, pp. 1).

In a longitudinal study from birth to age three years, Johnson, Swank, Howie et al. (1996) investigated the relationship between the initiation or duration of breastfeeding to intelligence in 204 children. After controlling for confounding variables (socioeconomic status, mother’s intelligence, mother’s smoking behavior and the gender and birth order of the child), they found that the initiation of breastfeeding predicted scores on intelligence tests at age three. Specifically, compared with formula feeding, breastfeeding was associated with a “4.6 point higher mean in children’s intelligence” (Johnson et al., p. 1179). “On the Stanford-Binet Composite IQ breastfed children had a mean score of 100.1 and non-breastfeeding children had a mean score of 95.1 (95% confidence interval: 0.3 – 9.5). Comparable Peabody means were 106.3 and 101.7 (95% confidence interval: 0.7 – 8.5)” (Johnson et al., p. 1183).
Infants born at below-normal birth weights who were fed breast milk achieved higher scores on developmental tests at age 18 months and on intelligence tests at age 7 or 8 years than similar infants receiving infant formula (Lucas, Morley, Cole, et al., 1990, p. 1477). Significant increases in the cognitive development test scores of school-aged children who were breastfed as infants were also found. Most significantly, the increases in cognitive development were linked to the length of breastfeeding duration (ADA, 1997, p. 3). One example of enhanced neurocognitive outcome is higher IQ scores. IQ scores of children who were born preterm and received breast milk averaged 8.3 points above scores of children who were born preterm and received infant formula (Reynolds, p. 167). This difference is two to five points higher than the difference reported by studies investigating IQ differences between breastfed children born full term and formula fed children born full term (Drane & Logemann, 2000, p. 354).

**Enhanced vision and neurological development**

Human milk contains significantly higher levels of the amino acid taurine than cow’s milk. Taurine “is thought to be important in neural development and the maintenance of proper eyesight” (Duerbeck, 1998, p. 311). Heird (2001) documented the advantages of human milk over infant formula on “subsequent cognitive and visual function” (Heird, p. 184). Human milk contains long-chain polyunsaturated fatty acids which infant formula lacks. These fatty acids have been linked to “optimal development for visual and central nervous systems” (Heird, p. 173). Researchers have theorized that the cholesterol content of human milk may also be a contributing factor in neural development (Duerbeck, p. 310).

**Psychological Benefits**

The psychological benefit of breastfeeding for both the mother and the infant “is generally assumed but has been particularly difficult to characterize and quantify”
(ADA, 1997, p. 3). In spite of the limitations of studies in this area, numerous studies have linked breastfeeding with psychological benefits.

**Increased mother-infant bonding**

The term *attachment* has been defined by Janke (1993) as “the development of an enduring relationship between the infant and the caretaker” (Janke, 1993, p. 23). The increased prolactin levels mothers experience while nursing are “thought to increase maternal caretaking behavior” (Janke, p. 23). In addition to the nutritional aspects of breastfeeding, the amount of early close contact and physical interaction between mother and newborn has been shown in animals to be “related both to imprinting of behavior patterns and to actual development of cerebral cells during the early critical neonatal period of brain growth” (Isabella & Isabella, 1994, p. 257). Mothers who are allowed contact with their infants early after delivery breastfeed longer and demonstrate “more attachment behavior than mothers who are denied early contact with their infants or mothers who do not breastfeed their infants (ADA, 1997, p. 3).

**Preterm status**

The nutritional needs of preterm infants are different than full-term infants. The positive health benefits of breastfeeding, including “protection from necrotizing enterocolitis, infections, and atopic disease; enhanced retinal maturation and neurocognitive outcome; and greater physiologic stability” (Kavanaugh, Zimmerman & Lead, 1997, p. 15), seem to be particularly salient in pre-term infants. In the past, it was thought to be impossible to breastfeed a sick or preterm infant. Currently, however, breast milk may be the preferred nutrition for premature infants, even though it may be necessary for feeding at the breast to be delayed (Merenstein & Gardner, 1989, p. 241). The nutritional needs of premature infants are different than infants born at full term. The positive health benefits of breastfeeding seem to be more significant for premature infants (Reynolds, 2001, p. 167). These health benefits
include: “protection from necrotizing enterocolitis, infections, and atopic disease; enhanced retinal maturation and neurocognitive outcome; and greater physiologic stability” (Kavanaugh, Zimmerman & Lead, 1997, p. 15).

**Benefits to Mothers**

“Approximately 30 years of increasingly rigorous and positive research findings have led to the rediscovery of breastfeeding as a valid and evidence-based health intervention… a clear pattern of positive physiologic changes that lead to improved short-term and long-term health sequelae are emerging. All patients and their families should be informed fully as to the positive preventative health effects of breastfeeding not only for infants but also for mothers” (Labbok, 2001, p. 155).

**Anemia**

Oxytocin released during breastfeeding in the early postpartum period increases the number of uterine contractions, results in a decreased risk of hemorrhage and lessens maternal blood loss (AAP, 1997, p. 2; ACOG, 2001, p. 218). This decreased blood loss results in reduced risk of iron deficiency anemia (AAP, 1997, p. 2).

**Cancers**

Labbok (2001) examined the evidence from 20 studies and concluded that a clear and consistent protective effect of breastfeeding against premenopausal breast cancer is reflected in nearly all of the analyses. “The level of relative risk (RR) reported varied from approximately 0.54 to 0.85 for the first 3 to 6 months of breastfeeding, from 0.39 to 0.71 at 12 months of breastfeeding, 0.4 to 0.72 for more than two years, and 0.35 for more than 6 years” (Labbok, p. 146). She points out that while several studies showed that “no association exists between breastfeeding patterns and postmenopausal breast-cancer incidence, however, two other large, population-based studies found a significant protective effect” (Labbok, p. 146). Newcomb, Egan, Titus-Ernstoff, Trentham-Dietz et al. (1999) investigated post-
menopausal breast cancer risk “according to breastfeeding characteristics” (Newcomb et al., p. 174). Their results suggest that “lactation may have a slight and perhaps long-lasting protective effect on postmenopausal breast cancer risk” (Newcomb et al., p. 174). “The multivariate-adjusted relative risk of breast cancer among women who had breastfed for at least 2 weeks compared with those who had never breastfed was 0.87 (95 percent confidence interval 0.78-0.96)” (Newcomb et al., p. 176).

The relationship between breastfeeding an infant and a decreased risk of breast cancer is clearer for premenopausal mothers. “Although breast cancer incidence is influenced by genetics, stress, hormones, and pregnancy, clearly breastfeeding has a protective effect” (Lawrence, 1994, p. 206). This very important health benefit is widely recognized (AAP, 1997, p. 2; ADA, 1997, p. 4; ACOG, 2001, p. 218; Gorrín-Peralta & Parrilla-Rodríguez, 2000, p. 375).

After examining the evidence from a dozen studies, Labbok (2001) concluded that “the initiation and physiologic completion of breastfeeding during the first 2 to 7 months postpartum is associated with a significant decrease in ovarian-cancer risk, with studies reporting protective levels that average 20%” (Labbok, p. 148). Studies have suggested several long-term maternal health effects of breastfeeding including decreased risk of ovarian and endometrial cancers (ACOG, 2001, p. 218; Gorrín-Peralta & Parrilla-Rodríguez, 2000; AAP, p. 2).

**Diabetes**

Breastfeeding often is associated with improved blood glucose control in diabetic women. Indeed, “some diabetic mothers enjoy a postpartum remission of their diabetes” (Lawrence, 1994, p. 503), which may continue only until the infant is weaned or, for some women, may continue for several years. In addition, “many diabetic women report a feeling of well-being during lactation” (Lawrence, 1994, p. 503).
Osteoporosis

While breastfeeding results in maternal bone demineralization, multiple studies have indicated that aggressive re-mineralization occurs after the infant is weaned. Several of these studies also report that breastfeeding mothers experience a diminished incidence of postmenopausal osteoporosis and hip fractures (AAP, 1997, p. 2; ACOG, 2001, p. 218; Cadwell, 1999, p. 527; Gorrín-Peralta & Parrilla-Rodríguez 2000, p. 375).

Diminished risk of pregnancy

For women who do not breastfeed, the average time to first ovulation after delivery is 45 days (ACOG, 2001, p. 224). Exclusive breastfeeding has been associated with delays in the resumption of normal ovarian cycles and therefore a delay in the return of fertility, resulting in a reduction in the risk of pregnancy for a period of six months or more (AAP, 1997, p. 2; ACOG, p. 218; ADA, 1997, p. 4). Lactation amenorrhea, the suppression of menstruation as a result of lactation, is a significant contributor to the spacing of pregnancy, and is acknowledged worldwide as preventing more pregnancies than all other contraceptive methods combined (Ford & Labbok, 1987, p. 79).

Decreased obesity

Breastfeeding often is promoted as a way for a new mother to lose weight, but lactation alone does not guarantee significant postpartum weight loss. The occurrence of “pregnancy-induced long-term obesity” is reduced when mothers breastfeed (ACOG, 2001, p. 218). The effect of lactation on postpartum weight loss and long-term obesity, however, is somewhat controversial (ADA, 1997, p. 4). Dewey, Heinig and Nommsen (1993) reported significantly greater weight loss among breastfeeding mothers than formula feeding mothers, but only after a minimum of six months of lactation. These researchers found a direct correlation between maternal weight loss and both the frequency and duration of breastfeeding (Dewey et al., 1993, p. 165).
Enhanced emotional attachment to infant

The relationship of a mother with her breastfeeding infant is one of the strongest of all human bonds (Lawrence, 1994, p. 182). Mothers report breastfeeding as being more “emotionally satisfying,” and this increased satisfaction is a reason they report for choosing to breastfeed (Graffy, 1992, p. 62). Breastfeeding mothers with early infant contact demonstrate more maternal-infant attachment behaviors than their formula feeding counterparts (ADA, 1997, p. 3).

Improved sense of well-being

As a result of their successful breastfeeding and nourishing of their babies, many mothers experience a sense of empowerment and increased self-confidence (Locklin, 1993, p. 30). Breastfeeding mothers have higher levels of the hormones prolactin and oxytocin in their bloodstreams, both of which are associated with triggering feelings of calmness, a sense of well-being and nurturing behaviors. These hormonal reactions contribute to positive mother-infant interactions linked to enhanced maternal-infant bonding and neurological development in the infant (ACOG, 2001, p. 218; Drane & Logemann, p. 349). Mothers who breastfeed their preterm infants may reap important emotional benefits. Providing breast milk for their preterm infants represents a tangible contribution mothers can make toward the care of their infants (Kavanaugh et al., 1997, p. 16).

Summary of the Benefits of Breastfeeding

Each year new scientific evidence adds to the understanding of the role that breastfeeding plays in the health, growth and development of children and in the health of mothers. The advantages of breastfeeding, most especially those associated with extended periods where infants exclusively receive breast milk, are becoming widely accepted. Additional benefits include economic savings to the families of the infants as well as for society as a whole. Breastfeeding benefits “infant health, intellectual and motor development, later chronic disease risk, and maternal health.
As the research base expands, and as understanding of this subject grows, the superiority of breastfeeding over alternative feeding methods for all of these outcomes becomes ever clearer. These benefits come not at a price, but with additional economic benefits for the household, the health system, employers, and society” (León-Cava et al., 2002, p. 3).

**Factors Affecting the Decision to Breastfeed**

The benefits of breastfeeding, for both infant and mother, are widely known. However, psychological, social, economic, environmental and familial factors combine to influence a mother’s ability to achieve her breastfeeding goal (Arora et al., 2000, p. 2).

Within the human life cycle, infancy represents the period of most rapid growth and development. Appropriate growth and development during infancy is greatly influenced by adequate nutrition. Parents—most often, mothers—are responsible for the feeding of infants; therefore, the responsibility of making the decision of what and how infants will be fed usually falls to mothers (Tanaka, 1987, p. 940).

The infant feeding decision is a very personal and intimate decision. The decision is influenced as much by “beliefs, values, and cultural norms as it is by medical and public health information” (Abramson, 1992, p. 721). If the prevalence of breastfeeding is to increase, healthcare professionals and health educators must understand the “factors that promote and enhance lactation” (Isabella & Isabella, 1994, p. 257). In addition, “the sociocultural context of infant feeding” must be understood and this information should be incorporated into breastfeeding promotion campaigns and breastfeeding management strategies (Abramson, p. 721).

Human milk is regarded by the American Academy of Pediatrics, the United States Department of Health and Human Services, the World Health Organization and the American Dietetic Association, as the optimal nutrition for infants. Yet, while the positive health benefits and, specifically, the nutritional value of human milk are
widely accepted, many women choose not to breastfeed their infants (AAP, 1997, p. 1; ADA, 1997, p. 1; USDHHS, 2000a, p. 8)

Throughout history, the attitudes toward, and the resulting incidence and duration of, breastfeeding have been cyclical (Jones, 1987, p. 75). Correlations have been drawn between the incidence of breastfeeding and the economic and social climate of the day. Historically, in times of prosperity and peace, breastfeeding rates have decreased. Conversely, in times of economic hardship and/or war, breastfeeding rates have increased.

If health practitioners and educators are to succeed in their efforts to encourage women to breastfeed, they must first understand the factors involved in the infant feeding decision (Littman, Medendorp & Goldfarb, 1994, p. 214). Four categories of factors associated with the infant feeding decision and duration of breastfeeding were proposed by Ford and Labbok (1990). These categories are: “demographic and socioeconomic, psychological and cultural, health-service related (i.e., hospital and clinic procedures that affect breast-feeding), and biomedical” (Ford & Labbok, p. 451).

The Theory of Planned Behavior (TPB) suggests an approach for “explaining, predicting, and influencing human behaviors based on the modifiable measures of subjective norm, control, and attitude” (Janke, 1994, p. 100). The TPB is based on the assumption that individuals “will engage in health behaviors when they believe their action will achieve desired consequences (attitude); when the behavior is considered worthwhile by persons or groups they want to please (subjective norm); and when they believe the behavior will be easy to perform (control)” (Janke, 1994, p. 100).

**Demographic and Socioeconomic Factors**

Demographic and socioeconomic factors affect the infant feeding decision. The infant most likely to be breastfed in the 1980’s was the “first child of a white,
wealthy, educated woman who sees a private physician and is employed at least part-time during pregnancy” (Ford & Labbok, 1990, p. 451).

Analyzed data from the 1988 National Maternal and Infant Health Survey were used by Piper and Parks (1996) to identify predictors of duration of lactation. The sample of 2,372 breastfeeding mothers was divided into exclusive-breastfeeding and partial-breastfeeding subgroups. Statistically significant results were found when these subgroups were compared on the study variables. “Mothers were more likely to breastfeed for longer than six months if they fully breastfed during the first month postpartum, were nonsmokers, were of higher parity, were consistent in their prenatal intent to breastfeed fully or partially and in their postpartum behaviors, participated in childbirth education classes, and delayed their return to work postpartum” (Piper & Parks, p. 7).

Age

Research studies addressing the influence of maternal age on breastfeeding initiation and duration have varying results (Ford & Labbok, 1990, p. 454). Investigators have found a strong, positive correlation between maternal age and education level and breastfeeding initiation and duration. Specifically, older, more educated women are the subgroup most likely to choose breastfeeding as their preferred infant feeding method, and generally they breastfeed their children longer than other groups (AAP, 1997, p. 2; Alexy & Martin, 1994, p. 217; Freed, Jones, & Schanler, 1992; Hawkins, Nichols & Tanner, 1987, p. 204; Ryan, Rush, Krieger & Lewandowski, 1991; Scott & Binns, 1999, p. 11). Ross Mothers’ Survey (Ross Mothers’ Survey, Abbott Laboratories, 2000 [Ross Mothers’ Survey]) reports that women less than 20 years of age were the least likely to breastfeed in the hospital (Ross Mothers’ Survey, p. 3). Other researchers have found that maternal age covaries with other variables such as marital status, education level and race (Grossman, Larsen-Alexander, Fitzsimmons & Cordero, 1989).
Older women are more likely to breastfeed exclusively (Arora et al., 2000, p. 4; Black et al., 1990, p. 255; De La Mora et al., 1999, Ford & Labbok, 1990, p. 454). De La Mora et al. reported a statistically significant correlation between maternal age and attitudes toward infant feeding methods. Older women were found to have more positive attitudes toward breastfeeding (De La Mora et al., p. 2366).

Multiple studies addressing the factors associated with the infant feeding choice have “identified adolescent mothers as one group that is unlikely to breastfeed” (Volpe & Bear, 2000, p. 196). Research studies have documented that the choice of infant feeding method is affected by the support mothers receive from friends, significant others and, most importantly, the maternal grandmother. Often, this support (or lack thereof) has greater influence on mothers than their knowledge of the benefits of breastfeeding. Specifically, the infant feeding decisions of adolescent girls are often influenced more by social attitudes and family than by knowledge of breastfeeding benefits (Volpe & Bear, p. 197; Leffler, 2000, p. 36).

However, breastfeeding education can influence adolescent mothers. Volpe and Bear (2000) conducted research involving 91 pregnant adolescents enrolled in a high school adolescent-pregnancy program. The adolescents participating in the study were divided into two groups: those receiving breastfeeding education from a lactation consultant in group classes, and those who did not receive the breastfeeding education. “Of the 48 adolescents who received no special education, 7 (14.6%) initiated breastfeeding. Of the 43 adolescents in the education group, 28 (65.1%) initiated breastfeeding, which indicates a significant difference between groups with regard to infant feeding choice” (Volpe & Bear, p. 196).

Leffler (2000) surveyed 100 teenagers in two suburban high schools to evaluate “the knowledge and attitudes of U.S. high school girls regarding infant feeding” (Leffler, p. 36). He found that the adolescent girls were poorly informed about the benefits of breastfeeding. Leffler’s research confirmed that adolescents are
more likely to be influenced by peers than by health professionals. He determined that “breastfeeding rates were higher in communities where teenagers view breastfeeding positively than in communities where teenagers are not aware of the benefits of breastfeeding” (Leffler, p. 36).

**Race/ethnicity**

Despite marked increases in breastfeeding rates over the past decade, significant differences in the incidence of breastfeeding exist among ethnic groups in the United States. Even after controlling for factors such as maternal age, socioeconomic status and education level, African American and Hispanic women breastfeed at lower rates than white women (Arora et al., 2000, p. 5; Ford & Labbok, 1990; Grossman et al., 1989; IOM, 1991; Scott & Binns, 1999, p. 7; Tuttle & Dewey, 1995, p. 69; USDHHS, 2000a, p. 8).

In 1998, 45% of African American mothers initiated breastfeeding as compared to 66% of Hispanic mothers and 68% of white mothers (USDHHS, 2000a, p. 8). Investigators hypothesized that the lower breastfeeding rates among minority populations resulted from the “transition from extended to nuclear families, transition from a rural to an urban environment, an increased interest in Western lifestyles, a need to work or look for work, and the availability of infant formula” (Scott & Binns, 1999, p. 7).

Ryan et al. (1991) also found differences in breastfeeding duration rates among ethnic groups in the United States. Only six percent of African American mothers were breastfeeding at six months compared with 14% of Mexican American and 21% of Anglo American mothers (Ryan et al., p. 722). The Surgeon General declared the disproportionate rate of breastfeeding by African Americans a public health challenge and has encouraged health professionals across the country to “put in place national, culturally appropriate strategies to promote breastfeeding” (USDHHS, 1990a, p. 3).
African American women are less likely to breastfeed than women from other racial and ethnic backgrounds. Generally, African Americans do not view breastfeeding positively (USDHHS, 2000a, p. 9). Across socioeconomic groups, the breastfeeding duration of African American infants is shorter than that of white infants (Black et al., 1990, p. 255; IOM, 1991, p. 39).

Caulfield et al. (1998) investigated the effectiveness of WIC breastfeeding promotional efforts in four clinics located in Baltimore, Maryland, in which more than 90% of the survey population was African American. Respondents often reported experiencing multiple breastfeeding problems during the first week postpartum. “Thirty-five percent of the women who initiated breastfeeding stopped by 7-10 days postpartum” (Caulfield et al., p. 21).

African American women often view the support of friends to be more important in the decision to breastfeed than do white women (Guttman & Zimmerman, 2000, p. 1458). Black et al. (1990) reported that African American women “perceived the support from a close friend as most important for initiating breastfeeding” (Black et al., p. 258). African American women were more likely to breastfeed if they “attended childbirth classes, were married or were older” (Black et al., p. 256).

The influence of the father’s attitude toward breastfeeding upon the mother’s decision is also significantly less important among African American women than among other racial or ethnic groups (Black et al., p. 258). Among African Americans, a father’s negative attitude toward breastfeeding was not “sufficient motivation for mothers to select formula feeding,” while a father’s negative attitude was sufficient motivation among whites, Cubans and Puerto Ricans (Bar-Yam & Darby, 1997, p. 46).

Hispanic women living in the United States also are less likely to breastfeed than white women (Arora et al., 2000, p. 1; Ford & Labbok, 1990, p. 453). Hispanics
also breastfeed for shorter periods of time than do their white counterparts (Ford & Labbok, p. 454). They typically value more the support of their mothers, while white women tend to value the support of their male partners more strongly than other sources of support (Bar-Yam & Darby, 1997, p. 46; Black et al., 1990, p. 258; Guttman & Zimmerman, 2000, p. 1458). White mothers are more likely to choose the “feeding method favored by the father of the child” (Black et al., p. 258).

Among Hispanic women in the United States, “initiation and duration of breastfeeding vary widely by country of origin” (Libbus, 2000a, p. 216). Currently, more white, non-Hispanic women are breastfeeding at hospital discharge than Mexican American women. Similarly, the breastfeeding rates of Hispanic American women from Puerto Rico and Cuba also are well below the U.S. national average. Contrary to the U.S. national trend, Hispanic women are choosing to breastfeed at lower rates, and those who do choose to breastfeed their infants are doing so for shorter periods of time (Libbus, 2000a, p. 216). “The extent of the woman’s acculturation is believed to be related to breastfeeding intention and initiation” (Libbus, 2000a, p. 216). The longer an Hispanic woman lives in the United States, the less likely she is to choose to breastfeed her infant (Libbus, 2000a, p. 216).

Urban/rural

Several socioeconomic factors differentiate urban and rural mothers. These differences may play a role in the infant feeding decisions of these women. Generally speaking, families living in rural areas are less educated and are more likely to be living in poverty than their urban counterparts. Rural families report two or more workers in the family at a rate of 28.9% as compared to 15.4% for urban families. These statistics suggest that rural women are less likely to breastfeed than their urban counterparts (Alexy & Martin, 1994, p. 215). Additionally, urban women are more likely to have access to health education and information which may include breastfeeding information. Similarly, urban mothers are more likely to have access to
lactation consultants for education and support (Alexy & Martin, p. 217). However, breastfeeding rates are especially low in economically deprived, inner-city areas (Hawthorne, 1994, p. 27).

**Income/socioeconomic status**

Socioeconomic status is a contributing factor to breastfeeding success, with middle-class women experiencing higher breastfeeding rates than lower-income women. In Graffy’s (1992) study, women reported cost savings as one of the reasons they chose to breastfeed (Graffy, p. 62). In research conducted by Guttman and Zimmerman (2000), both breastfeeding and formula feeding low-income mothers agreed that formula feeding had a “higher monetary cost” (Guttman & Zimmerman, p. 1465).

Low-income populations tend to breastfeed at lower rates. Investigators found notable differences in the breastfeeding rates of different socioeconomic groups in industrialized countries (Black et al., 1990, p. 255; Guttman & Zimmerman, 2000, p. 1458). “Medicaid recipients were less likely to indicate that they breastfed” (Margolis & Schwartz, 2000, p. 125). Results from a 1996 national survey indicated that “only 42 percent of women in households with incomes less than $10,000 breastfeed at all and only 12 percent breastfeed for 6 months” (Weimer, 1999, p. 31). Women in lower socioeconomic populations are less likely to breastfeed and, if breastfeeding is initiated, their duration rates are lower than other socioeconomic populations (AAP, 1997, p. 3; Duerbeck, 1998, p. 313; Graffy, 1992, p. 63, Johnson et al., 1996, p. 1179; Margolis & Schwartz, 2000, p. 121; Weimer, 1999, p. 31).

Low-income women also reported a perception that breastfeeding is easier for privileged women. While many low-income women indicated an awareness that breastfeeding is better for their babies, they elected not to breastfeed (Guttman & Zimmerman, p. 1471). Breastfeeding programs targeting low-income mothers should
include “education in a language and mode which that population found acceptable and understandable” (Black et al., 1990, p. 255).

Professional women breastfeed their infants longer than women in other types of positions (IOM, 1991, p. 39). In general, women who are in professional positions have more choices for child care and greater work schedule flexibility than do women who are in non-professional positions. In addition, women in professional positions are more likely to have access to an appropriate place for pumping at their worksites, as well as more time available to pump. Middle-class women also are more strongly affected by prenatal breastfeeding education than women of lower socioeconomic status (Black et al., 1990, p. 255).

The effect of socioeconomic status on the decision to breastfeed differs among white and African American women. “Among black women, socioeconomic status as measured by mother’s education was not a significant determinant of breastfeeding whereas socioeconomic status was a strong determinant of breastfeeding in the white population” (Ford & Labbok, 1990, p. 453).

The relationship between breastfeeding and pre-pregnancy employment, enrollment in school and intention to return to work are reported inconsistently in research findings (Littman et al., 1994, p. 1). However, most investigators agree that full-time employment and school enrollment are associated with decreased breastfeeding duration as the result of environmental barriers at both work and school (IOM, 1991, p. 44; Spisak & Gross, 1991, p. 38).

Numerous investigators have found that the relationship between demographic and socioeconomic factors and breastfeeding among the WIC population are similar to that of the general population (Ford & Labbok, 1990, p. 454; Grossman et al., 1989; p. 40; James, Jackson & Probart, 1994, p. 1). The WIC Breastfeeding Report (Schwartz, Guilkey, Akin et al., 1992) describes a study which used cross-sectional data from the 1988 National Maternal and Infant Health Survey and revealed that
maternal age, race, education, and location of residence were significantly associated with the likelihood of breastfeeding initiation among WIC participants (Schwartz, Guilkey, Akin, et al., 1992, no page number).

Historically, investigations of breastfeeding initiation and duration have suggested that black mothers and WIC participants initiated breastfeeding at lower rates, and those who did initiate breastfeeding terminated the practice earlier during the postpartum period than did their counterparts from other ethnic groups. While these findings generally still hold true, the most recent Ross Mothers’ Survey (2000) reported significant increases in both the initiation and duration of breastfeeding among black women and WIC participants. These positive changes may be linked to increased social marketing efforts and an increase in the number of breastfeeding promotion and peer counselor programs (Ross Mothers’ Survey, p. 3).

Rush, Sloan, Leighton, Alvir et al. (1988) found no difference between WIC and non-WIC women in the rates of breastfeeding when women with similar levels of socioeconomic status were compared (Rush et al., p. 463). From 2,250 hospital-record abstracts completed at discharge, 1,331 (59.2%) reported initiating breastfeeding. “Fewer women in the initial WIC group (5.2% fewer; p < 0.05) and 7.2% fewer in the WIC group at follow-up (p < 0.01) breastfed compared with controls. With adjustment for maternal sociodemographic characteristics, these differences fell to 0.3% and 2.3%, respectively; neither was significant” (Rush et al., p. 463).

**Level of education**

Breastfeeding incidence and rates of duration are positively associated with maternal education and family income through six months of age (De La Mora et al., 1999, p. 2366; Ford & Labbok, 1990; Grossman et al., 1989; IOM, 1991).

While an ethnic disparity exists in relation to breastfeeding success, ethnicity is less a deterrent to breastfeeding initiation than is the level of education (Black et
Breastfeeding incidence and duration rates are positively associated with maternal education (AAP, 1997, p. 3; Ford & Labbok, 1990, p. 453; Grossman et al., 1989; Hawkins et al., 1987, p. 204; IOM, 1991; O’Keefe & Henly, 1998, p. 1). Women with a higher level of education are more likely to breastfeed both in the hospital and at six months postpartum (De La Mora et al., 1999, p. 2366; IOM, 1991, p. 32). Mothers who have any college training are much more likely to initiate breastfeeding and will breastfeed longer than their counterparts who have no college training (Arora et al., 2000, p. 1; Black et al., 1990, p. 255; IOM, 1991, p. 32; O’Keefe & Henly, 1998, pp. 1-2).

White and Hispanic women who have more education are more likely to breastfeed than are their non-educated counterparts. However, among African American women, the relationship between level of education and breastfeeding success is less clear. Ford and Labbok (1990) found no significant difference in the breastfeeding initiation or duration among of African American women regardless of their levels of education. Conversely, investigators for the Institute of Medicine found that African American mothers who are college educated breastfeed at a rate twice that of their counterparts who have a high school education or less (IOM, 1991, p. 32).

Littman et al. (1994) identified that the education levels of fathers were associated with multiple factors that seemed to affect women’s decisions to breastfeed. “The infants of fathers with more than 12 years of education were more likely to be breastfed than infants of fathers with 12 years or less of education” (Littman et al., p. 216).

Researchers have also found a relationship between education, infant feeding decision, and parity. Generally, women choose the same feeding method for subsequent children as they chose for their first-born. However, Da Vanzo, Starbird and Leibowitz (1990) found that “among women who did not breastfeed their first
child, education beyond high school increases the likelihood that they will switch to breastfeeding with a later-born” (Da Vanzo et al., p. 223).

Multiple studies in the United States have found a strong, positive relationship between level of education and both the incidence and duration of breastfeeding. Generally, “in studies using multivariate analysis, the higher the education level attained by the mother, the more likely” she is to breastfeed, and the duration of breastfeeding may be expected to continue for a longer period of time (Scott & Binns, 1999, p. 7).

**Geographic location**

Geographic location is one of the demographic factors associated with the infant feeding decision (Lawrence, 1991, p. 2). Women living in the Mountain and Pacific regions of the United States experience higher rates of breastfeeding. In 2000, Ross Laboratories reported that 81.6 percent of mothers in the Mountain region and 81.8 percent of mothers in the Pacific region were breastfeeding in-hospital after delivery. At six months of age, 42.8 percent of infants in the Mountain region and 41.2 percent of infants in the Pacific region were still being fed human milk. Conversely, in the East South Central region, where breastfeeding rates are lowest, only 53.4 percent of mothers were breastfeeding in-hospital, 13 percent of which were still breastfeeding when their infants reached six months (Ross Mothers Survey, 2000, pp. 8-11).

**Marital status**

Married women breastfeed their infants exclusively more often than single women (Arora et al., 2000, p. 1; Black et al., 1990, p. 256; Scott & Binns, 1999, p. 7). Similarly, unmarried women with less than a high school education choose breastfeeding at much lower rates than married women or women with a higher level of education. When unmarried women do elect to breastfeed, their rates of duration are lower (Grossman et al., 1989, p. 4).
In a study by De La Mora et al. (1999), the attitudes of married women concerning breastfeeding were more positive than were the attitudes of single mothers (De La Mora et al., p. 2366). When Isabella and Isabella (1994) looked at factors affecting duration of breastfeeding, they found that “mothers who reported the highest proportion of breastfeeding at nine months also reported higher levels of marital satisfaction and intimacy prenatailly, as well as satisfaction with emotional support from male partner” (Isabella & Isabella, p. 262).

Familial Factors and Social Attitudes

The infant feeding decision is both complex and multifaceted (Arora et al., 2000, p. 1). While social, psychosocial, emotional and environmental factors impact the decision, none of these factors has a more profound impact on the decision than familial factors (Arora et al., p. 1; Meyerink & Marquis, 2002, p. 38). Wagner and Wagner (1999) concluded that “decisions about infant feeding are influenced more by familial relationships and social attitudes than by sociodemographic factors” (Wagner & Wagner, p. 514). “Maternal and familial breastfeeding experiences eliminated the effect of more distal factors, such as income or education” (Meyerink & Marquis, p. 38).

Contact with breastfeeding/ having been breastfed as an infant

Baisch et al. (1989) examined the infant feeding practices of low-income adolescents and adults. They found a number of factors that had significant effects on the infant feeding decisions and practices of these mothers. For example, having contact with breastfeeding in the past (i.e., knowing someone who breastfed, or the fact that the mother herself was breastfed as a baby) was positively related to breastfeeding intention among pregnant women (Baisch et al., p. 62; Hawthorne, 1994, p. 26; Isabella & Isabella, 1994, p. 257; James et al., 1994, p. 3; Meyerink & Marquis, 2002, p. 38). Having been breastfed as an infant, or having a sibling who was breastfed, establishes breastfeeding as the social norm for an individual and her
household (ACOG, 2001, p. 220; Duerbeck, 1998, p. 313; Meyerink & Marquis, p. 38). Women are more likely to feed their infants in the same manner in which they themselves were fed (Hawthorne, 1994, p. 26; Meyerink & Marquis, p. 38; Wagner & Wagner, 1999 p. 513).

Other social factors contribute significantly to the infant feeding decision. Mothers are also influenced by other women in their social groupings. Women are more likely to choose to feed their infants in the same manner as their friends. Having breastfeeding role models such as friends and mothers, together with positive attitudes to breastfeeding, are important in the final decision to breastfeed (Hawthorne, 1994, p. 27).

**Previous breastfeeding/ formula feeding experience**

The most effective predictor of how women will choose to feed their infants is how they fed their previous children (Graffy, 1992, p. 62; Meyerink & Marquis, 2002, p. 38). Positive past experience with breastfeeding is a strong predictor for choosing breastfeeding as the preferred method of infant feeding. Similarly, positive past experience with breastfeeding is related to longer breastfeeding duration (Dennis, 1999, p. 196; Hawthorne, 1994, p. 26). Conversely, if a woman previously had a negative experience with breastfeeding, it is more likely that she will formula feed in the future. Twenty-five percent of the 120 women in Graffy’s (1992) study who intended to bottle-feed listed “past problems with breastfeeding” as a reason they would choose to bottle-feed (Graffy, p. 62).

With a thorough appreciation of the relationship of previous breastfeeding experience to infant feeding decisions, healthcare professionals should include an assessment of previous breastfeeding experience (both personal and vicarious) during the prenatal history. This prenatal interaction may allow misinformation to be corrected and breastfeeding self-efficacy to be enhanced. Similarly, health professionals should continue their efforts toward boosting the new mother’s self-
efficacy immediately following birth by employing “confidence-enhancing strategies for the successful initiation of breastfeeding” (Dennis, 1999, p. 199).

**Attitudes of significant others/ family members/ friends**

The attitudes and beliefs toward breastfeeding of significant others, family members and close friends also affect the infant feeding decision. Pletta, Eglash and Choby (2000) reported that “a mother’s confidence in her ability to breastfeed and a strong family support system” are related to longer breastfeeding duration (Pletta et al., p. 57). Bryant et al. (1992) found that the infant’s father, grandmother, and other female relatives have the greatest influence on a mother’s infant feeding decision, and that the opinions of the infant’s father carry more weight when he lives with the infant’s mother (Bryant et al., p. 727). Dix (1991) reported that the choice of infant feeding method was significantly influenced by the woman’s family, but was “not strongly influenced by health care providers” (Dix, p. 224).

In a study of women in the United States, Giugliani, Caiaffa, Vogelhut and Perman (1994) found that the opinion of the infant’s father concerning breastfeeding was “the most important factor related to breastfeeding, regardless of maternal age, educational level, ethnic group and marital status” (Giugliani et al., p. 157). When their partners preferred breastfeeding, mothers were more likely to breastfeed than when their partners favored formula feeding or had no preference in infant feeding method (Bar-Yam & Darby, 1997, p. 45; Scott & Binns, 1999, p. 10).

The attitude of the mother’s male partner toward breastfeeding has a significant influence on her infant feeding decision. Fathers actively participate in the infant feeding decision as well as the timing of weaning, thus influencing breastfeeding duration (Bar-Yam & Darby, 1997, p. 45; Scott & Binns, 1999, p. 10). Littman et al. (1994) confirmed the relationship between strong paternal support of breastfeeding and a high incidence of breastfeeding (Littman et al., p. 1). “Strong approval of breastfeeding by the father was associated with a high incidence of
breastfeeding (98.1%), compared to only 26.9% breastfeeding when the father was indifferent to feeding choice (p < 0.001)” (Littman et al., p. 1). In a study of international students at a Florida university, “seventy-three percent (n = 119) of the women said their husbands influenced their choice of mode of infant feeding” (James et al., 1994, p. 2).

Freed, Jones and Schanler (1992) found that women who intended to bottle-feed “overwhelmingly perceived a negative outlook on breastfeeding by their significant others” (Freed et al., 1992, p. 422). The study by Littman et al. (1994) revealed that the father’s approval of breastfeeding was a very significant factor in determining if the child was breastfed or formula-fed (Bar-Yam & Darby, 1997, p. 45; Littman et al., p. 216). One of the primary reasons mothers gave for choosing to formula-feed rather than to breastfeed was their perception of the father’s preference of feeding method (Arora et al., 2000, p. 1; Bar-Yam & Darby, p. 45). Black et al. (1990) suggested that the importance of the father’s attitude toward breastfeeding warranted the inclusion of fathers in all prenatal breastfeeding education efforts (Black et al., p. 255).

The study by Black et al. (1990) reinforced the findings of Bevan et al. (1984) which reported that “increased duration of breastfeeding was significantly associated with father’s support of breastfeeding” (Bar-Yam & Darby, 1997, p. 46; Bevan et al., p. 563). The exception to this finding is young women (under age 25) who were without steady partners. These women did not rate the infant feeding preference of the infant’s father as important (Guttman & Zimmerman, 2000, p. 1465; Black et al., p. 255).

The study by Freed et al. (1992) placed emphasis on “determining prenatal intent of feeding choice and identifying specific factors influencing intent to bottle-feed” (Freed et al., 1992, p. 422). These investigators studied prenatal intent of feeding choice with the belief that “prenatal intent is the key to increasing the
incidence of breastfeeding” (Freed et al., 1992, p. 422). The most significant finding of the study “was the degree to which lack of support for breastfeeding from a significant other influenced women to bottlefeed” (Freed et al., 1992, p. 422). A majority of the respondents perceived negative attitudes toward breastfeeding from their significant others (Freed et al., 1992, p. 423).

Black et al. (1990) surveyed a local WIC population in Georgia (n = 120). They found that “attitudinal variables had a stronger relationship with the choice of feeding method than either the social influence or psychological variables” (Black et al., p. 255). For these mothers, the negative attitudes of their significant others, other women and family members represented significant barriers to breastfeeding success.

Expectant parents need accurate, research-based and culturally appropriate sources of information about breastfeeding if they are to successfully overcome the inaccurate information they often receive from other family members and peer groups (Arora et al., 2000, p.1). The opinions, attitudes and perceptions of individuals interacting with a woman can “affect her view on breastfeeding” (USDHHS, 2000a, p. 16). Peer pressure, personal attitudes and family support are important factors in a woman’s infant feeding decision (Hawthorne, 1994, p. 27). Mothers who have been able to successfully breastfeed their infants report that the greatest degree of emotional support came from husbands and grandmothers (Isabella & Isabella, 1994, p. 257).

Formula feeding mothers cited that support from the infant’s grandmother or other family members would have been an important positive influence had they decided to breastfeed (Arora et al., 2000, p. 1). Some formula feeding mothers reported that they were affected by family members assisting with the care-giving of their infants who were not supportive of breastfeeding (Guttman & Zimmerman, 2000, p. 1467).
Psychosocial and Cultural Factors

While many studies report the significant effect of negative attitudes toward breastfeeding by friends and family members, Black et al. (1990) found that this negative effect was “secondary to the influence of maternal beliefs about breastfeeding” (Black et al., p. 255). Multiple investigators have reported that attitudes, beliefs and breastfeeding intentions have a greater influence on the infant feeding decision than either demographic and/or social factors (Baisch et al., 1989, p. 68). The maternal breastfeeding prenatal intention is the strongest predictor of infant feeding method (McNatt & Freston, 1992, p. 76). Matheny, Picciano and Birch (1987) found that “maternal attitude mediated the effects of demographic factors on intention” (Matheny et al., p. 21).

Multiple psychosocial and cultural factors may be associated with increased breastfeeding initiation and duration. They include: preconceptual and prenatal maternal intention to breastfeed; positive maternal attitudes toward breastfeeding; positive attitudes toward breastfeeding by significant others; and social support and maternal knowledge of the benefits of breastfeeding. (Mihok, 1997, p. 63).

The process used by women to make the important decision of how and what they will feed their infants is not clearly understood. The decision-making process is complex and the choice frequently is made unconsciously. Keith (1997) captured the complexity of this decision-making process: “A woman making an infant feeding decision faces a real choice. Her choice is influenced by a myriad of cultural, social, economic, educational, physical, and psychological issues, but nonetheless she has a choice” (Keith, pp. 220-221).

Social support

While lactation is a natural physiological process, breastfeeding itself is not instinctive. Breastfeeding is a social behavior and, as such, is best learned just as any other social behavior: in a supportive environment. Even after lactation is established,
in order to be successful, most women need the social support of family, friends, and healthcare professionals. Social support that increases breastfeeding includes emotional, tangible, and educational components from both informal social relationships (family/friends) and healthcare professionals (Scott & Binns, 1999, p. 10).

Whether a woman is successful in breastfeeding her infant may be significantly affected by the support she receives from family, friends and healthcare providers (USDHHS, 2000a, p.14). The availability of social support has a significant effect on both breastfeeding initiation and duration (Matich & Sims, 1992, p. 919).

“Social support can be divided into three categories: emotional support (providing affection, love, empathy or acceptance); tangible or instrumental support (task oriented behaviors that directly assist the person); and informational support (providing guidance, advice, facts and knowledge)” (Scott & Binns, 1999, p. 10).

Appropriate and sufficient social support may “increase the likelihood that mothers will breastfeed their babies” (Duerbeck, 1998, p. 312). While many researchers have found social support to be an important factor in the decision to breastfeed, social support manifests itself “differently across ethnic and racial groups” (Guttman & Zimmerman, 2000, p. 1458). Numerous studies have indicated that social support may be the differentiating factor between women who are able to sustain breastfeeding over several months and those women who stop breastfeeding prematurely (AAP, 1997, p. 3; Isabella & Isabella, 1994, p. 257).

Discrepancies exist among the findings of studies examining the influence of social support on both the decision to initiate breastfeeding as well as the effect of social support on breastfeeding duration. Matich and Sims (1992) found that “tangible and emotional support” were not significantly different among women who intended to breastfeed as compared to those planning to bottle-feed, although “informational support” was higher among women intending to breastfeed, with the baby’s father
identified as the primary source of support (Matich & Sims, p. 919). McNatt and Freston (1992) surveyed women who were four- to six-months postpartum. They found significant relationships between perceived support in both informational and healthcare provider networks and the mothers’ perceptions of successful lactation (McNatt & Freston, 1992, p. 75). Joffe and Radius (1987) identified social support as being “positively associated with the intention to breastfeed” (Joffe & Radius, p. 1). Barron et al. (1988) identified a correlation between social support and the initiation and duration of breastfeeding (Barron et al., p. 1557).

“The effect of sociocultural attitudes on infant feeding decisions has been thoroughly reviewed and should be considered in efforts to promote breastfeeding” (ADA, 1997, p. 2). One of the sociocultural factors reported by mothers as a reason they chose to feed their infant formula and reported by other mothers as the reason they breastfed for a short time is that breastfeeding is not the cultural norm, especially among certain demographic groups (ADA, 1997, p. 2). “In communities in which breastfeeding rates are low, there are no visible role models or sources of support for women interested in breastfeeding” (Abramson, 1992, p. 718). Historically, without role models in the community, health professionals have not been effective in getting communities to change health behaviors even when the community perceives the proposed behavior as good for them. “To promote breastfeeding in vulnerable communities, health care professionals must understand how to address the sociocultural factors that affect infant feeding choices” (Abramson, p. 718).

**Sources of breastfeeding information/education/support**

Arora et al. (2000) surveyed 245 mothers whose infants received well-child care from a family medicine practice in Pennsylvania. They found that the primary sources women access for information about infant feeding are “family (33.9%), friends (9.9%), the physician and nurse (19.8%), and nurses in the hospital (6.6%)” (Arora et al., p. 4). Some evidence suggests that including breastfeeding information
as a part of antenatal classes may positively influence breastfeeding duration (Scott & Binns, 1999, p. 10). Clearly, most mothers are more likely to be influenced by family, friends and peers in making their infant feeding decision than by health professionals (Abramson, 1992, p. 717).

If increases in breastfeeding initiation and duration are to be achieved, breastfeeding education efforts should include appropriate prenatal instruction as well as postpartum breastfeeding support (Black et al., 1990, p. 259). Health education about breastfeeding from school age onward will be needed to change societal attitudes about breastfeeding and to eliminate the sexual taboos often associated with the breast (Hawthorne, 1994, p. 28).

**Prenatal breastfeeding education**

Breastfeeding education classes offered prenatally have been shown to be effective in increasing breastfeeding duration (ACOG, 2001, p. 221; Duerbeck, 1998, p. 313; Tuttle & Dewey, 1995, p. 69; Zimmerman, 1999, p. 217). Research evidence suggests that women who participate in prenatal childbirth education classes are more likely to breastfeed exclusively than women who do not participate in educational classes (Arora et al., 2000, p. 1).

Physicians and breastfeeding educators should actively encourage mothers if they are to be successful at promoting breastfeeding (Wiemann et al., 1998, p. 862). Prenatal classes should explore infant feeding options with mothers, pointing out the advantages of breastfeeding as well as explaining the physiology of breastfeeding (Hawthorne, 1994, p. 28; Zimmerman, 1999, p. 217). Ideally, pregnant women should have the opportunity to observe a mother breastfeeding and be given the opportunity to ask questions of her (Hawthorne, p. 28). “Teaching the pregnant woman and her partner about childbirth and breastfeeding is an integral part of good prenatal care” (ACOG, 2001, p. 220).
Providing families with information about the benefits of breastfeeding is a simple but significant step on the part of the physician to support breastfeeding. Additionally, physicians can work at “eliminating barriers to breastfeeding in both their office and hospital environments” (Pletta et al., 2000, p. 58).

In a study of pregnant women by Arora et al. (2000), the largest percentage of respondents reported receiving prenatal care from the staff at their obstetricians’ offices. Therefore, “health care professionals who provide prenatal care should be targeted as the group to discuss the positive effects of breastfeeding with their patients, partners, and optimally maternal grandmothers” (Arora et al., p. 4).

Arora et al. (2000) surveyed 245 mothers whose infants were patients in a Pennsylvania pediatric practice. Approximately 78% of their respondents (both breastfeeding and formula feeding) reported making their infant feeding decision “before the pregnancy or during the first trimester” (Arora et al., p. 1). Formula feeding mothers reported that the most important factors “that would have encouraged them to breastfeed included more information from prenatal classes, magazines, books, and television” (Arora et al., p. 1). Both these findings point to the need for educational campaigns addressing the benefits of breastfeeding directed to the public at large.

The most significant reasons reported by women for choosing to initiate breastfeeding were: they felt that breastfeeding was best for the infant’s health; breastfeeding was the natural method of infant feeding; and they felt that breastfeeding would result in a stronger bond between mother and infant (Arora et al., 2000, p. 1). These reasons should be highlighted and reinforced in prenatal education classes and individual counseling sessions (Arora et al., p. 1).

Postpartum breastfeeding education

Educational efforts highlighting both the benefits of breastfeeding and strategies for overcoming obstacles to breastfeeding success should be targeted to
mothers, fathers and significant family members/friends. Research evidence indicates that in order to be most beneficial, information needs to be accessed by mothers before pregnancy and during the first trimester of pregnancy (Arora et al., 2000, p. 4).

With appropriate prenatal breastfeeding classes, the education that new mothers receive in the hospital following delivery could focus on the management aspects of breastfeeding such as the appropriate techniques involved in latch-on, feeding techniques and positions (ACOG, 2001, p. 221). “Feeding on demand and its initial disruption of sleep and routine needs to be realistically explained and women should be given a contact number of an interested breastfeeding counselor, a midwife, health visitor…” (Hawthorne, 1994, p. 28).

**Community support/ peer counselors**

Although the support of family and peers is important in a woman’s decision to breastfeed, mothers do not report these individuals as playing a large role in their continued success with breastfeeding. Rather, they credit their long-term success to the assistance they received from health professionals or peer counselors. “First time mothers should be targeted for extra postnatal attention since frequent structured home visiting has been shown to increase breastfeeding duration” (Hawthorne, 1994, p. 28).

Shaw and Kaczorowski (1999) examined the effect of a peer counselor program in Tennessee on breastfeeding initiation and duration in a low-income rural population. “A postpartum survey and chart review were conducted with WIC clients at nine health departments (n = 293)” (Shaw & Kaczorowski, p. 19). They found that women who had contact with peer counselors (n = 156) not only were more likely to initiate breastfeeding (53% vs. 33%, p < 0.001), but also were more likely to be breastfeeding at six weeks (26% vs. 13%, p=0.006) postpartum (Shaw & Kaczorowski, p. 19).
Prenatal breastfeeding intentions

A woman’s intentions during pregnancy have been identified as the strongest predictors of her infant feeding decision. The feeding intentions of the mother during pregnancy are significantly related to the feeding practices she employs (Baisch et al., 1989, p. 62; Duerbeck, 1998, p. 312). Often mothers report making a decision—either before pregnancy or during the first trimester—concerning how they will feed their infants (Arora et al., 2000, p. 4; Duerbeck, 1998, p. 312; Skinner et al., 1997, p. 209; Tuttle & Dewey, 1995, p. 69; Wagner & Wagner, 1999, p. 513). Scott & Binns (1999) found “that women who had decided on their preferred feeding method prior to pregnancy were more likely to initiate breastfeeding than those who chose their feeding method during or after the pregnancy” (Scott & Binns, p.10).

James et al. (1994) surveyed mothers to ascertain when they made their infant feeding decision. Of the 163 respondents, 152 (58%) reported making their infant feeding decision before pregnancy, while 88 (36%) made their decision during pregnancy (James et al., p. 1).

Research conducted by Manstead, Plevin and Smart (1984) also revealed that the attitudes of mothers toward “infant feeding methods are more important determinants of which feeding method they will ultimately adopt than their perceptions of what socially significant others expect them to do” (Manstead et al., p. 230). Manstead et al. (1984) report that “measuring behavioral intentions is the simplest and most efficient way to predict behavior outcomes” (Manstead et al., p. 229). They suggest, therefore, that breastfeeding “intentions measured on a single seven-point scale during the last trimester of pregnancy “would provide a fairly accurate prediction of future infant feeding practices (Manstead et al., p. 229).

Alexy and Martin (1994) found that most women who breastfeed make their infant feeding decision by the sixth month of pregnancy (Alexy & Martin, p. 214). “By the time of delivery, 90% of women have made their decision regarding infant
feeding type” (Wagner & Wagner, p. 513). Similarly, because most women make their infant feeding decision before pregnancy or at least before delivery, “it is unlikely that hospital practices will exert an influence on the decision to breastfeed” (Scott & Binns, 1999, p. 9).

The factors involved in the decision to breastfeed often differ from the factors which predict duration. For example, the care and advice that new mothers receive in the hospital may positively affect the continuation of breastfeeding. But this care and advice are not likely to have any significant effect on the initiation of breastfeeding, because most women make their infant feeding choice before pregnancy (Scott & Binns, 1999, p. 6). Isabella and Isabella (1994) suggested that investigating the maternal factors observed during pregnancy and the postpartum period that are correlated with long-term breastfeeding may provide valuable knowledge to individuals seeking to assist mothers with breastfeeding during the critical early postpartum period. They found that long-term breastfeeding mothers “were those who had adjusted most optimally to pregnancy and motherhood, were most likely to characterize their marriages as satisfying and loving during the prenatal period and throughout the first postpartum year, and were most satisfied with the nature and extent of support received from husbands (Isabella & Isabella, p. 257).

“A number of univariate and multivariate studies have also shown that breastfeeding duration is strongly associated with the timing of the decision to breastfeed” (Scott & Binns, 1999, p. 10). Generally, the earlier the decision is made to breastfeed, the longer the duration (Scott & Binns, p. 10). In a study by James et al. (1994), mothers who made the decision to breastfeed before pregnancy breastfed significantly (p < .05) longer than those who made the decision during pregnancy and those who decided after delivery. James et al. (1994) surveyed 163 international students to determine the factors which affect the decision to breastfeed. Results of the study revealed that 58% of the students made the decision to breastfeed prior to
pregnancy, while 36% reached the decision during pregnancy (p < .05) (James et al., 1994, p. 2). This study illustrates the importance of regular and consistent education for the general public concerning the advantages of breastfeeding, starting with school-age children.

A consistent association has been found between the intended duration of breastfeeding reported by pregnant women and actual duration of breastfeeding among those women. After controlling for potentially confounding demographic factors such as maternal age, level of education, race, parity and socioeconomic status, Quarles, Williams, Hoyle et al. (1994) reported that intended duration was the strongest predictor of the actual duration of breastfeeding (Quarles et al., p. 107).

The relationship between intended breastfeeding and actual breastfeeding duration is consistent with the theory of reasoned action. One aspect of the theory states that “most actions of social relevance are under volitional control, and that individual intention to perform an action is an immediate determinant of that action” (Scott & Binns, 1999, p. 11). More precisely, an individual’s attitude toward a specific behavior precipitates that individual’s intention to perform the behavior. O’Campo et al. (1992) suggest that by simply asking how long a woman intends to breastfeed is an “efficient method of identifying prenatally who is at risk of a short breastfeeding duration” (O’Campo et al., p. 201).

**Maternal self-efficacy and personality**

A woman’s confidence in her ability to successfully breastfeed is a predictor of her decision of whether or not to breastfeed. Her level of confidence is also paramount to her success or failure. Historically, breastfeeding confidence has been associated with length of breastfeeding duration (Dennis, 1999, p. 195).

Self-efficacy, as derived from Bandura’s *Social Learning Theory*, is “a cognitive process of individuals’ confidence in their perceived ability to regulate their motivation, thought processes, emotional states, and social environment in
performing a specific behavior” (Dennis, 1999, p. 196). Multiple studies have shown self-efficacy “to be predictive of health behaviors” (Dennis, p. 196). Self-efficacy is critical to the adoption of behaviors because this thought process “reflects individuals’ perceptions about their abilities and not necessarily their true abilities” (Dennis, p. 196).

“Women develop their self-efficacy expectation based on past experiences and performances, vicarious experience, verbal persuasion, and their present physiological and emotional states” (Dennis, 1999, p. 200). Healthcare professionals have numerous opportunities to enhance the self-efficacy of new mothers relative to breastfeeding. By accentuating the mother’s positive breastfeeding experiences, the healthcare professional can raise the mother’s perceptions of self-efficacy (Dennis, p. 198).

Maternal Perceptions

Positive feelings about breastfeeding are associated with intention to breastfeed (Hawthorne, 1994, p. 26). A mother’s perceptions and beliefs have a more significant impact on her infant feeding decision than the psychosocial support of family and peers. Mothers’ beliefs about the consequences of breastfeeding or formula feeding for their infants and themselves are more important predictors of breastfeeding initiation than demographic factors or social support (Alexy & Martin, 1994, p. 215; De La Mora et al., 1999, p. 2276).

General beliefs

Sarrett, Bain and O’Leary (1983) surveyed 200 expectant mothers via telephone interviews, asking how they made the decision to breastfeed or to formula feed. Of the mothers who chose to breastfeed, the most frequent response was that they “thought breastfeeding was healthier or better or that they had read a book or literature showing advantages of breastfeeding” (Sarrett et al., p. 722). Other factors listed (with less frequency) by respondents in the survey conducted by Sarrett et al.
(1983) included “physician recommendations, prenatal classes and husband preference” (Sarrett et al., pp. 721-722).

Jones (1987) interviewed new mothers just after delivery in a hospital setting to ascertain their decision to breastfeed or to formula feed and specifically to identify the influences upon those decisions. The most prevalent reason given for choosing to breastfeed was that it was best for the baby (Alexy & Martin, 1994, p. 215; Arora et al., 2000, p. 1; Graffy, 1992, p. 62; Hawthorne, 1994, p. 26; James et al., 1994, p. 2; Jones, p. 75). Jones reported that another reason given by new mothers for choosing to breastfeed was that the mothers considered breastfeeding to be the natural way to feed their infants (Jones, p. 75; Graffy, p. 62).

Most mothers, regardless of infant feeding method, believe that breastfeeding “provides superior nutrition, protection from disease and psychological benefits to the baby” (Guttman & Zimmerman, 2000, p. 1468). In the Graffy (1992) study, the women “who chose to bottle-feed did so largely because they disliked the idea of breastfeeding (Graffy, p. 63). However, even among those women planning to bottle-feed, 72% believed that breastfeeding would be best for the baby” (Graffy, p. 63).

Convenience

Jelliffe and Jelliffe (1971) described human milk as “the original ready-to-serve 24-hour convenience food” (Jelliffe & Jelliffe, p. 1018). Nevertheless, many mothers perceive breastfeeding to be less convenient and more restrictive for the mother than formula feeding. Graffy (1992) interviewed 491 women, 358 of whom initiated breastfeeding (359 intended to breastfeed; 120 intended to bottle-feed; 35 were undecided). He asked questions of both groups to ascertain the reasons for their choice of feeding method. Twenty percent of the 359 women who intended to breastfeed reported the convenience of breastfeeding as a reason they elected this method. Ironically, 30 percent of the women who intended to formula feed listed convenience as a reason they chose this method (Graffy, p. 62). In a study by James
et al. (1994), women listed convenience as a reason they decided to breastfeed (James et al., p. 2).

A woman’s attitude toward formula feeding is a significant factor in her infant feeding decision (Black et al., 1990, p.258). In multiple studies, the main reason cited by women for choosing to formula feed was the issue of convenience associated with time (Black et al., p. 258; Hawthorne, 1994, p. 26; Sarrett et al., 1983, p. 722). Because women perceived formula feeding to be easier, they often cited that reason for choosing not to breastfeed (Black et al., p. 258). Formula feeding mothers in a study by Manstead et al. (1984) reported that “breastfeeding is more likely than bottle-feeding to impose limits on the mother’s social life” (Manstead et al., p. 228). Similarly, women in the Guttman and Zimmerman (2000) study cited convenience as a reason for choosing to formula feed. Additionally, they added that formula feeding “allowed others to help more with the baby” (Guttman & Zimmerman, p. 1465).

Some formula feeding mothers in the Guttman and Zimmerman study described breastfeeding mothers as “socioeconomically privileged,” “not having to work,” and as “someone who has a lot of time on her hands” (Guttman & Zimmerman, p. 1467).

**Breast function/ embarrassment**

Some women may experience a particular barrier of confusion concerning the role of the breast: sexual object vs. source of nourishment for baby. “Using breasts for feeding a baby may be for some women emotionally confusing if society and the woman’s own experience have concentrated on their sexual and aesthetic functions” (Guttman & Zimmerman, 2000, p. 1458). Embarrassment was one of four themes identified in the study by Guttman and Zimmerman as an explanation for why mothers elected not to breastfeed (Guttman & Zimmerman, p. 1466). Hawthorne’s (1994) research suggests a correlation between women who reported “embarrassment at feeding in public” and formula feeding as the infant feeding choice (Hawthorne, p. 27).
The link to sexual connotations was more prevalent among young mothers in the Guttman and Zimmerman study (2000, p. 1467). “Until breastfeeding is unhooked from sexual taboos surrounding the breast, these strong negative influences will continue” (Hawthorne, 1994, p. 28).

**Health benefits for infant**

The most frequent reason cited by mothers for choosing to initiate breastfeeding was health benefits for the infant. Many women overcome substantive barriers to breastfeeding because they are committed to providing their infants with these health benefits (Arora et al., 2000, p. 1).

**Appropriate infant care**

Maternal perceptions concerning appropriate infant care are also important to the infant feeding decision. Two issues about infant care that are related to breastfeeding are the maternal perception of insufficient milk supply and the use of pacifiers and bottle nipples.

**Fear of insufficient milk supply**

Many women perceive they cannot produce sufficient milk to nourish their infants. As a result, this is a common reason reported by mothers for choosing to formula feed (Arora et al., 2000, p.1). Isabella and Isabella (1994) found that the “most prevalent problem encountered by mothers during the first month postpartum was a “concern of inadequate milk supply” (Isabella & Isabella, p. 267). When mothers perceive their milk supply to be inadequate, they often supplement their infant’s diet with formula. Because breastfeeding is based on the principle of supply-and-demand, the introduction of supplementary infant formula may serve to decrease the mother’s milk supply, thus contributing to an inadequate milk supply.

**Pacifiers/ bottle nipples**

Many lactation experts consider the use of pacifiers and supplemental formula feeding as deterrents to the successful establishment of lactation as well as sustained
breastfeeding (ACOG, 2001, p. 226; Scott & Binns, 1999, p. 11). However, multiple research studies do not provide undisputable evidence that pacifiers or bottle feeding interfere with breastfeeding success. One “prospective cohort study indicated that pacifier use in the first 6 weeks was independently associated with declines in the duration of full and overall breastfeeding in the long term, but not short term (during the first 3 months of life)” (ACOG, p. 226). The suggestion from these authors is that “women who introduced pacifiers early tended to breastfeed fewer times per day” (ACOG, p. 226). Health professionals should take note of the importance of educating mothers that “substituting for or delaying breastfeeding may ultimately reduce milk supply because of the reduction in stimulation of milk production that depends on infant suckling” (ACOG, p. 226).

**Emotional bonding**

One of the most significant factors women report as influencing their decision to breastfeed is the maternal perception that breastfeeding enhances emotional bonding (Arora et al., 2000, p. 1). Both breastfeeding and formula feeding mothers in the Guttman and Zimmerman (2000) study believed that “the community approved more of breastfeeding than formula feeding as a way to nurture the baby” (Guttman & Zimmerman, p. 1465). Mothers in the study by James et al. (1994) also stated that their decision to breastfeed was influenced by their perceptions that breastfeeding better allowed for mother-infant bonding (James et al., p. 2).

**Encouragement/discouragement inherent in the work environment**

The need to return to work is perceived by many mothers as an important barrier to their decision to breastfeed or their ability to breastfeed successfully (Alexy & Martin, 1994, p. 217). De La Mora et al. (1999) found that women planning to return to work “expressed more negative attitudes toward breastfeeding while in the hospital” (De La Mora et al., p. 2375). “Information on how to coordinate breastfeeding with employment outside the home may be crucial to increasing the
numbers of expectant working mothers who plan to breastfeed” (Alexy & Martin, p. 217).

The mother’s perceived level of support for breastfeeding has been determined to be an “important factor in the decision to begin or to maintain breastfeeding” (Guttman & Zimmerman, 2000, p. 1458; Black et al., 1990, p. 255). “Supportive work environments, where mothers can either have the infant present, have access to on-site or nearby child care, or at least have time and facilities for pumping and storing milk, are, as yet relatively uncommon” (ADA, 1997, p. 2).

There are multiple work-related constraints associated with breastfeeding, some of which include: the lack of flexibility in work schedules, the fear of losing job security and the inflexibility of working hours (Guttman & Zimmerman, 2000, p. 1458). The lack of appropriate places to store expressed breast milk and “rigidly scheduled workdays are among the major institutional factors” that make continuing to breastfeed difficult for working women (Guttman & Zimmerman, p. 1459).

Monetary value

Although breastfeeding and formula feeding mothers both rated formula feeding as “bearing a much higher monetary cost,” the formula feeding mothers did not consider this cost “relatively important” (Guttman & Zimmerman, 2000, p. 1465). There is a connotation of social class deprivation among some limited-income mothers. In the Guttman and Zimmerman study, some of these mothers “suggested that more privileged women than themselves can more easily afford” to breastfeed (Guttman & Zimmerman, p. 1468).

Mothers in a study conducted by James et al. (1994) cited the monetary savings as a determining factor in their decision to breastfeed (James et al., p. 2). When questioned about the monetary cost associated with infant feeding, limited-income breastfeeding mothers were concerned about the cost of formula and cited the monetary savings as a benefit to breastfeeding. Conversely, the limited-income
formula feeding mothers were not concerned about the monetary cost of formula. This finding is, no doubt, linked to the fact that most of these women rely on WIC benefits to cover a significant amount of the formula needed by their infants (Guttman & Zimmerman, 2000, p. 1468).

Support of family and/or friends

Mothers reported their perceived level of support from family and friends as an important factor in their decision to begin or to maintain breastfeeding (Alexy & Martin, 1994, pp. 214-15). “Mothers who worry about discouragement or lack of psychosocial support from family and friends are less likely to breastfeed” (Alexy & Martin, p. 215). Mothers reported that the strongest disapproval for breastfeeding came from their peers. Peers often discouraged the mothers from breastfeeding by portraying breastfeeding as “nasty” or “painful” (Guttman & Zimmerman, 2000, p. 1467). A perceived lack of psychosocial support was also an important factor for women who were not planning to breastfeed. This finding came from the study conducted by Alexy and Martin (1994) of 142 women in both rural and urban public health clinics (Alexy & Martin, p. 217).

Community support from the social environment

Guttman and Zimmerman (2000) questioned women about their “reaction to seeing a woman breastfeed in public and their perception of others’ reaction” (Guttman & Zimmerman, p. 1465). This question was an attempt to ascertain the women’s perceptions of social norms. “Almost half the breastfeeding respondents believed others were neutral to the scene, half believed others had a negative reaction to the woman they saw breastfeeding in public and less than 5% perceived a positive reaction. In contrast, over a third said they themselves had positive feelings” (Guttman & Zimmerman, p. 1465). This represents a considerable gap between the respondents’ positive attitudes toward breastfeeding in public and their perception of “negative social norms” (Guttman & Zimmerman, p. 1465).
The mostly low-income mothers in the Guttman and Zimmerman (2000) study believed that their community “viewed breastfeeding as the preferred feeding method and as something a ‘good mother’ should do” (Guttman & Zimmerman, p. 1471). However, these mothers also felt that the actual environment in which they would have to breastfeed was socially constrained in its acceptance of breastfeeding. Some of the mothers reported that their friends disapproved of breastfeeding; some even “characterized breastfeeding as nasty” (Guttman & Zimmerman, p. 1467).

**Fear of pain**

Hawthorne (1994) distributed antenatal and postnatal questionnaires to women over 20 weeks gestation visiting an obstetric clinic over a three-month period. Of the 80 women who entered the study, 64 answered both antenatal and postnatal questionnaires. Some mothers reported the fear that breastfeeding would be painful; some reported they had experienced pain during prior attempts at breastfeeding. Although fear of pain during breastfeeding was reported by respondents, Hawthorne (1994) did not find this fear associated with an intention to bottle-feed among prenatal women (Hawthorne, p. 26).

**Myths**

Many myths are widely held relative to breastfeeding. If breastfeeding promotion efforts are to be successful, they must address these myths with research-based information. Examples of myths surrounding breastfeeding include: the belief that a special diet will be required while breastfeeding; the belief that new mothers must avoid stress and/or must rest frequently in order to breastfeed; and the belief that a breastfeeding mother requires supervision from a healthcare provider in order to successfully feed her baby.

**Special restricted diet**

Some women believe they will need to follow a restrictive diet in order to breastfeed. Their perception is that while they are breastfeeding, they will not be able
to eat normally. However, unless the infant has an allergic reaction to a food in the mother’s diet or experiences gastrointestinal distress, the mother need not avoid any foods to breastfeed (ACOG, p. 223).

Butte, Garza, Stuff, Smith and Nichols (1984) led a four-month longitudinal study of the milk production, dietary intake, and body composition of 45 lactating women. A dietary record was completed by each subject for a period of three consecutive days. Infants were weighed before and after each feeding to determine the amount of breast milk ingested over a 24-hour period. The average amount of milk produced (733 g/day) did not vary significantly over the course of the study. “The mean coefficient of variation in milk production over the 4 months was 17%, which reflected the variability between individuals. The mean coefficient of variation in milk production within individuals over the 4 months was 12%” (Butte et al., p. 298). The purpose of the study was to investigate the influence of maternal diet and body composition on lactation performance. The investigators concluded that the recommended energy allowance of 2,500 kcal/day was in excess of the needs of the women who participated in this study (Butte et al., p. 304).

Avoidance of stress

Another myth concerning breastfeeding is that women feel they should not breastfeed due to “stressful home situations” (Guttman & Zimmerman, 2000, p. 1467). The incorrect perception is that breastfeeding requires a mother to avoid stress and to get a great deal of rest in order to produce milk (Guttman & Zimmerman, p. 1467).

Fear of increased maternal health problems

While the health benefits breastfeeding provides for infants are widely known, many women do not know the benefits that lactation affords the mother. In the Guttman and Zimmerman (2000) study, non-breastfeeding mothers “did not believe breastfeeding offers health benefits to mothers” (Guttman & Zimmerman, p. 1468).
On the contrary, many women incorrectly believe they will need regular access to their healthcare provider to sustain successful lactation.

Often, low-income women lack access to healthcare that is readily available to other socioeconomic groups. “The risks and stresses of daily existence lead to a crisis mentality, leaving little energy for preventive health care” (Abramson, 1992, p. 719). As a result of significant stress of daily life, breastfeeding is often viewed as a “task too difficult to attempt” by mothers in the low-income population (Abramson, p. 719).

**Health Services-Related Factors**

“Hospital practices with regard to separation of mothers and infants, practices regarding the use of infant formula, as well as staff training and orientation may also affect the initiation and duration of breastfeeding” (Ford & Labbok, 1990, p. 451). The role of the healthcare professional can be critical in providing women with the information they need to make the decision to breastfeed as well as ensuring that women have access to the support they need to be successful in breastfeeding. Negative attitudes and lack of knowledge on the part of healthcare providers can be barriers to successful breastfeeding practices (Black et al., 1990, p. 259).

**Staff Attitudes and Clinical Management Practices**

Because women look to healthcare professionals for advice when making infant feeding decisions, healthcare professionals must be knowledgeable about breastfeeding. However, many healthcare professionals have had inadequate training in breastfeeding promotion and support. “The unfortunate consequence of inadequate training of health care professionals is inappropriate management of lactation and a clinical bias toward use of human milk substitutes when problems with breastfeeding arise” (ADA, 1997, p. 2).

The breastfeeding knowledge, attitudes, training, and experience of healthcare professionals impact the breastfeeding initiation and duration of their clients.
In a 1991 survey of 84 mothers, 17 percent reported “inaccurate and inappropriate advice from health care professionals as a barrier to initiation and continuation of successful lactation” (Spisak & Gross, 1991, p. 17). Lack of support from those healthcare professionals was identified by 32% of the mothers as an additional barrier to their success (Spisak & Gross, p. 32). “Health professionals often contribute to the ambivalence of mothers regarding breastfeeding by furnishing mixed, inconsistent or medically inaccurate messages” (Guttman & Zimmerman, 2000, p. 1458).

The lack of knowledge about breastfeeding and the assumption that clients have enough information about infant feeding to make an informed choice are specific concerns about healthcare providers, as identified by researchers. Brosseau (1994) confirmed the research findings of other investigators when she identified that the attitudes of healthcare professionals toward breastfeeding affect the quality and quantity of information they provide. She “identified three influences that shape attitudes among health care providers: breastfeeding education, media and consumerism, and personal experience” (Brosseau, p. 10). Moreover, she reported that the most prevalent reason given by health professionals for not encouraging breastfeeding is that they don’t want to make the woman feel guilty (Brosseau, p. 10).

Multiple descriptive, correlational and quasi-experimental studies were reviewed by Cronenwett and Reinhardt (1987) to investigate the relationship between support offered by health professionals and the decision to breastfeed (Cronenwett & Reinhardt, p. 199). The results of their findings suggest that “present methods used by health care providers have little or no influence on mothers’ initial decision about infant feeding method” (Cronenwett & Reinhardt, p. 202).

The National Maternal and Infant Health Survey (NMIHS) indicated that African American women are more likely than white women to report not receiving information about breastfeeding from their prenatal care provider (Kogan et al., 1994,
The survey suggests that (as a result of reading the literature on demographic factors associated with breastfeeding) physicians and other healthcare providers may perceive African American women as less likely to breastfeed and thus determine that their time is better spent supporting women of other ethnic/racial groups whom they believe to be more likely to choose to breastfeed. Dracup and Sanderson (1994) reported a similar effect of healthcare workers’ perceptions about the likelihood of breastfeeding among certain demographic groups (Dracup & Sanderson, p. 160).

Cadwell (1999) cited that the greatest challenge to the ability of health professionals concerning the promotion and support breastfeeding was “other health professionals who are not knowledgeable or supportive of breastfeeding” (Cadwell, p. 532). Educational programs targeting healthcare professionals about clinical management issues of breastfeeding “must highlight the importance of nursing for a longer duration to fully achieve the potential benefits for both mother and infant” (ADA, 1997, p. 3). Ultimately, “all breastfeeding mothers must have access to lactation management support provided by trained physicians, nurses, lactation specialists, peer counselors, or other trained health care providers, especially during the first days and weeks postpartum” (USDHHS, 2000a, p. 14).

Physicians

Physicians play an important part in the infant feeding decisions and practices of parents, as well as encouraging breastfeeding within the communities where they serve (Pletta, 2000, p. 58). “Mothers who are given positive advice about breastfeeding from a physician are much more likely to initiate breastfeeding regardless of ethnic or economic diversity” (Pletta, p. 57-58). Therefore, attitudes and actions of physicians that are perceived by patients as being non-supportive of breastfeeding often serve as barriers.

Women may perceive that their physicians are indifferent to breastfeeding if the physicians do not bring up the subject. From their study of 120 WIC participants
in Georgia, Black et al. (1990) recommended that “physicians assume a more aggressive role in initiating discussion with the mother on feeding methods” (Black et al., p. 259). They suggested “that health care providers should exert influence on maternal breastfeeding beliefs by reinforcing the concept of breastfeeding in the context of preventive health activities, encouraging women through direct positive advice about breastfeeding and distributing resource materials about breastfeeding” (Black et al., p. 259).

Physicians often report “attitudes supportive of breastfeeding but are frequently inadequately trained to recognize problems and to offer interventions that support breastfeeding” (ADA, 1997, p. 2). Many physicians continue to recommend weaning infants from breast milk and suggest feeding infant formula to infants when current medical research does not validate that recommendation (Gorrín-Peralta & Parrilla-Rodríguez, 2000, p. 376).

In Graffy’s (1992) research about mothers’ experiences with breastfeeding, 42% responded they had been advised to give a formula bottle as a supplement when they reported to their physicians that they felt they didn’t have enough milk. If mothers had been taught by their physicians to understand the way breast milk is produced, they could have breastfed more effectively and increased their milk supply instead of giving formula supplements (Graffy, p. 63).

“Breastfeeding provides health advantages for mothers as well as babies and...should be encouraged by all physicians who care for women in childbearing years” (Zimmerman, 1996, p. 103). “Physician apathy and misinformation” have been listed by the American Academy of Pediatrics as obstacles to the initiation and continuation of breastfeeding (AAP, 1997, p. 3). Healthcare providers should encourage breastfeeding by creating an atmosphere that is receptive to breastfeeding and by distributing educational materials promoting the practice of breastfeeding (ACOG, 2001, p. 228).
Nurses

Multiple studies have established the importance of the nurse as a source of breastfeeding information and support (Isabella & Isabella, 1994, p. 263). Although maternity nurses have a unique opportunity to support a mother’s decision to breastfeed, they can also negatively impact a mother’s success with breastfeeding. Nurses who are involved in educating others about breastfeeding must be aware of their own attitudes and beliefs about breastfeeding, and they must demonstrate real interest in and respect for the sentiments of the mother who is breastfeeding (Patton, Beaman, Csar & Lewinski, 1996, p. 112).

While there have been multiple national campaigns to promote breastfeeding, “there has been no initiative focused on a major barrier to breastfeeding: the non-supportive attitudes and behaviors of maternity nurses” (Patton, 1996, p. 112). Previous studies have focused on the knowledge deficits of nurses related to lactation rather than the nurses’ attitudes about breastfeeding and “the extent to which they promote it in their day-to-day practice” (Patton, p. 112).

Patton (1996) surveyed 230 maternity nurses who worked in 20 hospitals to discover what the nurses perceived as barriers to providing bedside breastfeeding support. Seventy-five percent of the nurses ranked “time factors” as their primary barriers to providing adequate breastfeeding support (Patton, p. 112). Brief hospital stay, short staffing, other priorities and paperwork were specifically named as factors which prevented them from providing bedside breastfeeding support. Hands-on lactation education for patients was perceived by nurses as too time consuming in light of other nursing responsibilities. Moreover, nurses also cited their own “lack of breastfeeding knowledge as a significant barrier to providing breastfeeding support (23 percent)” (Patton, pp. 112-113).

The nurses also were asked to report on maternal barriers to breastfeeding success. The “most frequently mentioned maternal barriers to breastfeeding were
mothers’ incomplete knowledge (39 percent) and poor psychosocial support (36 percent)” (Patton, 1996, p. 113). “It is essential for maternity nurses and other support staff assisting new mothers to be trained in the most effective methods of managing and promoting breastfeeding, if goals (on the personal and population level) are to be met” (Isabella & Isabella, 1994, p. 263).

Historically, hospital nurses have been an important source of breastfeeding education for new mothers. As the length of hospital stay after delivery shortens and the patient to nurse ratio increases in hospitals, the role of the pediatric office nurse in breastfeeding education and support is increasing. Clearly, pediatric office nurses play an important role in assisting breastfeeding women. Register et al. (2000) surveyed the nursing staffs (n = 227) of 27 private pediatric practices in North Carolina to determine their breastfeeding knowledge and attitudes. “Most respondents (83%) felt that breastfeeding promotion is a good use of their time and that follow-up of a new breastfeeding mother is the role of the office nurse” (Register et al., 2000, p. 213). In addition, “fewer than half (46%) said their nursing school was a source of training” (Register et al., pp. 212-213). The data from this study by Register et al. indicates a need to increase the knowledge, clinical experience and confidence of pediatric office nurses (Register et al., p. 214).

**Lactation consultants**

Mothers often express discontent with the breastfeeding information and/or support they receive from their primary healthcare providers. Many women are seeking the advice and support of lactation consultants. Increasingly, hospitals, private physician practices, and public health programs are hiring certified lactation consultants to provide prenatal breastfeeding education and postpartum breastfeeding instruction, counseling, and support (Guttman & Zimmerman, 2000, p. 1458).
**Hospital and public health policies**

The shift from home births to hospital births was one of several important factors that contributed to the decline in breastfeeding rates (Mulford, 1995, p. 465). Hospital policies and procedures often are barriers to breastfeeding success. Healthcare professionals cited “hospital policies and procedures that did not foster breastfeeding” as a substantive barrier to their success with supporting breastfeeding (Cadwell, 1999, p. 532). In the hospital setting, infant feeding often is regarded as a science with potential pathologic aspects rather than simply a nutrition issue. Short hospital stays make it difficult for even well trained staff to provide the necessary education and support for breastfeeding in the limited amount of time available after delivery. In addition, the presence of formula, both in the hospital and in take-home discharge packs, serves to decrease the number of mothers who breastfeed their infants (Abramson, 1992, p. 720; Mulford, p. 464).

Multiple investigators have suggested that hospitals must adopt policies that support breastfeeding if hospital infant feeding practices are to improve (Mihok, 1997, p. 28). “Disruptive hospital policies,” “inappropriate interruption of breastfeeding,” “early hospital discharge,” and “commercial promotion of infant formula through distribution of hospital discharge packs” were identified by the American Academy of Pediatrics as obstacles to the initiation and continuation of breastfeeding (AAP, 1997, p. 3).

**Rooming-in**

The separation of mother and infant soon after birth interferes with breastfeeding initiation and duration (Cole, 1977, p. 352; Ford & Labbok, 1990, p. 451). Multiple investigators have reported a significant positive relationship between the amount of time the mother spent with her infant in the hospital and breastfeeding success (Scott & Binns, 1999, p. 9). Rooming-in (allowing the infant to remain in the mother’s hospital room on a 24-hour basis instead of placing the baby
in a common nursery) provides the maximum opportunity for interaction between the
new mother and her newborn (ACOG, 2001, p. 222; Ford & Labbok, 1990, p. 451;
Scott & Binns, p. 9).

**Early mother-infant contact**

“The initial feeding should occur as soon after birth as possible, preferably, in
the first hour when the baby is awake, alert and ready to suck” (ACOG, 2001, p. 222).
The routine separation of mothers and newborns after delivery hinders the initiation
of breastfeeding during the first hour following birth, as recommended by the
American Academy of Pediatrics (Gorrín-Peralta & Parrilla-Rodríguez, 2000, p. 378).
Unfortunately, the policies and procedures in many hospitals give precedence to the
mechanics of weighing, measuring, and other postpartum activities over the first
feeding (ACOG, p. 222). Hands-on assistance during the early postpartum period
should help new mothers with “appropriate positioning and latch-on to avoid breast
soreness and/or engorgement” (ADA, 1997, p. 5).

A quasi-experimental, randomly assigned study which controlled for a variety
of potentially confounding variables such as method of delivery, infant health, parity,
and access to breastfeeding guidance was conducted by Pérez-Escamilla, Pollitt,
Lönnerdal and Dewey (1994). Their research suggests that rooming-in was positively
associated with lactation performance among primiparous mothers. They proposed
that this success was achieved because breastfeeding was initiated earlier and/or a
significantly higher nursing frequency resulted during the hospital stay than when
rooming-in was not available (Pérez-Escamilla et al., p. 89).

Rooming-in allows the new mother and her newborn to begin the adjustment
to the breastfeeding routine (ACOG, 2001, p. 222). Rooming-in allows for “frequent
and unrestricted suckling in the early days of life, which in turn has been shown to
eliminate some neonatal feeding problems often associated with breastfed neonates,
such as weight loss, slow weight gain and elevated serum bilirubin levels” (Scott & Binns, 1999, p. 9).

Rooming-in also provides the mother the opportunity to observe and, therefore, learn her child’s feeding cues or signs of hunger (ACOG, 2001, p. 222). Feeding on demand is the unrestricted pattern of breastfeeding characterized by unscheduled day and night feedings, in which the mother remains in close proximity to the infant, observing when her infant is hungry (Scott & Binns, 1999, p. 9).

**Supplementary/complementary feeding**

In-hospital formula feeding represents a psychosocial barrier for many new breastfeeding mothers (Chezem et al., 1998, p. 649; Ford & Labbok, 1990, p. 451). Chezem et al. found that any feeding of breast milk substitutes during hospitalization was associated with shortened breastfeeding duration (Chezem et al., p. 650). They also reported that some mothers perceive that “offering formula to the newborn shows a preference for formula feeding by medical professionals” (Chezem et al., p. 649). Goodine and Fried (1984) investigated the duration of breastfeeding and factors that determined its cessation. Tracking the duration of 288 predominantly middle-class breastfeeding women, their results indicated that supplementation in the hospital was associated with shorter duration. “The length of time the woman breastfed was associated with whether or not supplementation (formula or glucose) was given in hospital” (Goodine & Fried, p. 442). The early introduction of formula supplements by hospital staff “has been negatively associated with duration of breastfeeding when other potentially confounding variables such as low birth weight, infant health problems and admission to the special care nursery have been controlled” (Scott & Binns, p. 10).

The effect of the introduction of infant formula on breastfeeding rates is difficult to describe fully because in the past, few studies have differentiated between supplementation and complementation. Coreil and Murphy (1988) defined
supplementation as “the replacement of an entire feeding with formula,” and they defined complementation as “giving formula immediately after a breastfeeding to complete a meal” (Coreil & Murphy, p. 274). Supplementation results in a reduction in the frequency of sucking and has been shown, therefore, to result in decreased milk production. Scott and Binns (1999) observed that supplementation during the early postpartum period is detrimental to breastfeeding success, but noted that the effect of complementation on milk production remains unclear (Scott & Binns, 1999, pp. 9-10).

**Breastfeeding guidance from hospital staff**

“Hospital personnel should have adequate time allotted to each patient, no matter when the delivery occurs, and provide a specific program on practical aspects of breastfeeding that women master before discharge” (ACOG, 2001, p. 222). Health professionals in the hospital should observe the mother breastfeeding and ensure the mother has “correct nursing positions, latch-on, and adequacy of newborn swallowing” (ACOG, p. 222). While in the hospital, the mother also should be educated about “age-appropriate elimination patterns” and normal patterns of weight loss and gain for her infant (ACOG, p. 222).

**Timing of hospital discharge**

U.S. national data on hospital discharge reflect that the “mean length of stay for childbirth has declined by nearly 60% over the past 30 years, to 1.4 days” (Margolis & Schwartz, 2000, p. 121). Health professionals report that early discharge may have a negative effect on breastfeeding (Margolis & Schwartz, p. 121; Tuttle & Dewey, 1995, p. 73). Significant numbers of case studies have indicated that “additional postpartum time in the hospital may have averted complications stemming from inadequate breastfeeding” (Margolis & Schwartz, p. 121).

However, Margolis and Schwartz (2000) also point out that women who experience short stays in-hospital often breastfeed successfully. They suggest that
while longer hospital stays may help in the identification of breastfeeding problems, longer stays also may hinder breastfeeding success as the mother and infant are exposed to hospital practices and procedures that may include “routine formula supplementation, distribution of formula promotional materials, and endurance of hospital medical routines that create an environment adverse to breastfeeding” (Margolis & Schwartz, pp. 125-126).

**Availability of follow-up after hospital discharge**

New mothers need follow-up care from healthcare professionals after hospital discharge. Unfortunately, hospital stays for vaginal deliveries are typically 24 to 48 hours. When mothers leave the hospital within 48 hours of delivery, follow-up appointments with a healthcare provider should be scheduled between the infant’s second and fourth day when the health status of the infant can be assessed. In addition, someone with knowledge of breastfeeding should observe the mother and infant while breastfeeding (ACOG, 2001, p. 223). Regardless of any other social or familial support system, women need access to healthcare professionals for “ongoing instruction and advice” (ACOG, p. 223). Some hospitals provide a toll-free telephone number that mothers may call for advice and answers to questions (ACOG, p. 223). Mothers who received lactation education from hospital staff members were likely to call telephone helplines more frequently than women who did not receive lactation instruction (Schy, Maglaya, Mendelson et al., 1996, p. 121).

**Training of staff**

The training of hospital staff members may affect both the initiation and duration of breastfeeding (Ford & Labbok, 1990, p. 451). The *Healthy People 2000* report (USDHHS, 1990) “indicates that overcoming barriers to successful breastfeeding would require both public and professional education from health care providers” (Arora et al., 2000, p. 1). All staff members in obstetricians’ offices “should be aware of the value and importance of breastfeeding and understand that
their contacts with patients can help them decide to breastfeed and encourage them to continue” (ACOG, 2001, p. 228).

Adequate training for health professionals to increase their competence in breastfeeding promotion and management has been advocated by the Surgeon General’s Workshop, by professional organizations associated with multiple health professions, and by recognized experts in the field (Mihok, 1997, p. 26). One of the recommendations identified in the Second Followup Report: The Surgeon General’s Workshop on Breastfeeding and Human Lactation was to “improve professional education in human lactation and breastfeeding” (Spisak & Gross, 1991, p. 8).

A national random sample of pediatric residents (n = 999) and practitioners (n = 610) was surveyed by Freed, Clark, Lohr, and Sorenson (1995) to determine knowledge, attitudes, training, and activities related to breastfeeding promotion. Survey results suggest that “residency training does not adequately prepare pediatricians for their role in breastfeeding promotion” or to meet the needs of breastfeeding patients (Freed, Clark, Lohr & Sorenson, 1995, p. 490). In a similar survey of residents (n = 3,115) and physicians (n = 1,920) in obstetrics/gynecology and family medicine, Freed, Clark, Sorrenson, Lohr, Cefalo and Custis (1995) found that these physicians also “were ill-prepared to counsel breast-feeding mothers” (Freed, Clark, Sorenson, Lohr, Cefalo & Custis, 1995, p. 472).

Bagwell et al. (1993) surveyed physicians, dietitians and nurses working in the Alabama WIC program to determine their breastfeeding knowledge and attitudes. The results of their survey suggested that each of these groups had positive attitudes toward breastfeeding but were lacking in breastfeeding knowledge, especially with regard to answering maternal questions (Bagwell et al., 1993, p. 3).

Of specific concern with regard to the training of healthcare providers is their frequent lack of knowledge about possible contraindications for breastfeeding. Formula feeding often is recommended when not necessary, as a result of
inadequately trained hospital staff. For example, women who give birth by caesarean section are routinely encouraged to formula feed because they received medications such as analgesics and antibiotics during delivery. Neither of these categories of medications necessarily contraindicates breastfeeding. Such inaccurate information becomes a barrier to breastfeeding success (Gorrín-Peralta & Parrilla-Rodríguez, 2000, p. 378).

Healthcare professionals working with postpartum women should be trained to “recognize signs and symptoms of insufficient milk, such as infant lethargy and/or irritability, jaundice, infrequent defecating or urinating, and/or failure to gain weight or excessive weight loss (greater than 7% of birth weight)” (ADA, 1997, p. 5). With adequate training in lactation management and support, healthcare professionals will be prepared to recognize the onset of problems and, therefore, provide intervention which should “prevent lactation difficulties that lead to insufficient milk supply and early lactation cessation” (ADA, 1997, p. 5).

**Promotion of breastfeeding at all stages of care**

With the knowledge that many women make their infant feeding decision before pregnancy and that the overwhelming majority make their infant feeding decision prior to delivery, breastfeeding promotion at all stages of life is important. “Building positive attitudes and beliefs about breastfeeding should be carried out over several years by offering information in health, family life, biology, and babysitting classes for elementary and high school students” (Danner, 1991, p. 227).

Danner (1991) found that healthcare providers had minimal influence on the infant feeding decisions of low-income women and noted that the nature of prenatal care provided to many low-income women does not allow for breastfeeding counseling and education. She described the prenatal care available to low-income women as being “characterized by long waits, little time for discussion and questions,
and impersonal attitudes, leaving the women feeling helpless, frustrated, and uninformed” (Danner, p. 227).

Danner (1991) also addressed the ethical dilemma in which healthcare providers and educators find themselves relative to counseling mothers about the benefits of breastfeeding—particularly mothers who have stated that they do not want to breastfeed. She advocates for a “balanced perspective,” so the healthcare provider or educator will not be viewed as “fanatical or insensitive” (Danner, p. 228). While the counselor must be sensitive to the opinions of the mother, Danner also feels that it is equally unethical “not to give the mother the support she needs and all the correct information about breastfeeding, and to advise her about exploring her options” (Danner, p. 228). Moreover, she purports that failure to provide prenatal women with this information may well result in these women having to make uninformed decisions (Danner, p. 228).

In many clinics, women who express an initial preference for bottle-feeding receive little encouragement to breastfeed. Libbus (1994b) surveyed 90 public health departments in Missouri. With 75 (83%) responding, her results suggest that many healthcare providers, nutritionists and educators are reluctant to discuss the benefits of breastfeeding with women who express a desire to bottle-feed (Libbus, 1994b, p. 3). Only 38 women (51%) reported that they would be comfortable promoting breastfeeding if the woman had expressed an intention to bottle-feed (Libbus, 1994b, p. 6).

“Provider reluctance to challenge women’s decisions seems reflective of our society’s practice of respecting autonomy and individual choice” (Libbus, 1994b, p. 7). Libbus (1994b) speculates a number of possible reasons for this reluctance among healthcare providers, including “inadequate provider knowledge base or motivation” (Libbus, 1994b, p. 7). “The convention of not questioning choice may be damaging to current efforts to increase breastfeeding” (Libbus, 1994b, p. 7).
Unfortunately, many women are asked about their infant feeding decision before any education about the feeding choice is provided. Libbus (1994b) theorized that many women “may respond based on normative influences—that is, from information gathered from people in their social sphere—instead of responding from a position of knowledge” (Libbus, 1994b, p. 7). In essence, women are being asked to declare their infant feeding intentions before they have the necessary information to make an informed decision.

Libbus (1994b) also reported a low frequency of inclusion of family members or friends in breastfeeding education or counseling sessions. She points out that healthcare providers “may influence feeding choice by targeting the woman’s significant others for educational interventions” (Libbus, 1994b, p. 7).

Isabella and Isabella (1994) investigated the influence of first-time mothers’ perceptions of their marital relationships and support systems on breastfeeding initiation and duration. The results of their study suggest that to increase the incidence and duration of breastfeeding, “professionals working with new and expectant mothers to promote breastfeeding might focus their efforts on women who tend to be at risk for lactation failure: those who adjust poorly to pregnancy and/or lack marital satisfaction, as well as those who lack access to help with breastfeeding and family support systems” (Isabella & Isabella, p. 263).

**Effective management**

Effective management of lactation begins with early feedings (ideally within the first hour of birth). Optimally, obstetricians, pediatricians, hospital nursing staffs, physicians’ office staffs, and home health visitors work together to provide mothers with the individualized support they need. Isabella and Isabella (1994) outlined essential elements of lactation management as: “unrestricted access to the breast, prevention of jaundice through early and unrestricted nursing, avoidance of bottles of industrial milk and/or water in hospital and the first few weeks at home, and early
management of lactation to prevent nipple soreness, engorgement, and other common problems” (Isabella & Isabella, p. 263).

**Maternal Employment**

Many researchers have investigated the relationship between maternal employment and/or full-time enrollment in school and breastfeeding incidence and duration (Weimer, 1999, p. 32). One of the top three reasons reported by women as to why they did not breastfeed was that they “had to return to work” (Arora et al., 2000, p. 3). Limited maternity leave benefits are cited by many women as the reason they discontinued breastfeeding or never attempted breastfeeding (Guttman & Zimmerman, 2000, p. 1459).

In the United States, approximately one-third of mothers who choose to return to work after the birth of a child do so within three months; approximately two-thirds return to work within six months (USDHHS, 2000a, p. 16). De La Mora et al. (1999) reported that “whether or not the mother planned to return to work” was a significant predictor of maternal attitude toward feeding methods (De La Mora et al., p. 2375). Piper and Parks (1996) reported that mothers were more likely to breastfeed for longer than six months if they delayed returning to work (Piper & Parks, p. 7).

The need to return to work within a short period of time after the birth of a child has also been documented as a strong barrier to breastfeeding success (Chezem et al., 1998, p. 647; Arora et al., 2000, p. 1). Chezem et al. noted that “breastfeeding women who returned to work outside the home in the 1st year postpartum reported significantly shorter durations of lactation compared with those not employed outside the home” (Chezem et al., p. 647). Piper and Parks (1996) reported that “full breastfeeding during the infant’s first month predicted duration longer than six months” (Piper & Parks, pp. 10-11). Among different racial groups “African American women are more likely than other women to return to work earlier
(8 weeks) and to be engaged in jobs that do not allow the mother to be successful at breastfeeding” (USDHHS, 2000a, p. 16).

Barriers typically encountered by women in the workplace include “inflexibility in working hours, limited worker control over work schedules, and fear of job insecurity” (Guttman & Zimmerman, 2000, p. 1458).

Chezem et al. (1998) proposed reasons for the shorter durations of lactation, including: “brief maternity leave; lengthy separation of mother and infant, which may reduce milk supply; and lack of policies and facilities supportive of breastfeeding within the work environment” (Chezem et al., p. 647). The American Dietetic Association (1997) also cited “short maternity leave and the difficulty of maintaining a good milk supply with prolonged separation from the infant” as factors “mitigating against sustained breastfeeding” (ADA, p. 2). Brief maternity leave and lengthy separation of mother and infant can be identified as both physical and psychological barriers to breastfeeding success. The lack of policies and facilities supportive of breastfeeding within the work environment is evidence of social, cultural and economic barriers to breastfeeding success.

Gielen et al. (1991) found no association between intended return to work and initiation of breastfeeding. However, being employed was significantly associated with early cessation of breastfeeding. The target population of 1,900 was stratified by ethnicity (African American or white), level of education and intended infant feeding method. “A stratified design and disproportionate sampling (n = 22) were used to reduce the total number of women to be interviewed” (Gielen, p. 3). “Only 48% of the employed mothers compared with 68% of those not employed were still breastfeeding” at 2-3 months postpartum (Gielen et al., p. 7). “Maternal employment that involves working more than 20 hours per week outside the home may adversely affect initiation of breastfeeding and has been associated with early discontinuance of breastfeeding” (Miller & Miller, 1996, p. 2).
Many women return to work while their infants are less than six months old. These women miss work often because their infants are ill. As breastfed infants have been shown less likely to catch common infectious illnesses than formula-fed infants, mothers who breastfeed typically miss fewer days from work to care for sick babies than mothers who are formula feeding (Weimer, 1999, p. 35).

**Appropriate pumping location/time to pump**

Working mothers often experience fatigue and difficulties finding sufficient time to pump and store breast milk (Guttman & Zimmerman, 2000, p. 1458). Miller and Miller (1996) surveyed resident physicians who were breastfeeding their infants to learn if they had access to an appropriate place in their hospital to pump and store breast milk. Ten (n = 21) of the resident physicians “said there was no appropriate place in their hospital for them to express milk” (Miller & Miller, p. 3). In the same study, nineteen resident physicians (70%) described “insufficient time during their work shifts to express milk” (Miller & Miller, p. 3). The authors of the study suggest interventions to support the infant feeding decision of the working mothers, such as on-site day care and a flexible work schedule that would allow mothers sufficient time to visit their infants for feedings. Additional workplace policies should include a place with privacy for pumping and flexible work schedules that allow mothers time to use a breast pump. Such interventions could increase the number of working mothers who would continue to breastfeed (Miller & Miller, p. 5).

**Support of colleagues**

Sixteen (67%) of the twenty-four resident physicians surveyed by Miller and Miller (1996) “felt their colleagues were supportive of their efforts to express milk for their infants” (Miller & Miller, p. 3). “Mothers who receive support for continued breastfeeding as they re-enter the workplace tend to return earlier” after the birth of their infant (Weimer, 1999, p. 35).
Effects of infant formula marketing practices

“Currently, breastfeeding promotion stands in competition with the marketing of a for-profit, commercially-manufactured product: infant formula” (Guttman & Zimmerman, 2000, p. 1458). The marketing practices of infant-formula companies play a role in the infant feeding decision. The effect of infant formula marketing has been the topic of multiple studies which report that the distribution of free formula at the time of hospital discharge decreases breastfeeding duration (Bergervin, Dougherty, & Kramer, 1983, p. 1149; James et al., 1994, p. 3).

Aggressive marketing practices by infant-formula companies adversely affect both the initiation and duration of breastfeeding. Formula companies expend great efforts to “attract the interest of pregnant women with gift packs” (ACOG, 2001, p. 228). Physicians and all obstetric office staff members “should be aware that the giving of gift packs with formula to breastfeeding women is commonly a deterrent to continuation of breastfeeding” (ACOG, p. 228). No matter how subtle, a professional endorsement of the products accompanies the gift pack (ACOG, p. 228).

By sending these samples home with breastfeeding mothers, hospitals subtly promote the separation of the mother and infant while also undermining the mother’s confidence in her ability to breastfeed successfully (ADA, 1997, p. 2). In addition, some formula companies mail samples of formula and coupons for free formula directly to the homes of breastfeeding mothers (Lawrence, 1991, p. 2). “Physicians may conclude that noncommercial educational alternatives or gift packs without health-related items are preferable” (ACOG, 2001, p. 228).

The use of infant formula seems to be an attractive alternative for hospitals and physicians. “It enables the specification of measured dosages and ensures patient adherence to a schedule that is compatible with a biomedical professional-control orientation and has more of the scientific precision that breastfeeding schedules typically lack” (Guttman & Zimmerman, 2000, p. 1458).
Child care providers

The attitude of the child care provider toward breastfeeding can also represent a barrier to breastfeeding success. Although accommodations for breastfeeding should be available at all child care facilities, the reality is that many child care centers do not make the accommodations needed to support mothers who choose to breastfeed their infants. Providing breastfeeding-friendly child care on-site is perhaps the best way employers can support the families of their employees (Weimer, 1999, p. 34).

Breastfeeding Promotion Programs

The evidence of the health benefits associated with breastfeeding has increased interest in breastfeeding promotion. A number of states and local communities have organized breastfeeding task forces, committees and coalitions. “Activities of these groups include surveys to characterize breastfeeding policies and practices among health care providers; professional education programs; advocacy of breastfeeding through contacts with legislators, government agencies, insurance companies, etc.; sponsorship of community events related to breastfeeding; and serving as a clearinghouse for information on breastfeeding promotion resources” (Mihok, 1997, p. 27).

Current breastfeeding promotion efforts have been successful at supporting and even increasing initiation of breastfeeding. However, additional efforts are clearly needed to increase duration rates of breastfeeding. “The establishment of breastfeeding for at least 6 months, but optimally for at least one year, as a cultural norm supported by medical, social, and economic practices is a fundamental cornerstone of true promotion of wellness” (ADA, 1997, p. 6).

Additional efforts are needed by healthcare professionals (physicians, nurses, midwives, lactation consultants, nutritionists and dietitians, health educators and others involved in supporting breastfeeding) to advocate for changes “in policies to
allow longer family leave; family-friendly employers with on-site day care facilities and or nursing/pumping rooms; breastfeeding support personnel/lactation consultants; and attainment of reimbursement for lactation consultation and management for maternal or infant considerations” (ADA, 1997, p. 6).

A number of investigators have examined the relationship between breastfeeding education programs and incidence and duration of breastfeeding. Grossman, Harter, Sachs, and Kay (1990) conducted a study designed to determine if “intensive postpartum breastfeeding education and support result in a longer duration” (Grossman et al., 1990, p. 471). When compared to a control group, no significant difference in breastfeeding duration was found (Grossman et al., 1990, p. 471).

Results from a study by Kaplowitz and Olson (1983) suggest that an educational program consisting of five pamphlets mailed to subjects’ homes increased knowledge about breastfeeding but did not cause the women to form positive attitudes nor did the program increase the incidence or duration of breastfeeding” (Kaplowitz & Olson, p. 61). While their knowledge of breastfeeding increased, neither the incidence or duration of breastfeeding increased (Kaplowitz & Olson, p. 61).

Abramson (1992) defined cultural sensitivity as “acquiring a new awareness and a fundamental respect for differences among people” (Abramson, 1992, p. 718). She stressed the importance of cultural sensitivity in breastfeeding promotion (Abramson, p. 717). For example, multiple investigators have suggested that low-income African American women respond more positively to prenatal breastfeeding education in the form of group classes, individual counseling or videotape than printed materials (Gross et al., 1998; Kistin et al., 1990). “Prenatal breastfeeding education interventions for low-income women have been associated with increased breastfeeding intention and initiation but have not had an influence on breastfeeding duration” (Gross et al., p. 143). “One strategy to increase the duration of
breastfeeding is the provision of support to women who have initiated breastfeeding, thereby assisting these women to not give up breastfeeding” (Fairbank et al., 2002, p. 3)

In multiple studies, peer counselors have proven to be effective, with breastfeeding initiation and duration rates higher among women who participated in peer-counseling programs. “Peer counselor support and motivational videos can positively affect the duration of breastfeeding among African-American women” (Gross et al., 1998, p. 143). Long et al. (1995) used the definition of a breastfeeding peer counselor from the Utah WIC program, which is, “a woman who has experience with breastfeeding and whose role is to provide information, counseling, and support to WIC prenatal and postpartum participants to assist them in their breastfeeding experience” (Long et al., p. 280). Peer counselor support increased both the initiation and duration of breastfeeding for “at least the first three months” among program participants (Long et al., p. 283).

**Social Marketing**

“A general consensus among breastfeeding advocates is that the first step in improving breastfeeding practices is to alter cultural norms” (Mihok, 1997, p. 29). Social marketing utilizes “commercial marketing techniques and theories to design, implement, and evaluate social change initiatives” (Lindenberger & Bryant, 2000, p. 53). Best Start Social Marketing developed a social marketing campaign “intended to be a comprehensive, national effort to promote breastfeeding among families enrolled in WIC” (Lindenberger & Bryant, p. 54). To date, Best Start has been unsuccessful in acquiring funding for evaluation of the social marketing campaign. However, “state and local WIC programs have reported that the implementation process has gone smoothly and breastfeeding rates have risen since the program was launched” (Lindenberger & Bryant, p. 59).
International Initiatives

The International Code of Marketing of Breast-Milk Substitutes was developed and adopted by the United Nations in 1981 through the efforts of the World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) (UNICEF, 1999, p. 7). The Code, dating from 1981, is a set of recommendations regarding the “marketing practices of breast milk substitutes” (Walker, 2001, p. 13), and was created to counteract the influence of infant formula-producing companies on declining rates of breastfeeding in both developing and developed countries (Mihok, 1997, p. 24). When the Code was brought to a vote in the World Health Assembly (1981), only one nation of the 122 member states represented—specifically, the United States of America—opposed adoption of the Code. “Although the U.S. Congress condemned this negative vote which reflected the position of the administration at the time, the United States continues its official opposition to the WHO Code” (Mihok, 1997, p. 25). The U.S. finally adopted the WHO Code in 1994.

In 1992, UNICEF and WHO launched the Baby-Friendly Hospital Initiative (BFHI) “to ensure that all hospitals become centers of breastfeeding support” (UNICEF, 1999, p. 5). In order to be recognized as Baby-Friendly, hospitals must agree “not to accept free or low-cost breastmilk substitutes, feeding bottles or teats, and to implement the Ten Steps to Successful Breastfeeding” (UNICEF, p. 5). Since 1992, “nearly 15,000 hospitals in 128 developing and industrialized countries have been awarded Baby-Friendly status” (UNICEF, p. 5). Unfortunately, less than 50 of those Baby-Friendly hospitals are in the United States of America. Hospital administrators in the U.S. have been reluctant to relinquish the free formula available to them from formula companies. “The Baby Friendly Hospitals Initiative has notable potential to enhance successful initiation of breastfeeding, but full implementation has yet to be realized in US hospitals” (ADA, 1997, p. 2).
U.S. Surgeon General reports

In 1984, the first U.S. Surgeon General’s Workshop on Breastfeeding was convened. This event was the first U.S. national meeting “focused exclusively on supporting breastfeeding” (Spisak & Gross, 1991, p. iii). The Surgeon General’s Workshop on Breastfeeding convened medical and nutrition professionals and representatives from the media, as well as business and industry. This group generated recommendations designed to increase breastfeeding initiation and duration. The strategies developed at the 1984 meeting are still used today as the nation moves toward the breastfeeding objectives as published in *Healthy People 2010: Understanding and Improving Health*” (USDHHS, 2000b, p. 8).

Healthy People 2000 goals

The United States Department of Health and Human Services (USDHHS, 1990) published *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*, created to continue efforts toward the achievement of national breastfeeding goals. The objectives addressing breastfeeding read: “To increase to at least 75% the proportion of mothers who breastfeed their babies in the early postpartum period and to at least 50% the proportion of mothers who continue to breastfeed until their babies are 5 to 6 months old” (Cadwell, 1999, p. 530). “The in-hospital breastfeeding rate for 1996 was 59.2%, substantially lower than the 75% year 2000 goal and an increase of fewer than 6 percentage points over 1988 baseline” (Cadwell, p. 535). The five- to six-months breastfeeding rates were reported individually by ethnicity. The total breastfeeding rate at five- to six-months was “estimated to be under 25%, less than half the goal” (Cadwell, p. 535).

The Maternal and Child Health Bureau (MCHB) of the U.S. Department of Health and Human Services initiated and directed the 1984 Surgeon-General’s Workshop on Breastfeeding and Human Lactation, and continued to monitor progress on workshop objectives. MCHB is the governmental body that requested that
breastfeeding be included in a study of maternal nutrition conducted by the Institute of Medicine. The report from the study conducted by the Institute of Medicine (IOM), *Nutrition During Lactation*, was published in 1991 (IOM, 1991, p. 21).

**Healthy People 2010 goals**

In 1990, a U.S. national workshop entitled “Call to Action: Better Nutrition for Mothers, Children and Families” was sponsored by MCHB and USDHHS. Recommendations were developed as a result of this workshop, the eighth of which reads: “to promote breastfeeding among all women to achieve the year 2000 National Health Promotion and Disease Prevention Objectives for breastfeeding, and establish breastfeeding as the societal norm for infant feeding” (Cadwell, 1999, p. 531).

In November of 2000, *Healthy People 2010* was released, continuing this initiative into the 21st century (USDHHS, 2000b, p. 1). As in the *Healthy People 2000* goals, the goals of *Healthy People 2010* include an objective pertaining to breastfeeding. This objective maintained the 2000 goal of having 75% of all new mothers initiate breastfeeding. Breastfeeding duration aspects of the goal call for 50% of those women initiating breastfeeding to continue through six months postpartum, with 25% still breastfeeding when the infant is 12 months (USDHHS, 2000b, pp. 16-46).

**Cultural Appropriateness**

If they are to be successful, breastfeeding promotion efforts must address the barriers of language and literacy (International Lactation Consultant Association [ILCA], 1999, p. 16). Written materials targeting low-income women should be composed on a fourth-grade to sixth-grade reading level. Often the response of low-income women is stronger to visual images than verbal or written messages. Moreover, Abramson (1992) notes that “the amount of written text on a page should be minimal” (Abramson, p. 721). Multicultural images should be employed and culturally based issues should be considered, such as “modesty and style of hair and
dress” (Abramson, 1992, p. 721). “To overcome cultural barriers, breastfeeding education should be based on the principle of dialogue. Teachers and students are seen to be involved in a mutual learning process that reinforces participant self-esteem and empowerment” (Abramson, p. 721).

**Infant Biomedical Factors**

Multiple infant biomedical factors have been identified affecting the infant feeding decision. Of these factors, prematurity, birth weight, health, congenital conditions, and environmental contaminants are discussed below.

**Prematurity**

The health advantages of human milk for infants are compounded for the premature infant. “The unique nutritional qualities of human milk, including the protein/amino acid and lipid composition, offer advantages with respect to digestibility and feeding tolerance, maturation of the gastrointestinal tract, and neurologic development” (ADA, 1997, p. 5). The antibodies and cellular components of breastmilk work to help protect premature infants with immature immune systems from infection (Hertz, 2001, p. 18).

**Birth weight**

Low birth-weight infants are less likely to be breastfed than their normal weight counterparts (Ford & Labbok, 1990, p. 455). Similarly, low birth weight has been negatively associated with breastfeeding duration (Scott & Binns, 1999, p. 11).

**Health**

After controlling for confounding variables, “a negative association between infant health problems and both the initiation and duration of breastfeeding have been reported” (Scott & Binns, 1999, p. 8). With careful medical management, mothers of infants with many serious health conditions can breastfeed successfully. Examples of such health conditions are cleft lip and cleft palate, “inborn errors of metabolism, especially phenylketonuria; cystic fibrosis…and Down syndrome” (ADA, 1997, p. 6).
Serious health problems diagnosed at birth may require that the mother and newborn be separated for significant periods of time while the health issues of the infant are addressed. As a result, the initiation of breastfeeding may be delayed by 24 hours or more. Hospital staff should be encouraged to limit the separation of the mother and newborn as much as possible to assist with the establishment of lactation (Scott & Binns, 1999, p. 8).

Serious health conditions of the newborn often require that the infant remain in the hospital after the mother is discharged. Regardless of the reason, “if the child was in the hospital longer than the mother, then the child was less likely to be breastfed” (Ford & Labbok, 1990, p. 453).

**Congenital conditions**

Infants with congenital health conditions were breastfed for shorter periods of time than other infants (Arora et al., 2000, p. 1). Ethnic differences were reported in the breastfeeding behaviors relative to congenital conditions. A positive relationship was found between white infants with congenital problems and receiving human milk, while no relationship was found between African American infants with congenital problems and receiving human milk (Ford & Labbok, 1990, p. 454).

**Environmental contaminants**

There is concern about the possible effects of pollutants in breast milk. Toxic waste has accumulated in soil, water and air and, as a result, in the food chain. Although breast milk worldwide is contaminated with low levels of pollutants, these levels of contamination pose minimal risk to infants. The American Academy of Pediatrics and the World Health Organization both recommend breastfeeding as the optimal method for feeding infants in spite of the evidence of chemical residues in breast milk (Rogan, 1996, p. 981).
Maternal Biomedical Factors

Multiple maternal biomedical factors have been identified as affecting the infant feeding decision. A number of these maternal biomedical factors are discussed below.

Parity

Multiple researchers have investigated the relationship between breastfeeding duration and parity (the number of children borne by one woman). Generally, research findings suggest increased breastfeeding duration with each subsequent child. “Duration of lactation increased with parity, approximately 5 months per child” (Arora et al., 2000, p. 1). Ford and Labbok (1990) also found that breastfeeding duration increased with parity. However, the increase they measured was approximately one-half month per child (Ford & Labbok, p. 454).

Prenatal care

Researchers in the field of lactation and breastfeeding have concluded that quality prenatal care is associated with higher breastfeeding initiation. Shorter duration of breastfeeding was associated with “later onset of prenatal care” (Grossman, et al., 1990, p. 473).

Childbirth experience

Scott and Binns (1999) suggested that a woman’s “persistence with breastfeeding” is likely to be affected by her childbirth experience (Scott & Binns, p. 8). There are multiple negative effects on breastfeeding when cesarean section delivery is required; cesarean section delivery is categorized as major surgery (Gorrín-Peralta & Parilla-Rodríguez, 2000, p. 378). Childbirth by caesarean section often hinders breastfeeding initiation as a result of the separation of mother and newborn immediately after birth as the physician attends to the mother’s medical needs (Scott & Binns, 1999, p. 8). In addition, the mother’s pain level is increased and her mobility is reduced, thus making breastfeeding instruction and support
relative to breastfeeding positioning especially important (Gorrín-Peralta & Parilla-Rodríguez, 2000, p. 378). “However, it would appear that once breastfeeding is initiated, a caesarean delivery has no long-term negative impact on breastfeeding success” (Scott & Binns, p. 8).

Ford and Labbok (1990) also found a relationship between the childbirth experience and breastfeeding success. In general, their research suggests that normal vaginal deliveries free of complications and without the use of pain medication were associated with higher breastfeeding rates. Similarly, if complications were encountered during labor and delivery, “the likelihood of breastfeeding decreased” (Ford & Labbok, p. 454).

**Body mass index (BMI)**

A high maternal body mass index (BMI) has been negatively associated with breastfeeding duration. BMI is defined as a measure of body fat based on a ratio of weight to height (Scott & Binns, 1999, p. 11). A BMI less than 25 is categorized as normal weight, 25.0 through 29.9 is considered overweight, and a BMI greater than or equal to 30 is considered obese (Ruowei, Ogden, Ballew, et al., 2002, p. 1107).

**Health conditions**

While most women can breastfeed, there are conditions that contraindicate breastfeeding. Those contraindications include women who “take street drugs or do not control alcohol use, have an infant with galactosemia, are infected with the human immunodeficiency virus (HIV), have active, untreated tuberculosis, take certain medications, or are undergoing treatment for breast cancer” (ACOG, 2001, p. 219). Otherwise, “lactation is appropriate for women with systemic lupus [sic] erythematosis, hypertension, Crohns’ [sic] disease, and many other chronic diseases if medications are chosen carefully” (ADA, 1997, p. 5).

While breastfeeding is not contraindicated with a number of other health problems, the incidence of breastfeeding is reduced among women with health
problems. Two examples of these health problems are diabetes (Ford & Labbok, 1990, p. 454) and maternal anemia (Scott & Binns, 1999, p. 11).

Use of alcohol

There are many misconceptions about the relationship between alcohol and breastfeeding. Many resources suggest that a breastfeeding woman should not consume any alcohol. “Alcohol is a toxin, so a breastfeeding woman should minimize or avoid it, and a mother who drinks significant amounts of alcohol should not breastfeed” (ACOG, 2001, p. 219).

However, Lawrence (1994) suggests that the “recommendation regarding alcohol requires the physician to avoid the extremes and assist the mother in adjusting her alcohol consumption appropriately, avoiding prescribing or prescribing it” (Lawrence, 1994, p. 344). The mother of a full-term, healthy infant can safely enjoy an alcoholic beverage every 24 hours. Lawrence (1994) cautions that “many women who enjoy an occasional beer or wine may well be discouraged from breastfeeding if they think wine or beer would be forbidden” (Lawrence, 1994, p. 343).

Smoking

Non-smokers are more likely to breastfeed their infants exclusively than women who smoke tobacco (Arora et al., 2000, p. 1; Ford & Labbok, 1990, p. 454). Research evidence suggests that smoking is negatively associated with breastfeeding initiation and duration (Scott & Binns, 1999, p. 8). “Furthermore, a clear and significant dose-response pattern was present for the daily number of cigarettes smoked by the mother” (Scott & Binns, p. 9).

Hill and Aldag (1996) investigated the relationship between smoking and breastfeeding status at 8 weeks postpartum in 400 mothers of term infants and 110 mothers of low-birth weight infants. “Women who smoked were more apt to stop breastfeeding early in both study samples” (Hill & Aldag, p. 125). Hill and Aldag also found a relationship between smoking and the “levels of milk production”
Smoking mothers reported a “significantly higher incidence of perceived insufficient milk compared with nonsmoking mothers” (Hill & Aldag, p. 130).

Additionally, the 1996 study by Hill and Aldag results reflected a higher rate of reported colic among the infants of smokers. The researchers presumed the increased incidence of colic to be “nicotine-induced” (Hill & Aldag, p. 130). Clearly, “smoking is a risk factor for the continuation of breastfeeding and a barrier to the promotion of infant health” (Hill & Aldag, p. 130).

**Medications**

There are very few classes of drugs that contraindicate breastfeeding (Hale, 2002, p. 6). These classes of drugs include: “radioactive isotopes, chemotherapeutic drugs, lithium, ergotamine, lactation-suppressing drugs and recreational drugs” (ADA, 1997, p. 5).

Many healthcare providers lack information about which drugs contraindicate breastfeeding. This lack of knowledge often leads them to recommend weaning unnecessarily. Ideally, a physician should “determine the risk/benefit ratio of continued breastfeeding” when deciding if breastfeeding should be terminated or temporarily averted (Lawrence, 1994, p. 323).

Lawrence (1994) cautions physicians that the lost benefits to the infant when breastfeeding is terminated are equally significant to potential drug interactions. “It is equally inappropriate to discontinue breastfeeding when it is not medically necessary as it is to continue breastfeeding while taking contraindicated drugs” (Lawrence, 1994, p. 324). In this way she summarizes the dilemma facing physicians with breastfeeding mothers who have health issues requiring medication. The physician must answer the question: “Can this infant be safely exposed to this chemical as it appears in breast milk without a risk that exceeds the tremendous benefits of being breastfed?” (Lawrence, p. 324).
Birth control

Exclusive breastfeeding provides an effective method of birth control (Lactational Amenorrhea Method [LAM]) for six months in mothers to whom menstruation has not returned (Gorrín-Peralta & Parrilla-Rodríguez, 2000, p. 375). Lawrence (1994) reports that “most studies of lactation indicate that the initial menses occur prior to the onset of adequate ovulation” (Lawrence, 1994, p. 584-585).

The conservative recommendations of the American College of Obstetricians and Gynecologists (ACOG, 2001) regarding contraception options for breastfeeding women include: the Lactational Amenorrhea Method; barrier methods such as condoms or diaphragms; intrauterine contraceptive devices; and male or female sterilization (if permanent contraception is desired). Conservative physicians will likely advise women choosing to breastfeed to avoid hormonal methods of contraception. However, women may view hormonal methods (birth control pills) as the most reliable and convenient form of contraception. A physician’s recommendation to avoid hormonal methods of contraception may present a significant barrier to breastfeeding for many women. (ACOG, p. 224).

In reality, progestin-only oral contraceptives “do not affect the quality of breast milk and may slightly increase the volume of milk and duration of breastfeeding compared with nonhormonal methods” (ACOG, 2001, p. 224). As a result, progestin-only contraceptives are the “hormonal contraceptives of choice” (ACOG, p. 224) for breastfeeding women. For exclusively breastfeeding women, the recommendation is to delay the introduction of progestin-only contraceptives for at least six weeks after delivery. This recommendation is surrounded by significant controversy: many experts feel that there is no evidence to prevent introduction as early as three weeks, while others believe the high progesterone levels diminish milk supply. Differing medical opinions and conservative labeling instruction leads to confusion and, therefore, hesitation among patients (ACOG, 2001, p. 224).
The debate and confusion are compounded for patients because of the recommendations for estrogen-progestin combination oral contraceptives. Contraceptives that contain both estrogen and progestin have been shown to reduce both the “quantity and quality of breast milk” (ACOG, 2001, p. 225). The official recommendation of the World Health Organization regarding estrogen-progestin oral contraceptives is that “breastfeeding women wait at least 6 months after childbirth to start using them” (ACOG, p. 225).

The American Academy of Obstetricians and Gynecologists (ACOG, 2001) recommends that if hormonal methods of contraception are desired, that the conservative label instructions be followed. The position of the ACOG on hormonal contraception while breastfeeding includes the following statement: “Most women experience reduced milk volume as a result of estrogen ingestion; this may be dealt with more easily after breastfeeding skills and patterns are established, should combined contraceptives be chosen despite this disadvantage” (ACOG, p. 225).

**Decision-Making Constructs/ Cognitive-Behavioral Theories**

Keith (1997) conducted a qualitative study to investigate how women make the infant feeding decision. Analysis of the interviews resulted in 14 themes which were “distilled into six conceptual categories” (Keith, p. 200). These categories are: benefits to infant; mother’s decision; procedural issues; body circumstances related to infant feeding; relationship factors and need for expertise. Keith’s model, Conceptualization of the Decision-Making Process in Infant Feeding, is based upon these six categories and their interdependence and interaction. “The process of decision-making occurs when factors are considered salient by the mother and are
allowed to influence the decision” (Keith, p. 212). The process outlined by the model is a dynamic process “in which change occurs overall if there is a change in any one part” (Keith, p. 212). By combining the abstract theories of decision-making with the real, concrete process of each individual mother, the decision-making process becomes visible (Keith, p. 212).

Bandura’s Social Learning Theory suggests “that behavior is determined by four different factors: cognitive processes; incentives and reinforcers, social modeling, and self-efficacy” (Kessler et al., 1995, p. 104). The four factors outlined by Bandura seem applicable to the infant feeding decision. “For example, cognitive processes (defined by Bandura as general attitude, knowledge, beliefs and prior experience) have been shown by several researchers to strongly influence a mother’s decision to breastfeed” (Kessler et al., p. 104). Some investigators have identified the “incentives or reinforcers provided by significant others to be important” (Kessler et al., p. 104). The fact that more breastfeeding mothers reported seeing their mother or female relatives breastfeed is reflective of social modeling at work (Kessler et al., p. 104). Lastly, “women who were more confident of their ability to breastfeed (their self-efficacy) at two weeks were more likely to be nursing at ten weeks” (Kessler et al., p. 104).

Fishbein’s (1980) Theory of Reasoned Action is based on the premise that much social behavior is “under volitional control and, consistent with this assumption, it views a person’s intention to perform (or not to perform) the behavior as the immediate determinant of that behavior” (Fishbein, p. 67). The intention to perform a certain volitional behavior is determined by two key factors: the individual
attitude toward the behavior and the social pressures put on the individual to perform or not perform the behavior in question. The latter factor dealing with social pressure is referred to as the subjective norm (Fishbein, p. 67). “Generally speaking, people will intend to perform a behavior when they evaluate it positively and when they believe that important others think they should perform it” (Fishbein, p. 67).

Manstead et al. (1984) suggest that the “choice of infant feeding method appears to be a highly suitable candidate for analysis in terms of the theory of reasoned action” (Manstead et al., p. 224). Obviously, the choice of the infant feeding method is a new decision for primiparous mothers. “Thus measures of attitude of behavior, subjective norms, and intentions, if taken prior to delivery, will not reflect prior behavioral experience” (Manstead et al., p. 224). Logically, the “observed relationships between these predictor variables and behavioral measures are highly suggestive of a causal link flowing from attitudes, norms and intentions to behavior” (Manstead et al., p. 224).

“Taking the present findings at face value, it would appear that attempts to increase the incidence of breastfeeding should focus on changing maternal attitudes to the two feeding methods rather than on changing real or perceived social norms” (Manstead et al., p. 230). If one is to be successful at achieving this kind of attitudinal change, the Theory of Reasoned Action suggests that the “primary beliefs underlying these attitudes” needs to change (Manstead et al., 1984, p. 224).

**Summary of Factors Affecting the Decision to Breastfeed**

Human milk is seen as the optimal nutrition for infants by the medical profession, yet many women choose not to breastfeed their infants. If the incidence
of breastfeeding is to increase, healthcare professionals and health educators must understand the factors that are necessary for the successful promotion of breastfeeding as well the factors required to support successful lactation.

Specific training to address the factors affecting the infant feeding decision should be integrated into the curricula of medical students who are studying to become obstetricians, pediatricians and family medicine practitioners, as well as the curricula for nurses, nutritionists, midwives, lactation consultants and social workers. Current practitioners should receive training in this subject matter area, as well as best practices in lactation management through ongoing professional development. Lactation professionals should lead the efforts to both promote the need for this training and to provide this education.

Demographic factors involved in the infant feeding decision that should be addressed in training programs of healthcare professionals include: age, ethnicity, socioeconomic status, years of education and marital status. Other factors affecting the infant feeding decision that should be included in training programs for health professionals include: familial factors, social attitudes, maternal perceptions, health services-related factors, infant and maternal biomedical factors.

Breastfeeding is a social behavior and as such must be learned like any other social behavior. Social support affects breastfeeding initiation and duration. Mothers report that the attitudes and opinions of family members and friends have the greatest influence on the decision to breastfeed (initiation). However, mothers report that health professionals and peer counselors are the keys to their success with breastfeeding (duration). The effect of sociocultural attitudes on infant feeding...
decisions should be considered when planning breastfeeding promotional efforts. Clearly, family (most especially the infant’s father and the maternal grandmother) and friends should be included in prenatal breastfeeding education classes.

Research studies have shown that a woman’s prenatal intention is the strongest predictor of her ultimate infant feeding method. In addition, the opinions, attitudes and perceptions of individuals who interact with a woman have a significant affect on her attitude toward breastfeeding. With this knowledge, health professionals and health educators should launch broad-based educational efforts promoting the benefits of breastfeeding targeting the general public including individuals of all ages. These social marketing campaigns should seek to change cultural norms regarding breastfeeding and raise awareness of the benefits of breastfeeding. Specific educational efforts should also target school-aged children of both sexes.

Hospital policies that are detrimental to the establishment of lactation must be addressed if breastfeeding promotion efforts are to be successful. Similarly, the training in lactation support and the attitudes toward breastfeeding of hospital personnel should be addressed to ensure that new mothers receive the support they need to successfully establish lactation.

Once breastfeeding is initiated, mothers need continued support for their infant feeding decision. New mothers need follow-up care from healthcare professionals, peer counselors and community support groups after hospital discharge.

Limited maternity-leave benefits and inadequate facilities in the workplace for pumping and storage of breast milk are significant deterrents to initiation and duration
of breastfeeding. Health professionals and health educators must work diligently to affect societal change where infant feeding norms are concerned. Special attention should be placed on educating employers about the economic benefits of breastfeeding.

Clearly, most women know that breastfeeding is best for their infants, and those who choose to breastfeed cite the health benefits for the infant as the most important reason for deciding to breastfeed. However, in spite of knowing the health benefits for their infants, many women choose not to breastfeed. The barriers to their success, whether genuine or perceived, may appear to them too difficult to overcome. Identification and understanding of the factors involved in the infant feeding decision can affect the design and delivery of education and care for breastfeeding mothers and their infants.
Chapter 3

METHODOLOGY

The purpose of this study was to identify the factors that affect the infant feeding decisions of limited-resource women in North Carolina who were participating in a postpartum breastfeeding support program. An overview of the population and sampling, instrumentation, data collection, description of study variables, and statistical procedures is presented.

Research Design

The research design included a multi-section questionnaire which was hand-delivered by staff members (program assistants of the In-Home Breastfeeding Support Program) to a random sample of women who were participating in the program. The questionnaire was a descriptive survey designed to examine and describe the demographic and familial factors, as well as the perceived barriers, that may influence the infant feeding decisions of limited-resource women in North Carolina participating in this program.

Population and Sample

The population sampled in this study consisted of limited-resource women in North Carolina who were enrolled as participants in the In-Home Breastfeeding Support Program (IHBSP). Respondents included women with a range of breastfeeding durations who were living in 40 North Carolina counties. A simple random sample of 500 women (without replacement) was taken from the 1,275 English-speaking participants enrolled in the IHBSP at the time of data collection.
Two hundred seventy-five participants completed the questionnaire, resulting in a 55% completion rate.

**Pilot Project**

Focus groups were conducted in the northeast (Hertford County), central (Wake County), and western (Swain County) regions of North Carolina to identify the barriers to and/or the factors influencing the infant feeding decisions of limited-resource women participating in the IHBSP. In each region, three focus groups were conducted with participants representing three distinct groups:

1. Women who elected to formula feed their infants and who, therefore, were not eligible to participate in the IHBSP;
2. Women who elected to breastfeed, who participated in the IHBSP, and who breastfed their infants for two weeks or less; and
3. Women who decided to breastfeed their infants, who participated in the IHBSP, and who breastfed their infants for one year or more.

A structured interview guide (see Appendix A) was utilized to facilitate the focus groups.

**Instrumentation**

The survey instrument was a multi-section questionnaire constructed by the researcher. Information gleaned from the focus groups and findings from the literature were used to develop the questionnaire.

Section one of the questionnaire investigated the familial factors associated with a woman’s infant feeding decision. The familial factors investigated included the infant feeding method by which the respondent was fed and the respondent’s previous
infant feeding experiences. In addition, the first section of the questionnaire included the perceived barriers associated with the infant feeding methods of family members and friends. The infant feeding method by which the respondent was fed was categorized as “breast milk,” “formula,” “both breast milk and formula,” and “I don’t know how I was fed.” The respondent’s previous infant feeding experiences were categorized by: “breast milk,” “formula,” or “both.” The infant feeding methods of family members and friends were categorized as: “breast milk,” “formula,” “breast milk and formula,” and “I don’t know how family members fed their babies,” or “I don’t know how friends fed their babies.”

Section two of the questionnaire assessed the influence of family members, friends and healthcare providers upon the respondent’s infant feeding decision. The individuals/relationships included: father of baby, respondent’s mother, respondent’s grandmother, infant’s paternal grandmother, respondent’s best friends, other family members, prenatal healthcare provider, WIC nutritionist, hospital nurses, and the infant’s healthcare provider. A 5-point Likert scale was used, and included the following response options: “strongly encouraged formula feeding,” “encouraged formula feeding,” “did not express an opinion,” “encouraged breastfeeding,” and “strongly encouraged breastfeeding.”

In section three of the questionnaire, respondents were asked if they were planning to return to work or school, or if they had already returned to work or school. If the respondent answered “yes,” the respondent was also asked if work or school would be full-time or part-time. Additionally, respondents were queried at what point postpartum they would/did return to work or school. Respondents were
also asked if there was a place at work or school where they could express/pump breast milk, and if they were allowed to take time from work or school in order to express/pump breast milk.

Section three concludes with three questions addressing maternal perceptions of breastfeeding publicly. Respondents were asked to indicate their perceptions about when it was acceptable to breastfeed in public, in front of family members, and in front of friends. Potential responses included: “never,” “only if covered,” and “any time.”

Section four of the questionnaire included a list of common influences on infant feeding decisions. Respondents were asked to report their beliefs and perceptions of the extent to which these factors influenced their own decisions about how to feed their babies. Maternal beliefs and perceptions were assessed using a 5-point Likert scale (1 = “strongly influenced me to formula feed my baby,” 2 = “influenced me to formula feed my baby,” 3 = “had no influence on my decision,” 4 = “influenced me to breastfeed my baby,” 5 = “strongly influenced me to breastfeed my baby”). A composite scale for these influences was computed since the Cronbach’s alpha was greater than 0.7. The total scores were broken into four groups. Group one included respondents who reported positive influences for both breastfeeding and formula feeding as infant feeding methods. Groups two and three were respondents who had less positive influences about the feeding decision. Group four included those respondents who reported positive influences for breastfeeding.

Section five of the questionnaire solicited demographic and familial factors of the respondent, including: race/ethnicity, level of education, age of respondent,
marital status, presence of romantic partner, number of people living in the home, and place of residence. Race/ethnicity was categorized as: “African American/ Black,” “Asian/ Pacific Islander,” “American Indian/ Alaskan Native,” “Caucasian/White,” and “Hispanic/Latina.” Level of education was categorized as: “some high school,” “high school graduate/GED,” “some college,” or “college graduate.” Maternal age was captured as a continuous variable and later collapsed into the following categories: “under 20,” “20-24,” “25-29,” “30-34” and “40-44.” The categories for marital status were “single/unmarried,” “married,” “separated/divorced,” and “widowed.” The categories for presence of romantic partner were “partner lives/stays with me all the time,” “partner lives/stays with me sometimes,” and “partner does not live/stay with me.” The number of people living in the home was captured as a discrete variable.

**Data Collection**

Staff members (program assistants) of the In-Home Breastfeeding Support Program attempted to hand-deliver the questionnaire to 500 program participants. Program assistants made multiple attempts to contact the program participants included in the sample. Methods utilized to contact participants included telephone calls and home visits. A maximum of three attempts was made to contact each participant. Hand-delivery of the questionnaire was chosen in an attempt to maximize return rates.

When contact with program participants was established, the program assistants explained the purpose and possible benefits of the study, invited the participants to complete the questionnaire, obtained informed consent, and provided
them with envelopes in which to place their completed questionnaires to ensure confidentiality of the responses. The researcher’s name and contact telephone number also were provided to facilitate respondent access to the researcher in the event there were questions or concerns relating to the questionnaire. The program assistants either waited for the participants to complete the questionnaire, or scheduled a return visit to retrieve the completed questionnaire. Program assistants placed the sealed envelopes (containing the completed questionnaires) into boxes and shipped them via overnight delivery service to the researcher.

Program assistants received the questionnaires and instructions concerning their role in data collection during a face-to-face training session. The training session included an opportunity for the program assistants to complete the questionnaire and to ask questions about the questionnaire. Additionally, program assistants received instructions concerning random sampling techniques, their responsibility for maintaining the confidentiality of respondents, and the specific steps associated with distributing and returning questionnaires. Program assistants also received a written protocol from the researcher for the research project’s data collection. A copy of the protocol may be found in the Appendix. A deadline was established for the return of questionnaires in order to encourage timely response.

Reliability and Validity

The interview questions were based on information gleaned from the focus groups and current research findings from the literature. A panel of infant feeding experts was asked to review the instrument to determine construct validity. Staff members (program assistants) from the In-Home Breastfeeding Support Program
were asked to review the instrument to determine face validity. In addition, the questionnaire was piloted with In-Home Breastfeeding Support Program participants to ensure face validity.

Encouragement items were analyzed for internal validity, and Cronbach’s alpha was greater than 0.89. Subsequently, the items were summed to obtain a composite score for the encouragement factors.

For purposes of establishing reliability for the study, a split-half reliability coefficient was computed. The Guttman split-half coefficient was 0.81 and the correlation between halves was 0.7.

**Data Analysis**

Both descriptive and multivariate statistics were computed for the data. Descriptive statistics included measures of central tendency with mean and standard deviation being assessed. To examine the relationship between certain variables, the Chi-square test was conducted. Throughout the study, a 0.05 level of significance was used. Analyses of the data using multiple regression and discriminant analysis were performed, but no significant models were found.
CHAPTER 4

RESULTS

Breastfeeding provides numerous benefits, including economic benefits as well as health benefits to the infant and to the mother. This study was designed and conducted to identify the perceived barriers that influenced the infant feeding decisions among limited-resource women in North Carolina who were participating in the IHBSP. In addition, the study examined the relationships between these barriers and demographic factors (race/ethnicity, place of residence, level of education, age, and marital status). The study also examined the relationships between these barriers and familial factors (how respondent was fed, previous infant feeding experiences, presence of romantic partner, and number of people living in the home).

The research questions outlined in the Introduction guide the reporting format. These research questions are:

(1) Do the influences on the infant feeding decision differ according to the following demographic factors? (race/ethnicity, place of residence, level of education, age, marital status);

(2) Do the following familial factors influence the infant feeding decision and, if so, to what extent? (infant feeding method by which the respondent was fed, respondents’ previous infant feeding experience[s], infant feeding methods of family/friends, presence of the respondent’s partner, the number of people living in the home); and
(3) Do the following perceived barriers influence the infant feeding decision and, if so, to what extent? (attitudes of prenatal healthcare providers, attitudes of postpartum healthcare providers, plans for returning to work or school, maternal beliefs/perceptions about breastfeeding, and the attitudes of family/friends toward infant feeding methods).

Of the 500 IHBSP participants that comprised the random sample, 275 completed the questionnaire, which resulted in a 55% return rate. This return rate is appropriate to make certain inferences and address any non-respondent error (Ary, Jacobs & Razavieh, 1996).

**Demographic Data**

This section reviews data that were collected on five independent variables used to describe program participants in the In-Home Breastfeeding Support Program. The five independent variables were: race/ethnicity, place of residence, level of education, age, and marital status. These variables were selected based upon review of the literature, which revealed their influence on the infant feeding decision (Arora et al., 2000; Alexy & Martin, 1994; De La Mora et al., 1999; American Academy of Pediatrics [AAP], 1997; and Scott & Binns, 1999). Findings for each independent variable follow below.

Race/Ethnicity: Respondents indicated their race/ethnicity as shown in Table 1. The findings indicate that a majority (n=178, 64.7%) of the respondents are white, while 75 (27.3%) respondents are African American/ Black, and 12 (4.4%) are American Indian/ Alaskan Native. Asian/ Pacific Islanders represented 2.5% (n=7), and the sample included three (1.1%) Hispanics/Latinas.
Place of Residence: A presentation of the respondents’ places of residence is displayed in Table 1. Among the respondents, 114 (42.1%) live in towns with less than 10,000 people, often described as rural, non-farm areas, and 108 (39.9%) reside in towns and cities with populations of 10,000 - 50,000 people. While these two categories reflect the majority of respondents, 23 (8.5%) respondents reported living on a farm, 9 (3.3%) reside in suburbs of cities over 50,000 population, and 17 (6.3%) live in central cities with populations over 50,000.

Level of Education: A presentation of the levels of education of the study respondents is represented in Table 1. Of the 275 respondents, 101 (36.7%) reported that they had completed “some college,” while 85 (30.9%) held a college degree. Additionally, 71 (25.8 %) reported having completed high school (or the GED), while 18 (6.5 %) reported having completed “some high school.”

Age of Respondents: Respondents indicated their age as summarized in Table 1. The findings indicate that 72 (26.2%) of the respondents are between 25 and 29 years of age, 69 (25.1%) are between 20 and 24 years of age, and 62 (22.5%) are between 30 and 34 years of age. Fewer numbers (and percentages) of respondents reported ages below 20 or above 34 years. Specifically, 34 (12.4 %) respondents were younger than 20 years of age, 31 (11.3%) reported their age between 35 and 39 years, and seven (2.5%) reported their age between 40 and 44 years.

Marital Status: A display of respondents reported marital status is given in Table 1. The data indicate that a majority (n=177, 64.8%) of respondents are married, while 85 (31.1%) are single. Only 11 (4%) are separated or divorced, and none of the respondents reported being widowed.
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<th>Race/Ethnicity</th>
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<td>Asian/Pacific Islander</td>
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<tr>
<td>American Indian/ Alaskan Native</td>
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<tr>
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<td>3.3</td>
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<td>Central cities over 50,000 people</td>
<td>17</td>
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<td>High school graduate/ GED</td>
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<tr>
<td>College degree</td>
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*Numbers vary by respondents completing each question
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<tr>
<th>Age of Respondents</th>
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<td>Under 20</td>
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<td>20-24</td>
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<td>25-29</td>
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<td>30-34</td>
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<td>40-44</td>
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<tr>
<th>Martial Status</th>
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<td>Single/ Unmarried</td>
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<td>Separated/ Divorced</td>
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**Familial Factors**

The following section reviews the familial factors that influence the infant feeding decision. These factors include: how the respondent was fed as an infant, the previous infant feeding experiences of the respondent (how she fed other children), the infant feeding methods of family members and friends, the presence of a romantic partner, and the number of people living in the home.
How Respondents Were Fed: Respondents’ reports of how they were fed as infants are in Table 2. A majority of respondents (n=162, 59.8%) were formula fed. Only 53 (19.6%) were breastfed exclusively, 34 (12.5%) received both breast milk and formula, and 22 (8.1%) reported they did not know how they were fed as infants.

How Family Members Fed Their Infants: Respondents’ reports of the feeding methods employed by family members are included in Table 2. Respondents reported that a majority of their family members chose to formula feed their infants (n=141, 51.6%), while 71 (26.0%) respondents indicated that their families provided both breast milk and formula for their infants. Only 44 (16.1%) reported their family members breastfed exclusively, and 17 (6.2%) reported that they didn’t know how their family members fed their infants.

How Friends Fed Their Infants: Respondents’ reports of the feeding methods used by friends is included in Table 2. A significant number of respondents (n=134, 48.9%) reported that their friends formula fed their infants, while 88 (32.1%) respondents reported that their friends fed their infants both breast milk and formula. Only 45 (16.4%) respondents reported that their friends exclusively breastfed their infants, and seven (2.6%) reported that they didn’t know how their friends fed their infants.

<table>
<thead>
<tr>
<th>Table 2. Feeding methods for respondents, family, and friends</th>
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<tr>
<td></td>
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<tr>
<td><strong>How respondents were fed</strong></td>
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<tr>
<td><strong>How family members fed their babies</strong></td>
</tr>
<tr>
<td><strong>How friends fed their babies</strong></td>
</tr>
<tr>
<td>n</td>
</tr>
<tr>
<td>------</td>
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<tr>
<td>Breast milk</td>
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Table 2 (continued)

<table>
<thead>
<tr>
<th>How respondents were fed</th>
<th>How family members fed their babies</th>
<th>How friends fed their babies</th>
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<tr>
<td></td>
<td>n</td>
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<tr>
<td>Formula</td>
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<td>Both breast milk AND</td>
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<tr>
<td>formula</td>
<td></td>
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</tr>
<tr>
<td>I don’t know</td>
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<tr>
<td>Total</td>
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</table>

Number of Respondents’ Children: The number of the respondents’ children is summarized in Table 3. The findings indicate that 131 (47.6%) of the respondents reported having one child (thus, this was the first infant feeding experience for these respondents), 72 (26.2%) reported having two children, 44 (16.0%) reported having three children, 16 (5.8%) reported having four children, and eight (2.9%) reported having five children.

Table 3. Number of respondents’ children

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<th>Number of children</th>
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<td>1</td>
<td>131</td>
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<td>2</td>
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<td>4</td>
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<td>5</td>
<td>8</td>
<td>2.9</td>
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</table>
Previous Infant Feeding Methods: A presentation of the feeding methods used by the respondents with their previous children is displayed in Table 4. The data reflect the number and percentage of respondents who breastfed, who formula fed, and who offered a combination of breast milk and formula to their previous children. The table also reflects the total number of respondents who had one, two, three and four previous children. Of the 159 respondents who had at least one previous child, 60 (37.7%) breastfed their firstborn, while 43 (27.0%) formula fed their first-born, and 56 (35.2%) gave their first-born both breast milk and formula. Of the 84 respondents who had at least two previous children, 36 (42.9%) breastfed the second child, while 16 (19.0%) formula fed the second child, and 32 (38.1%) provided both breast milk and formula to the second child. Of the 42 respondents who had at least three previous children, 23 (54.8%) breastfed the third child, three (7.1%) formula fed the third child, and 16 (38.1%) provided both breast milk and formula to the third child. Of the 15 respondents who reported having at least four previous children, nine

Table 3 (continued)

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<td>0</td>
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<td>100</td>
</tr>
</tbody>
</table>

...
(60.0%) breastfed the fourth child, none formula fed the fourth child, and six (40.0%) provided the fourth child with both breast milk and formula.

<table>
<thead>
<tr>
<th>Table 4. Distribution of respondents by previous infant feeding decision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Child 1</td>
</tr>
<tr>
<td>Child 2</td>
</tr>
<tr>
<td>Child 3</td>
</tr>
<tr>
<td>Child 4</td>
</tr>
</tbody>
</table>

Presence of Partner: An assembly of the respondents categorized according to the presence of a romantic partner is in Table 5. Of the respondents, a majority (n=184, 76.7%) live with their romantic partners all the time. Only 36 (13.1%) do not live with their romantic partners, while 20 (7.3%) sometimes live with their romantic partners.

<table>
<thead>
<tr>
<th>Table 5. Presence of romantic partner in household</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
</tr>
<tr>
<td>Partner lives/ stays with me all the time</td>
</tr>
<tr>
<td>Partner lives/ stays with me sometimes</td>
</tr>
<tr>
<td>Partner does not live/ stay with me</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
Number of People Living in the Home: The number of people living in the respondent’s home (including the respondent) is displayed in Table 6. Of the 275 respondents, 102 (37.1%) live in a household of three, 78 (28.4%) of the respondents live in a household of four, 39 (14.2%) live in a household of five, 26 (9.5%) live in a household of six, 11 (4.0%) live in a household of two, five (1.8%) live in a household of eight, five (1.8%) additional respondents live in a household of nine, and one (0.4%) respondent lives in a household of 11.

Table 6. Number of people living in the home (including respondent)

<table>
<thead>
<tr>
<th>Number in household</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>11</td>
<td>4.0</td>
</tr>
<tr>
<td>3</td>
<td>102</td>
<td>37.0</td>
</tr>
<tr>
<td>4</td>
<td>78</td>
<td>28.4</td>
</tr>
<tr>
<td>5</td>
<td>39</td>
<td>14.2</td>
</tr>
<tr>
<td>6</td>
<td>26</td>
<td>9.5</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>2.9</td>
</tr>
<tr>
<td>8</td>
<td>5</td>
<td>1.8</td>
</tr>
<tr>
<td>9</td>
<td>5</td>
<td>1.8</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>275</td>
<td>100</td>
</tr>
</tbody>
</table>
Degree of Encouragement

A presentation of the level of encouragement as perceived by the respondents, categorized by relationship with individual family members, friends and healthcare providers, is displayed in Table 7. The mean response for each relationship represented by family members and healthcare providers was computed as the weighted average of the responses reported (1=strongly encouraged formula feeding, 2=encouraged formula feeding, 3=no opinion expressed, 4=encouraged breastfeeding, and 5=strongly encouraged breastfeeding).

A majority of the 271 respondents who reported the nature of encouragement received from the baby’s father indicated that the father of the baby either encouraged breastfeeding (24.7%) or strongly encouraged breastfeeding (39.9%). Almost one quarter (24.4%) of respondents reported that the baby’s father did not express an opinion about how the infant should be fed. The mean of the responses was 3.88, reflecting that, in general, the father of the baby encouraged breastfeeding.

The majority of respondents indicated that their prenatal healthcare provider either encouraged breastfeeding (35.5%) or strongly encouraged breastfeeding (45.4%), with the average level of encouragement (mean = 4.17) reflecting that prenatal healthcare providers encourage breastfeeding.

A majority of the 234 respondents who reported the nature of encouragement received from WIC nutritionists indicated that WIC nutritionists either encouraged (26.1%) or strongly encouraged breastfeeding (48.7%). About one-fifth (20.1%) of respondents reported that their WIC nutritionist did not express an opinion about how
infants should be fed. The mean of the responses was 4.15 reflecting that, overall, WIC nutritionists encouraged breastfeeding.

A majority of the 271 respondents whose perception of encouragement received from hospital nurses during and after delivery indicated that hospital nurses either encouraged (37.3%) or strongly encouraged breastfeeding (35.4%). Slightly more than one-fifth (21.8%) of respondents indicated their hospital nurses did not express an opinion about infant feeding, with the average level of encouragement (mean = 4.10) reflecting that hospital nurses generally encouraged breastfeeding.

For three of the family member relationships, a large number of respondents reported that these family members did not express an opinion about infant feeding methods. Specifically, 139 (58%) of 238 respondents reported that the baby’s maternal great-grandmother did not express an opinion concerning infant feeding methods. Similarly, 143 (56%) of 257 respondents reported that the baby’s paternal grandmother did not express an opinion concerning infant feeding methods, and 117 (43%) of 272 respondents reported that “other family members” did not express an opinion concerning infant feeding methods.

Table 7. Respondents’ perceived encouragement from family, friends and healthcare providers

<table>
<thead>
<tr>
<th>Relationship</th>
<th>1 = Strongly encouraged formula feeding</th>
<th>2 = Encouraged formula feeding</th>
<th>3 = Did not express an opinion</th>
<th>4 = Encouraged breastfeeding</th>
<th>5 = Strongly encouraged breastfeeding</th>
<th>Total</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father of baby</td>
<td>15 (5.5)</td>
<td>15 (5.5)</td>
<td>66 (24.4)</td>
<td>67 (24.7)</td>
<td>108 (39.9)</td>
<td>271</td>
<td>3.88</td>
</tr>
<tr>
<td>Baby’s maternal grandmother</td>
<td>16 (6.0)</td>
<td>21 (7.8)</td>
<td>81 (30.2)</td>
<td>68 (25.4)</td>
<td>82 (30.6)</td>
<td>268</td>
<td>3.67</td>
</tr>
<tr>
<td>Baby’s maternal great-grandmother</td>
<td>9 (3.8)</td>
<td>15 (6.3)</td>
<td>139 (58.4)</td>
<td>33 (13.9)</td>
<td>42 (17.6)</td>
<td>238</td>
<td>3.35</td>
</tr>
</tbody>
</table>
Table 7 (continued)

<table>
<thead>
<tr>
<th></th>
<th>1 = Strongly encouraged formula feeding</th>
<th>2 = Encouraged formula feeding</th>
<th>3 = Did not express an opinion</th>
<th>4 = Encouraged breastfeeding</th>
<th>5 = Strongly encouraged breastfeeding</th>
<th>Total</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby’s paternal grandmother</td>
<td>13 5.1</td>
<td>14 5.4</td>
<td>143 55.6</td>
<td>39 15.2</td>
<td>48 18.7</td>
<td>257</td>
<td>100</td>
</tr>
<tr>
<td>Mother’s best friends</td>
<td>15 5.6</td>
<td>28 10.4</td>
<td>84 31.0</td>
<td>90 33.3</td>
<td>53 19.7</td>
<td>271</td>
<td>100</td>
</tr>
<tr>
<td>Other family members</td>
<td>10 3.8</td>
<td>11 4.0</td>
<td>117 43.0</td>
<td>86 31.6</td>
<td>48 17.6</td>
<td>272</td>
<td>100</td>
</tr>
<tr>
<td>Prenatal healthcare provider</td>
<td>11 4.0</td>
<td>3 1.1</td>
<td>38 13.9</td>
<td>97 35.5</td>
<td>124 45.4</td>
<td>273</td>
<td>100</td>
</tr>
<tr>
<td>WIC nutritionists</td>
<td>8 3.4</td>
<td>4 1.7</td>
<td>47 20.1</td>
<td>61 26.1</td>
<td>114 48.7</td>
<td>234</td>
<td>100</td>
</tr>
<tr>
<td>Hospital nurses (during/after delivery)</td>
<td>6 2.2</td>
<td>9 3.3</td>
<td>59 21.8</td>
<td>101 37.3</td>
<td>96 35.4</td>
<td>271</td>
<td>100</td>
</tr>
<tr>
<td>Baby’s healthcare provider</td>
<td>7 2.6</td>
<td>5 1.8</td>
<td>35 12.9</td>
<td>102 37.6</td>
<td>122 45.1</td>
<td>271</td>
<td>100</td>
</tr>
</tbody>
</table>

Returning to Work/School

Respondents’ decisions to return to work or school are presented in Table 8.

Of the respondents, almost two-thirds (n=174, 63.5%) plan to return to work or school, and 100 (36.5%) do not plan to return to work or school.

Table 8. Respondents’ plans to/did return to work/school

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>174</td>
<td>63.5</td>
</tr>
<tr>
<td>No</td>
<td>100</td>
<td>36.5</td>
</tr>
<tr>
<td>Total</td>
<td>274</td>
<td>100</td>
</tr>
</tbody>
</table>
Returning to Work or School—Full-Time or Part-Time: Respondents’
decisions to return to work or school (either full-time or part-time) are displayed in
Table 9. Of the respondents planning to return to work or school, a majority (n=110,
63.6%) plan to return to work or school full-time, and 63 (36.4%) plan to return to
work or school on a part-time basis.

<table>
<thead>
<tr>
<th>Table 9. Respondents who work/attend school – full-time or part-time</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
</tr>
<tr>
<td>----</td>
</tr>
<tr>
<td>Full</td>
</tr>
<tr>
<td>Part-time</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Age of Baby when Respondent Returns/Returned to Work/School:
Respondents are categorized by the age of their babies when they plan to return (or
did return) to work/school, as shown in Table 10. A majority of the respondents plan
to return (or did return) to work/school before their babies were 10 weeks old (n=216,
79.2%). The largest percentage (n=121, 44.3%) plan to return (or did return) to
work/school when their babies will be (or were) nine weeks old.

<table>
<thead>
<tr>
<th>Table 10. Age of baby when respondent returned to work/school</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
</tr>
<tr>
<td>----</td>
</tr>
<tr>
<td>2 Weeks</td>
</tr>
<tr>
<td>3 Weeks</td>
</tr>
<tr>
<td>4 Weeks</td>
</tr>
</tbody>
</table>
Table 10 (continued)

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Weeks</td>
<td>5</td>
<td>1.8</td>
</tr>
<tr>
<td>6 Weeks</td>
<td>34</td>
<td>12.5</td>
</tr>
<tr>
<td>7 Weeks</td>
<td>8</td>
<td>2.9</td>
</tr>
<tr>
<td>8 Weeks</td>
<td>24</td>
<td>8.8</td>
</tr>
<tr>
<td>9 Weeks</td>
<td>121</td>
<td>44.3</td>
</tr>
<tr>
<td>10 Weeks</td>
<td>4</td>
<td>1.5</td>
</tr>
<tr>
<td>11 Weeks</td>
<td>3</td>
<td>1.1</td>
</tr>
<tr>
<td>12 Weeks</td>
<td>15</td>
<td>5.5</td>
</tr>
<tr>
<td>13-16 Weeks</td>
<td>9</td>
<td>3.3</td>
</tr>
<tr>
<td>17-20 Weeks</td>
<td>8</td>
<td>2.9</td>
</tr>
<tr>
<td>21-24 Weeks</td>
<td>6</td>
<td>2.2</td>
</tr>
<tr>
<td>26-29 Weeks</td>
<td>4</td>
<td>1.5</td>
</tr>
<tr>
<td>30-33 Weeks</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>34-37 Weeks</td>
<td>3</td>
<td>1.1</td>
</tr>
<tr>
<td>38-41 Weeks</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>52 Weeks</td>
<td>2</td>
<td>0.7</td>
</tr>
<tr>
<td>I don’t know</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>273</td>
<td>100</td>
</tr>
</tbody>
</table>

Place at Work/School to Pump: Respondents are categorized according to access to a place at work or school where they may express their breast milk while away from their babies, as displayed in Table 11. The data indicate that a large number (n=115, 69.7%) of the respondents have access to facilities at work or school
where they may express their breast milk, while 50 (30.3%) do not have access to such facilities at work or school.

| Table 11. Respondents have place at work/school to pump breast milk |
|----------------------------------|--------|-----|
| Yes                              | 115    | 69.7|
| No                               | 50     | 30.3|
| Total                            | 165    | 100 |

Time to Pump at Work/School: A presentation of respondents categorized according to their ability to take time from work or school duties to express their breast milk is displayed in Table 12. The data reflect that a number (n=123, 76.4%) of the respondents do have the opportunity to take time from work or school duties to express their breast milk, while 38 (23.6%) do not have the opportunity to take time from work or school duties to express their breast milk.

| Table 12. Respondents have time at work/school to pump breast milk |
|----------------------------------|--------|-----|
| Yes                              | 123    | 76.4|
| No                               | 38     | 23.6|
| Total                            | 161    | 100 |
Maternal Beliefs: Embarrassment

A presentation of respondents’ beliefs relative to breastfeeding in public, in front of their (respondents’) families, and/or in front of their friends is displayed in Table 13. The largest number of respondents (n=166, 60.4%) felt that it is acceptable for a woman to breastfeed in public only if covered, while 101 (36.7%) felt it is acceptable for a woman to breastfeed in public anytime, and eight (2.9%) felt that a woman should never breastfeed in public. The largest number of respondents (n=168, 61.1%) felt it is acceptable for a woman to breastfeed in front of her family anytime, while 106 (38.5%) felt it is acceptable for a woman to breastfeed in front of her family only if covered, and one (0.4%) felt it is never acceptable for a woman to breastfeed in front of her family. The largest number (n=142, 51.6%) felt it is acceptable for a woman to breastfeed in front of her friends anytime, while 129 (46.9%) felt it is acceptable for a woman to breastfeed in front of her friends only if covered, and four (1.5%) felt it is never acceptable for a woman to breastfeed in front of her friends.

Table 13. Maternal beliefs: Breastfeeding in front of others

<table>
<thead>
<tr>
<th>It is okay for a woman to breastfeed in public</th>
<th>Never</th>
<th>Only if Covered</th>
<th>Anytime</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>It is okay for a woman to breastfeed in public</td>
<td>8</td>
<td>166</td>
<td>101</td>
<td>275</td>
</tr>
<tr>
<td></td>
<td>2.9</td>
<td>60.4</td>
<td>36.7</td>
<td></td>
</tr>
<tr>
<td>It is okay for a woman to breastfeed in front of her friends</td>
<td>4</td>
<td>129</td>
<td>142</td>
<td>275</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>46.9</td>
<td>51.6</td>
<td></td>
</tr>
</tbody>
</table>
Table 13 (continued)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Only if Covered</th>
<th>Anytime</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>It is okay for a woman to breastfeed in front of her family</td>
<td>1</td>
<td>0.4</td>
<td>106</td>
<td>38.5</td>
</tr>
<tr>
<td></td>
<td>168</td>
<td>61.1</td>
<td>275</td>
<td>100</td>
</tr>
</tbody>
</table>

Maternal Beliefs: Influences of Facts/Fictions on the Infant Feeding Decision

The type and degree of influence that specific facts or myths had on respondents are presented in Table 14. The mean response for each factual or fictitious statement was computed as the weighted average of the responses reported (1=strongly influenced me to formula feed my baby, 2=influenced me to formula feed my baby, 3=had no influence on my decision, 4=influenced me to breastfeed my baby, and 5=strongly influenced me to breastfeed my baby).

The mean responses of five of the six true statements reflected that the fact either influenced or strongly influenced the respondents to breastfeed. Specifically, the five true statements in question were: Breastfeeding is best for my baby’s health, Breastfeeding is best for my health, It is more convenient to breastfeed, It is cheaper to breastfeed, and Breastfed babies have a stronger bond with their mothers.

A majority of the 275 respondents who reported the level of influence that the fact/fiction Breastfeeding is best for my baby’s health had on their infant feeding decisions indicated that the statement either influenced or strongly influenced them to breastfeed their infants (96%). A majority of the 274 respondents who reported the level of influence that the fact/fiction Breastfeeding is best for my health had on their
infant feeding decisions indicated that the statement either influenced or strongly influenced them to breastfeed (83%).

A majority of the 274 respondents who reported the level of influence that the fact/fiction *It is more convenient to breastfeed* had on their infant feeding decisions indicated that the statement either influenced or strongly influenced them to breastfeed (73%). Similarly, a majority of the 275 respondents who reported the level of influence that the fact/fiction *It is cheaper to breastfeed* had on their infant feeding decisions indicated that the statement either influenced or strongly influenced them to breastfeed (78%). A majority of the 275 respondents who reported the level of influence that the fact/fiction *Breastfed babies have a stronger bond with their mothers* had on their infant feeding decisions indicated that the statement either influenced or strongly influenced them to breastfeed (89%).

The mean responses of eight of the nine false statements reflected that the false statement had no influence on the respondents’ infant feeding decisions. Specifically, the eight false statements were: *You have to eat a special diet if you breastfeed*, *You can’t take medicine if you breastfeed*, *You can’t smoke if you breastfeed*, *You can’t drink beer or alcohol if you breastfeed*, *Breastfeeding is more time-consuming than formula feeding*, *Breastfeeding mothers have to visit their doctors regularly*, *Breastfeeding hurts*, and *It is cheaper to formula feed*.

A majority of the 273 respondents who reported the level of influence that the fictitious statement *You have to eat a special diet if you breastfeed* had on their infant feeding decisions indicated that the statement had no influence on their decisions (77%). Of the 274 respondents, 81% indicated that the fictitious statement *You can’t
drink beer or alcohol if you breastfeed indicated that the fictitious statement had no influence on their infant feeding decisions. A majority of the 274 respondents who reported the level of influence that the fictitious statement You can’t take medicine if you breastfeed had no influence on their infant feeding decisions indicated that the fictitious statement had no influence on their decisions (81%). Of the 271 respondents, 84% indicated that the fictitious statement You can’t smoke if you breastfeed had no influence on their infant feeding decisions. The majority of the 274 respondents who reported the level of influence that the fictitious statement Breastfeeding is more time-consuming that formula feeding had on their infant feeding decisions indicated that the fictitious statement had no influence on their infant feeding decisions (73%). Of the 275 respondents, 87% indicated that the fictitious statement Breastfeeding mothers have to visit their doctors regularly had no influence on their infant feeding decisions. The majority of the 272 respondents who reported the level of influence that the fictitious statement It is cheaper to formula feed had on their infant feeding decisions indicated that the fictitious statement had no influence on their infant feeding decisions (86%). Of the 274 respondents, 84% indicated that the fictitious statement Breastfeeding hurts had no influence on their infant feeding decisions.

A number of the fact/fiction statements were not true/false statements; rather, they described subjective beliefs or opinions. The mean responses of four of these subjective belief/opinion statements reflected that these statements had no influence on the respondents’ infant feeding decisions. Specifically, the four statements were:
If you breastfeed, you’ll be tied down, My past experience with formula feeding, Commercials I saw on TV, and Breastfeeding would be embarrassing.

The majority of the 275 respondents who reported the level of influence the statement If you breastfeed, you’ll be tied down had on their infant feeding decisions indicated that the statement had no influence on their decisions (80%). Of the 263 respondents, 83% indicated that the statement My past experience with formula feeding had no influence on their decisions. The majority of the 274 respondents who reported the level of influence that the statement Commercials I saw on TV had on their infant feeding decisions indicated that the statement had no influence on their decisions (83%). Of the 275 respondents, 89% indicated that the statement Breastfeeding would be embarrassing had no influence on their decisions.

Table 14. Fact/Fiction – Distribution of Respondents by influences on the infant feeding decision

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>You have to eat a special diet if you breastfeed.</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>210</td>
<td>30</td>
<td>273</td>
<td>3.20</td>
</tr>
<tr>
<td>You can’t take medicine if you breastfeed.</td>
<td>3</td>
<td>15</td>
<td>5.5</td>
<td>223</td>
<td>18</td>
<td>274</td>
<td>3.10</td>
</tr>
<tr>
<td>You can’t smoke if you breastfeed.</td>
<td>2</td>
<td>4</td>
<td>1.5</td>
<td>230</td>
<td>11</td>
<td>273</td>
<td>3.20</td>
</tr>
<tr>
<td>You can’t drink beer or alcohol if you breastfeed.</td>
<td>1</td>
<td>5</td>
<td>1.8</td>
<td>232</td>
<td>11</td>
<td>274</td>
<td>3.20</td>
</tr>
<tr>
<td>Breastfeeding is more time consuming than formula feeding</td>
<td>1</td>
<td>26</td>
<td>9.5</td>
<td>200</td>
<td>21</td>
<td>274</td>
<td>3.16</td>
</tr>
</tbody>
</table>
Table 14 (continued)

<table>
<thead>
<tr>
<th></th>
<th>1 = Strongly influenced me to formula feed my baby</th>
<th>2 = Influenced me to formula feed my baby</th>
<th>3 = Had no influence on my decision</th>
<th>4 = Influenced me to breastfeed my baby</th>
<th>5 = Strongly influenced me to breastfeed my baby</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
</tr>
<tr>
<td>If you breastfeed, you’ll be tied down.</td>
<td>4 1.5</td>
<td>24 8.7</td>
<td>220 80.0</td>
<td>11 4.0</td>
<td>16 5.8</td>
<td>275 100</td>
</tr>
<tr>
<td>I didn’t think I would be able to make enough breast milk.</td>
<td>4 1.5</td>
<td>24 8.7</td>
<td>220 80.0</td>
<td>11 4.0</td>
<td>16 5.8</td>
<td>275 100</td>
</tr>
<tr>
<td>Breastfeeding is best for my baby’s health.</td>
<td>0 0</td>
<td>1 0.4</td>
<td>9 3.3</td>
<td>37 13.5</td>
<td>228 82.8</td>
<td>275 100</td>
</tr>
<tr>
<td>Breastfeeding is best for my health</td>
<td>1 0.4</td>
<td>0 0</td>
<td>45 16.4</td>
<td>68 24.8</td>
<td>160 58.4</td>
<td>274 100</td>
</tr>
<tr>
<td>Breastfeeding mothers have to visit their doctors regularly</td>
<td>0 0</td>
<td>8 2.9</td>
<td>238 86.6</td>
<td>13 4.7</td>
<td>16 5.8</td>
<td>275 100</td>
</tr>
<tr>
<td>Breastfeeding hurts.</td>
<td>4 1.5</td>
<td>21 7.7</td>
<td>229 83.6</td>
<td>11 4.0</td>
<td>9 3.2</td>
<td>274 100</td>
</tr>
<tr>
<td>Breastfeeding would be embarrassing.</td>
<td>1 0.4</td>
<td>14 5.1</td>
<td>244 88.7</td>
<td>11 4.0</td>
<td>5 1.8</td>
<td>275 100</td>
</tr>
<tr>
<td>It is more convenient to formula feed.</td>
<td>8 2.9</td>
<td>37 13.5</td>
<td>179 65.6</td>
<td>19 7.0</td>
<td>30 11.0</td>
<td>273 100</td>
</tr>
<tr>
<td>It is more convenient to breastfeed.</td>
<td>1 0.4</td>
<td>4 1.5</td>
<td>70 25.5</td>
<td>82 29.9</td>
<td>117 42.7</td>
<td>274 100</td>
</tr>
<tr>
<td>It is cheaper to breastfeed.</td>
<td>0 0</td>
<td>0 0</td>
<td>62 22.5</td>
<td>71 25.8</td>
<td>142 51.7</td>
<td>275 100</td>
</tr>
<tr>
<td>It is cheaper to formula feed.</td>
<td>4 1.5</td>
<td>3 1.1</td>
<td>235 86.4</td>
<td>8 2.9</td>
<td>22 8.1</td>
<td>272 100</td>
</tr>
<tr>
<td>Breastfed babies have a stronger bond with their mothers.</td>
<td>0 0</td>
<td>0 0</td>
<td>30 10.9</td>
<td>58 21.1</td>
<td>187 68.0</td>
<td>275 100</td>
</tr>
<tr>
<td>Other people can feed the baby if I formula feed.</td>
<td>13 4.8</td>
<td>46 16.8</td>
<td>189 69.2</td>
<td>9 3.3</td>
<td>16 5.9</td>
<td>273 100</td>
</tr>
<tr>
<td>Reading handouts/brochures/videos/books about infant feeding.</td>
<td>1 0.4</td>
<td>0 0</td>
<td>95 34.9</td>
<td>96 35.3</td>
<td>80 29.4</td>
<td>272 100</td>
</tr>
</tbody>
</table>
Table 14 (continued)

<table>
<thead>
<tr>
<th>Feeding Method</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = Strongly influenced me to formula feed my baby</td>
<td>1</td>
<td>0.4</td>
<td>0</td>
<td>0</td>
<td>174</td>
<td>63.5</td>
<td>54</td>
<td>19.7</td>
<td>45</td>
<td>16.4</td>
<td>274</td>
<td>100</td>
<td>3.52</td>
<td></td>
</tr>
<tr>
<td>2 = Influenced me to formula feed my baby</td>
<td>2</td>
<td>0.7</td>
<td>5</td>
<td>1.8</td>
<td>228</td>
<td>83.2</td>
<td>15</td>
<td>5.5</td>
<td>24</td>
<td>8.8</td>
<td>274</td>
<td>100</td>
<td>3.20</td>
<td></td>
</tr>
<tr>
<td>3 = Had no influence on my decision</td>
<td>10</td>
<td>3.7</td>
<td>22</td>
<td>8.1</td>
<td>154</td>
<td>56.6</td>
<td>43</td>
<td>15.8</td>
<td>43</td>
<td>15.8</td>
<td>272</td>
<td>100</td>
<td>3.32</td>
<td></td>
</tr>
<tr>
<td>4 = Influenced me to breastfeed my baby</td>
<td>2</td>
<td>0.8</td>
<td>1</td>
<td>0.4</td>
<td>160</td>
<td>60.8</td>
<td>30</td>
<td>11.4</td>
<td>70</td>
<td>26.6</td>
<td>263</td>
<td>100</td>
<td>3.63</td>
<td></td>
</tr>
<tr>
<td>5 = Strongly influenced me to breastfeed my baby</td>
<td>3</td>
<td>1.1</td>
<td>3</td>
<td>1.1</td>
<td>217</td>
<td>82.5</td>
<td>19</td>
<td>7.2</td>
<td>21</td>
<td>8.1</td>
<td>263</td>
<td>100</td>
<td>3.20</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>275</td>
<td>100</td>
<td>275</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Feeding Method of Youngest Child

An assembly of the respondents categorized by how they fed their youngest child is displayed in Table 15. A majority (n=183, 66.5%) of respondents exclusively breastfed their youngest child, while 90 (32.7%) fed their youngest child breast milk and formula, and two (0.7%) exclusively formula fed their infants.

Table 15. Feeding method for youngest child

<table>
<thead>
<tr>
<th>Feeding Method</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast milk</td>
<td>183</td>
<td>66.6</td>
</tr>
<tr>
<td>Formula</td>
<td>2</td>
<td>0.7</td>
</tr>
<tr>
<td>Breast milk and Formula</td>
<td>90</td>
<td>32.7</td>
</tr>
<tr>
<td>Total</td>
<td>275</td>
<td>100</td>
</tr>
</tbody>
</table>
When Infant Feeding Decision Was Made: A display of the respondents according to when the infant feeding decision was made is represented in Table 16. The largest number (n=132, 48.2%) of respondents *always knew* how they would feed their babies, while 116 (42.3%) made their infant feeding decisions during pregnancy, and 16 (5.8%) made their infant feeding decisions while hospitalized for the birth of their babies.

Table 16. When respondents made infant feeding decision

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I always knew</td>
<td>132</td>
<td>48.2</td>
</tr>
<tr>
<td>I decided while I was pregnant</td>
<td>116</td>
<td>42.4</td>
</tr>
<tr>
<td>I decided while I was in the hospital for the birth of my baby</td>
<td>16</td>
<td>5.8</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
<td>3.6</td>
</tr>
<tr>
<td>Total</td>
<td>274</td>
<td>100</td>
</tr>
</tbody>
</table>

Cross-tabulations

A distribution of feeding method by ethnic background is displayed in Table 17. A significant relationship was observed between ethnicity and whether the youngest child received breast milk exclusively, or received formula (p<.05). Forty-eight percent of African American respondents reported feeding their youngest child breast milk only, compared with 74% of Caucasian respondents and 68% of respondents with other ethnicities.
Table 17. Distribution of feeding method by ethnic background

<table>
<thead>
<tr>
<th></th>
<th>African-American/Black</th>
<th>Caucasian/White</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Breast milk</td>
<td>36</td>
<td>48.0</td>
<td>132</td>
<td>74.2</td>
</tr>
<tr>
<td>Breast milk &amp; Formula</td>
<td>39</td>
<td>52.0</td>
<td>46</td>
<td>25.8</td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
<td>100</td>
<td>178</td>
<td>100</td>
</tr>
</tbody>
</table>

$X^2 = 16.2$ (df = 2); $p < .05$

A distribution of feeding method by education level is represented in Table 18. Respondents who reported having “some college” or a “college degree” were significantly more likely to breastfeed exclusively than respondents who reported having “some high school” or “high school graduate/GED” ($p < .05$).

Table 18. Distribution of feeding method by level of education

<table>
<thead>
<tr>
<th></th>
<th>Some high school/ High school graduate/ GED</th>
<th>Some college</th>
<th>College degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Breast milk</td>
<td>50</td>
<td>56.2</td>
<td>74</td>
<td>73.3</td>
</tr>
<tr>
<td>Breast milk &amp; Formula</td>
<td>39</td>
<td>43.8</td>
<td>27</td>
<td>26.7</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>100</td>
<td>101</td>
<td>100</td>
</tr>
</tbody>
</table>

$X^2 = 6.7$ (df = 2); $p < .05$

A distribution of feeding method by age of respondent is displayed in Table 19. Although the percentage of respondents who chose to breastfeed exclusively
increased with age, this relationship was not statistically significant. Of the respondents under age 24, 60.2% reported breastfeeding their youngest child exclusively, compared with 67% of the respondents between the ages of 25 and 29, and 73% of those 30 years or older.

Table 19. Distribution of feeding method by age of respondents

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Breast milk</th>
<th>Breast milk &amp; Formula</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 24</td>
<td>62 (60.2%)</td>
<td>41 (39.8%)</td>
<td>103(100%)</td>
</tr>
<tr>
<td>25-29</td>
<td>48 (66.7%)</td>
<td>24 (33.3%)</td>
<td>72(100%)</td>
</tr>
<tr>
<td>30+</td>
<td>73 (73.0%)</td>
<td>27 (27.0%)</td>
<td>100(100%)</td>
</tr>
<tr>
<td>Total</td>
<td>183(100%)</td>
<td>92(100%)</td>
<td>275(100%)</td>
</tr>
</tbody>
</table>

X² = 3.7 (df = 2); p >.05

A distribution of feeding method by marital status of respondents is presented in Table 20. A significant relationship was observed between marital status and whether the youngest child received breast milk exclusively (p<.05). Fifty-seven percent of single/unmarried respondents reported feeding their youngest child breast milk exclusively, compared with 71.2% of married respondents.

Table 20. Distribution of feeding method by marital status

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Breast milk</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single/ Unmarried</td>
<td>55 (57.3%)</td>
<td>181(100%)</td>
</tr>
<tr>
<td>Married</td>
<td>126 (71.2%)</td>
<td></td>
</tr>
</tbody>
</table>

A distribution of feeding method by marital status of respondents is presented in Table 20. A significant relationship was observed between marital status and whether the youngest child received breast milk exclusively (p<.05). Fifty-seven percent of single/unmarried respondents reported feeding their youngest child breast milk exclusively, compared with 71.2% of married respondents.
The distribution of feeding method by presence of romantic partner in the respondent’s household is presented in Table 21. Exclusive breastfeeding rates were highest among respondents whose romantic partners resided full-time in the respondents’ households. Although the percentage of respondents who chose to breastfeed exclusively increased with an increase in the amount of time that their romantic partners were present in the households, this relationship was not statistically significant.
A distribution of feeding method by the number of people living in the home (including respondent) is represented in Table 22. The smaller the household, the more likely the mother is to breastfeed exclusively, although the relationship is not statistically significant.

Table 22. Distribution of feeding method by number of people living in the home (including respondent)

<table>
<thead>
<tr>
<th></th>
<th>2-3 People</th>
<th></th>
<th>4-5 People</th>
<th></th>
<th>6+ People</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Breast milk</td>
<td>79</td>
<td>69.9</td>
<td>79</td>
<td>67.5</td>
<td>25</td>
<td>55.6</td>
<td>183</td>
</tr>
<tr>
<td>Breast milk &amp; Formula</td>
<td>34</td>
<td>30.1</td>
<td>38</td>
<td>32.5</td>
<td>20</td>
<td>44.4</td>
<td>92</td>
</tr>
<tr>
<td>Total</td>
<td>113</td>
<td>100</td>
<td>117</td>
<td>100</td>
<td>45</td>
<td>100</td>
<td>275</td>
</tr>
</tbody>
</table>

\[X^2 = 3.1 \text{ (df = 2)}; p > .05\]

The distribution of feeding method by the number of children respondents have is represented in Table 23. No relationship was observed between the number of children and the infant feeding decision.

Table 23. Distribution of feeding method by number of respondents’ children

<table>
<thead>
<tr>
<th></th>
<th>1-2 children</th>
<th></th>
<th>3+ children</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Breast milk</td>
<td>114</td>
<td>64.9</td>
<td>69</td>
<td>70.7</td>
<td>183</td>
</tr>
<tr>
<td>Breast milk &amp; formula</td>
<td>61</td>
<td>35.1</td>
<td>31</td>
<td>29.3</td>
<td>92</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>275</td>
</tr>
</tbody>
</table>

\[X^2 = 2.2 \text{ (df = 1)}; p > .05\]
The distribution of feeding method by the respondent’s place of residence is represented in Table 24. No relationship was observed between the place of residence and the infant feeding decision (p > 0.05).

<table>
<thead>
<tr>
<th>Table 24. Distribution of feeding method by place of residence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Breast milk</td>
</tr>
<tr>
<td>Breast milk &amp; Formula</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

χ² = 0.4 (df = 1); p > 0.5

The distribution of feeding method by how the mother was fed as an infant is represented in Table 25. A significant relationship (p < 0.05) was observed between the feeding method used with the youngest child and how the mother was fed as an infant. Of the respondents who reported feeding their youngest child breast milk exclusively, 79.2% also reported that they were fed breast milk exclusively as infants, and 62.8% reported that as infants they were fed breast milk and formula. Similarly, of the respondents who reported feeding their youngest child both breast milk and formula, 20.8% reported that as infants they were fed breast milk exclusively, and 37.2% reported that they were fed breast milk and formula as infants.
Table 25. Distribution of feeding method by how mother was fed as an infant

<table>
<thead>
<tr>
<th></th>
<th>Mother was fed breast milk</th>
<th>Mother was fed breast milk &amp; formula</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Infant fed breast milk</td>
<td>42</td>
<td>79.2</td>
<td>123</td>
</tr>
<tr>
<td>Infant fed breast milk &amp; formula</td>
<td>11</td>
<td>20.8</td>
<td>73</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>100</td>
<td>196</td>
</tr>
</tbody>
</table>

$X^2 = 5.1$ (df = 1); p < .05

The distribution of the feeding method of the youngest child (latest birth) by how child 1 was fed is represented in Table 26. A significant relationship (p < .05) was observed between the feeding method of the youngest child and the feeding method of child 1. Of the respondents who reported feeding their youngest child breast milk exclusively, 96.7% also reported feeding child 1 breast milk only, while 52.5% reported feeding child 1 breast milk and formula. Of the respondents who reported feeding their youngest child breast milk and formula, 3.3% reported feeding child 1 breast milk only, while 47.5% reported feeding child 1 breast milk and formula.

Table 26. Distribution of feeding method by how child 1 was fed

<table>
<thead>
<tr>
<th></th>
<th>Child 1 was fed breast milk</th>
<th>Child 1 was fed breast milk &amp; formula</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Infant* fed breast milk</td>
<td>58</td>
<td>96.7</td>
<td>52</td>
</tr>
<tr>
<td>Infant* fed breast milk &amp; formula</td>
<td>2</td>
<td>3.3</td>
<td>47</td>
</tr>
</tbody>
</table>

*denotes latest birth as compared to older siblings
A distribution of the feeding method of the youngest child by how child 2 was fed is represented in Table 27. A significant relationship (p<.05) was observed between the feeding method of the youngest child and the feeding method of child 2. Of the respondents who reported feeding their youngest child breast milk exclusively, 94.4% also reported feeding child 2 breast milk exclusively, while 43.8% reported feeding child 2 both breast milk and formula. Of the respondents who reported feeding their youngest child both breast milk and formula, 5.6% reported feeding child 2 breast milk exclusively, while 52.6% reported feeding child 2 both breast milk and formula.
A distribution of the feeding method of the youngest child by how child 3 was fed is represented in Table 28. A significant relationship (p<.05) was observed between the feeding method of the youngest child and the feeding method of child 3. Of the respondents who reported feeding their youngest child breast milk exclusively, 87.0% also reported feeding child 3 breast milk exclusively, while 36.8% reported feeding child 3 both breast milk and formula. Conversely, of the respondents who reported feeding their youngest child both breast milk and formula, 13.0% reported feeding child 3 breast milk exclusively, while 63.2% reported feeding child 3 both breast milk and formula.
A distribution of the feeding method of the youngest child by how family members fed their babies is represented in Table 29. Although respondents were more likely to feed their infants in the same manner in which family members fed their infants, this relationship is not statistically significant (p>.05).

Table 29. Distribution of feeding method by how family members fed their babies

<table>
<thead>
<tr>
<th>Family members fed their babies</th>
<th>Family members fed their babies</th>
<th>Respondents did not know how family members fed their babies</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>breast milk</td>
<td>breast milk &amp; formula</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>32</td>
<td>72.7</td>
<td>137</td>
<td>64.6</td>
</tr>
<tr>
<td>12</td>
<td>27.3</td>
<td>75</td>
<td>35.4</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>212</td>
<td>100</td>
</tr>
</tbody>
</table>

$X^2 = 1.2$ (df = 2); p > .05

A distribution of the feeding method of the youngest child by how friends fed their babies is represented in Table 30. Although respondents were more likely to feed their infants in the same manner in which friends fed their infants, this relationship was not statistically significant (p>.05).
Table 30. Distribution of feeding method by how friends fed their babies

<table>
<thead>
<tr>
<th></th>
<th>Friends fed their babies breast milk</th>
<th>Friends fed their babies breast milk &amp; formula</th>
<th>Respondents did not know how friends fed their babies</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Breast milk</td>
<td>33</td>
<td>73.3</td>
<td>146</td>
<td>65.8</td>
</tr>
<tr>
<td>Breast milk &amp; Formula</td>
<td>12</td>
<td>26.7</td>
<td>76</td>
<td>34.2</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>100</td>
<td>222</td>
<td>100</td>
</tr>
</tbody>
</table>

$X^2 = 1.3 \text{(df = 2); } p > .05$

A distribution of the feeding method of the youngest child by the mother’s intention to return to work or school is represented in Table 31. A significant relationship was observed between the mother’s intention to return to work or school and whether the youngest child received breast milk exclusively or a combination of breast milk and infant formula ($p < .05$). Seventy-four percent of respondents who did not plan to return to work or school exclusively breastfed the youngest child, compared with 62.1% of respondents who planned to return to work or school.

Table 31. Distribution of feeding method by mother’s intentions of returning to work/school

<table>
<thead>
<tr>
<th></th>
<th>Plans to return</th>
<th>Does not plan to return</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Breast milk</td>
<td>108</td>
<td>62.1</td>
<td>74</td>
</tr>
<tr>
<td>Breast milk &amp; Formula</td>
<td>66</td>
<td>37.9</td>
<td>26</td>
</tr>
</tbody>
</table>
A distribution of the infant feeding method of the youngest child by maternal attitudes toward infant feeding methods is represented in Table 32. The relationship between the infant feeding decision and maternal attitudes was significant (p<.05). Respondents who fed their infants a combination of breast milk and formula expressed positive influences on their infant feeding decisions. Similarly, respondents who chose to breastfeed exclusively expressed positive influences on their infant feeding decisions. Encouragement items were analyzed for internal validity, and Cronbach’s alpha was greater than 0.89. Subsequently, the items were summed to obtain a composite score for the encouragement items. The totals were divided into four groups based on the distribution of the composite scores. Group 1 (labeled: Positive re formula feeding) represents the group with the lowest summed values and strongest feelings toward formula feeding. Group 2 (labeled: Less positive re formula feeding) represents the group with less strong feelings toward formula feeding and the next lowest summed values. Group 3 (labeled: Less positive re breastfeeding) represents the group with less strong feelings toward breastfeeding and the second highest summed values. Group 4 (labeled: Positive re breastfeeding) represents the group with the highest summed values and the strongest feelings toward breastfeeding.
Table 32. Composite scores for infant feeding methods by respondents’ attitudes toward infant feeding methods

<table>
<thead>
<tr>
<th>Maternal attitudes</th>
<th>Positive re breastfeeding</th>
<th>Less positive re breastfeeding</th>
<th>Less positive re breastfeeding</th>
<th>Positive re breastfeeding</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant feeding method</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Breast milk</td>
<td>24</td>
<td>42.9</td>
<td>47</td>
<td>73.4</td>
<td>48</td>
</tr>
<tr>
<td>Breast milk &amp; formula</td>
<td>32</td>
<td>57.1</td>
<td>17</td>
<td>26.6</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>100</td>
<td>64</td>
<td>100</td>
<td>64</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 18.1 (df = 3); p <.05 \]

**Multivariate Analysis**

Multivariate analyses were performed using both multiple regression techniques and discriminant analysis. Neither analysis produced a model.

**Summary**

Infant feeding method was found to be associated (p <.05) with the following demographic variables: race/ethnicity, level of education and marital status. With respect to infant feeding method, there was a significant difference between those mothers who were fed only breast milk and those who were fed both breast milk and formula. Although there was no association observed between the number of previous children and choice of infant feeding method, there was an association between the way they were fed and the way the youngest child was fed. Finally, a composite score reflecting the mother’s beliefs and attitudes about feeding methods was associated with choice of infant feeding method.
Previous research typically was performed with small groups of respondents in a single geographic location and contributed to the understanding of how demographic factors, familial factors and maternal perceived barriers influence the infant feeding decision. The findings of this study support the results of previous studies on the factors affecting the infant feeding decision.
CHAPTER 5

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

This chapter presents the conclusions and implications that are drawn from the findings of this study, recommendations for further research, and general recommendations for practice.

Purpose

The purpose of this study was to identify the factors that affect the infant feeding decisions of limited-resource women in North Carolina who participated in a postpartum breastfeeding support program. In addition, the study examined the relationships between the demographic and familial factors and maternal perceived barriers of study respondents on the infant feeding decision.

A descriptive analysis of the data was completed. This chapter first gives the conclusions drawn from the findings of this inquiry. Each conclusion is followed by corresponding implications. Finally, recommendations are presented for the utilization of the study and for further related research efforts.

The following three research questions guided the study:

1. Do the influences on the infant feeding decision differ according to the following demographic factors? (race/ethnicity, place of residence, level of education, age, marital status);

2. Do the following familial factors influence the infant feeding decision and, if so, to what extent? (infant feeding method by which the respondent herself was fed, respondent’s previous infant feeding experiences, infant feeding methods of family members and friends, presence of the respondent’s
romantic partner, the number of people living in the home); and

(3) Do the following perceived barriers influence the infant feeding decision and, if so, to what extent? (attitudes of prenatal healthcare providers, attitudes of postpartum healthcare providers, plans for returning to work or school, maternal beliefs/perceptions about infant feeding methods, attitudes of family members/friends toward infant feeding methods).

**Conclusions and Implications**

The conclusions based on the findings of the study are presented in this section. It should be noted that these conclusions are applicable to the population from which the sample was drawn. Based on the statistical analysis of the data, a primary conclusion is that the infant feeding decision is affected by certain demographic and familial factors as well as specific maternal perceived barriers.

*Conclusion 1: Race/ethnic background is related to the infant feeding decision.* A significant relationship was observed between ethnicity and whether the respondents’ youngest child was breastfed exclusively. Forty-eight percent of African American respondents reported feeding their youngest child breast milk only, compared with 74% of Caucasian respondents and 68% of respondents of other ethnicities. Thus, it may be concluded that within the population from which the sample was drawn, Caucasians exclusively breastfeed at higher rates than African Americans and other races. These findings are congruent with the findings of other studies (Ryan et al., 1991; Scott & Binns, 1999). Generally, African Americans do not view breastfeeding positively (USDHHS, 2000a).
Conclusion 2: Level of education influences the infant feeding decision.

Maternal education was positively associated with breastfeeding exclusivity. Women who completed some college, or who had received a college degree, exclusively breastfed at significantly higher rates than women who had no college experience. Respondents who reported having “some college” education (73.3%) or a “college degree” (69.4%) were more likely to breastfeed exclusively than were respondents who reported having “some high school/GED” (56.2%). This conclusion is supported by the earlier studies of Arora et al. (2000) and Black et al. (1990) which concluded that mothers who have any college training are much more likely to initiate breastfeeding and will breastfeed longer than their counterparts who have no college training.

Conclusion 3: Maternal age does not influence the infant feeding decision.

Although the percentage of respondents who chose to exclusively breastfeed increased with age, this association was not statistically significant. Of the respondents under age 24, 60% reported breastfeeding their youngest child exclusively, compared with 67% of respondents between the ages of 25 and 29, and 75% of those 30 years or older. Generally, research studies addressing the influence of maternal age on breastfeeding initiation and duration have reported varying results (Ford & Labbok, 1990). When paired with level of education, maternal age had a positive correlation with breastfeeding initiation and duration. Alexy & Martin (1994) and Scott & Binns (1999) led studies which addressed the relationship between maternal age and infant feeding practices. Both studies concluded that older, more educated women comprise the subgroup that is most likely to choose breastfeeding as
their preferred infant feeding method. The conclusion of this study relative to maternal age substantiates these earlier works.

**Conclusion 4: Marital status influences the infant feeding decision.** A significant relationship was observed between marital status and whether the youngest child was exclusively breastfed. Just over fifty percent (57%) of single/unmarried respondents reported feeding their youngest child breast milk exclusively, compared with 71% of married respondents. This conclusion is supported by the earlier studies of Arora et al. (2000), Black et al. (1990), and Scott & Binns (1999) which concluded that married women breastfeed their infants exclusively more often than single women. Similarly, De La Mora (1999) reported that the attitudes of married women toward breastfeeding were more positive than were the attitudes of single mothers.

**Conclusion 5: The presence of a romantic partner in the home does not influence the infant feeding decision.** Exclusive breastfeeding rates were highest among respondents whose romantic partners resided full-time in the respondents’ households. Although the percentage of respondents who chose to breastfeed exclusively increased with an increase in the amount of time the romantic partner was present in the household, this association was not statistically significant. Results reported within this study led the researcher to conclude that when the romantic partner spends more time in the household, the child is more likely to be exclusively breastfed. Since the literature indicates that the opinions of her romantic partner greatly influence a woman’s infant feeding decision, it follows that the more time a woman spends with her partner (as in the case of women whose partners live with
them), the greater the opportunity for the partner to influence the mother’s infant feeding decision. This conclusion is supported by previous studies. Giugliani et al. (1994) reported that the opinion of the infant’s father was a strong predictor of a mother’s infant feeding decision. When their partners preferred breastfeeding, mothers were more likely to breastfeed than when their partners favored formula feeding or had no preference of infant feeding method (Scott & Binns, 1999).

**Conclusion 6: The infant feeding method by which the mother was fed influences the infant feeding decision.** A significant relationship was observed between how the mother was fed as an infant and the feeding method used with the youngest child. Of the respondents who reported feeding their youngest child breast milk exclusively, over 79% also reported that they were exclusively breastfed as infants. This conclusion is supported by previous studies as well as statements published by the American College of Obstetrics and Gynecology. Having been breastfed as an infant, or having a sibling who was breastfed, establishes breastfeeding as the social norm for an individual and her household (ACOG, 2001; Meyerink & Marquis, 2002). Women are more likely to feed their infants in the same manner as they themselves had been fed (Meyerink & Marquis, 2002; Wagner & Wagner, 1999).

**Conclusion 7: Previous infant feeding experience influences the infant feeding decision.** A significant relationship was observed between the feeding method of the youngest child and the feeding method of previous children. Of the respondents who reported feeding their youngest child breast milk exclusively and reported having at least one other child, 97% also reported feeding child one breast milk only. Of the
respondents who reported feeding their youngest child breast milk exclusively and reported having at least two other children, 94% also reported feeding child two breast milk only. Similarly, of the respondents who reported breastfeeding their youngest child exclusively and reported having at least 3 other children, 87% also reported feeding child three breast milk only. These findings are congruent with those of previous studies. A strong predictor of how women will choose to feed their infants is how they fed their previous children (Graffy, 1992; Meyerink & Marquis, 2002). Positive past experience with breastfeeding is a strong predictor for choosing breastfeeding as the preferred method of infant feeding (Dennis, 1996).

**Conclusion 8: Place of residence does not influence the infant feeding decision.** Among study respondents, no association was observed between the place of residence and the infant feeding decision. Of the respondents who reported living in rural areas, 65% reported feeding their youngest child breast milk exclusively, while 35% reported feeding their youngest child both breast milk and formula. Respondents in rural and urban settings breastfed at similar rates. Little evidence of the relationship between place of residence and breastfeeding rates has been published. Alexy and Martin (1994) suggested that women living in rural areas may be less likely to breastfeed because rural families report more members of their families as “workers.” These authors also suggest that urban mothers may be more likely to breastfeed as a result of having easier access to health education and lactation consultants (Alexy & Martin, 1994). Results reported within the study led the researcher to conclude that, at least among limited-resource families in North Carolina, place of residence does not influence the infant feeding decision.
Conclusion 9: Maternal Beliefs/Perceptions influence the infant feeding decision. There was a significant relationship between the infant feeding decision and maternal attitudes. Respondents who expressed positive attitudes or perceptions toward breastfeeding exclusively fed their youngest child breast milk at higher rates. Similarly, respondents who expressed positive attitudes or perceptions toward formula feeding were more likely to feed their youngest child a combination of breast milk and formula. These findings are congruent with those of previous studies, specifically that a mother’s perceptions and beliefs have a more significant impact on her infant feeding decision than does the psychosocial support of family (other than her partner) and peers. A mother’s beliefs about the consequences of breastfeeding or formula feeding for her infant and for herself are important predictors of breastfeeding initiation (Alexy & Martin, 1994; De La Mora et al., 1999).

Conclusions 10: The infant feeding method by which friends and family members feed their infants does not influence the infant feeding decision. Although study respondents were more likely to feed their infants in the same manner in which family members and friends fed their infants, neither of these relationships was statistically significant. This finding fails to support the findings of previous studies which reported that the infant feeding method of friends and family members influenced the infant feeding decision. Hawthorne (1994) reported that women were influenced by other women in their social groupings and that having role models such as friends and mothers was important to the infant feeding decision. Similarly, Dix (1991) reported that the choice of infant feeding method was significantly influenced by the woman’s family.
Conclusion 11: The number of people living in the home does not influence the infant feeding decision. Although study respondents living in smaller households were more likely to exclusively breastfeed, the relationship between the number of people living in the home and the infant feeding decision was not statistically significant.

Conclusion 12: Respondents’ perceived encouragement from prenatal health care providers influences the infant feeding decision. A majority of respondents indicated that their prenatal healthcare provider either encouraged breastfeeding (36%) or strongly encouraged breastfeeding (45%). The conclusion of the study relative to the attitudes of prenatal healthcare providers substantiates earlier studies. Women who received positive advice concerning breastfeeding from a physician are more likely to breastfeed their infants (Pletta, 2000).

Conclusion 13: Respondents’ perceived encouragement from postpartum healthcare providers influences the infant feeding decision. A majority of respondents reported the nature of encouragement received from hospital nurses both during and after delivery, indicating that hospital nurses either encouraged (37%) or strongly encouraged (35%) breastfeeding. Multiple studies have established the importance of the nurse as a source of breastfeeding information and support (Isabella & Isabella, 1994; Register et al., 2000).

Conclusion 14: Intention to return to work or school influences the infant feeding decision. A significant relationship was observed between the mother’s intention to return to work or school and whether the youngest child received breast milk exclusively or in combination with infant formula. Researchers have
investigated the relationship between maternal employment and/or enrollment in school and breastfeeding incidence (Weimer, 1999). A primary reason reported by women as to why they did not breastfeed was that they “had to return to work” (Arora et al., 2000). De La Mora (1999) reported that a mother’s intention to return to work or school was a significant predictor of maternal attitude toward infant feeding methods.

Conclusion 15: Respondents’ perceived encouragement from family members and friends influences the infant feeding decision. Of the 271 respondents who reported the nature of encouragement they received from their best friends, 16% of best friends encouraged formula feeding, 53% of best friends encouraged breastfeeding, and 31% of best friends did not express an opinion. Of the 272 respondents who reported the nature of encouragement received from other family members, 8% of other family members encouraged formula feeding, 50% of other family members encouraged breastfeeding, and 43% of other family members did not express an opinion. It is important to note the relatively large number of best friends (31%) and other family members (43%) who did not express an opinion. Even when accounting for the number of friends and family members who did not express an opinion, among both family and best friends, a large number (50% and 53%, respectively) encouraged breastfeeding. These findings are congruent with the findings of other studies. Bryant et al. (1992) found that the infant’s father, grandmother and other female relatives had the greatest influence on a mother’s infant feeding decision. Dix (1991) reported that the choice of infant feeding method was significantly influenced by the woman’s family. Black et al. (1990) reported that
the negative attitudes of other women and family members represented significant barriers to breastfeeding success. Hawthorne (1994) reported that peer pressure, personal attitudes and family support are important factors in a woman’s infant feeding decision. Finally, Guttman and Zimmerman (2000) reported that formula feeding mothers were affected by family members who were not supportive of breastfeeding and who were assisting with the care-giving of the infant.

**Recommendations for Further Research**

The following recommendations are presented for design, instrumentation and additional research, based upon the findings, conclusions and implications derived from this study. The study should be replicated in order to strengthen the foundation for interpreting results. Moreover, the study could be conducted with samples drawn from participants in the IHBSP as well as from a control group of limited-resource women who exclusively formula fed their infants. A replication of the study with samples drawn from women who breastfed exclusively, women who fed their infants a combination of breast milk and formula, and women who exclusively formula fed their infants would provide additional insights into the factors affecting the infant feeding decision. A less skewed distribution of respondents in such a study might yield more consistent results for data analysis and interpretation, as well as strengthen the ability to generalize. Additional insight might be gained about relevant demographic and familial factors, as well as maternal perceived barriers.

If the study were to be replicated, consideration should be given to the research design. Care should be taken in determining populations from which to draw
study samples for both the control and experimental groups to ensure sufficient heterogeneity across familial factors.

Another recommendation is to consider modifying the instrument. Question three on the instrument asked respondents to report the infant feeding methods utilized with any previous children. The instrument refers to the previous children as: “child 1,” “child 2,” “child 3” and “child 4.” This terminology is not sufficiently specific to allow the researcher to refer to “child 1” as the respondent’s first born. Since the research literature describes relationships between birth order and changes in feeding method, the ability to delineate the birth order of previous children may provide meaningful additional information. If the study were replicated, the terminology “child 1,” “child 2,” etc., should be replaced with “your first child,” “your second child,” etc.

Relative to modifying the instrument, yet an additional recommendation is to strengthen the directions throughout the instrument so as to clarify that the respondent should answer all questions concerning the infant feeding decision/method used with the youngest child. In addition, question 12 of the instrument could be modified. More meaningful results might be obtained if each part of the question were constructed into two parts. The first part of the question would ask the respondent if she believes the statement to be true or false. The second part of the question would then ask the respondent how the statement influenced her infant feeding decision.

Based on the findings of this study, demographic and familial factors and the intervening variable of maternal perceived barriers are related to the infant feeding decision. Further research could identify ways to specify important variables, better
measure the relationships between the independent and dependent variables and, therefore, provide additional recommendations for practice.
REFERENCES


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.


APPENDICES
APPENDIX A.

FOCUS GROUP INTERVIEW GUIDE
Focus Group Interview Guide: Non-Breastfeeding Women

1. Why did you decide not to try to breastfeed?
2. What did you know, or were you told, about breastfeeding?
3. Where did you receive information about infant feeding?

Focus Group Interview Guide: Women Who Breastfed for Two Weeks or Less

1. What does the word “breastfeeding” make you think about?
2. Where did you receive information about infant feeding?
3. Why did you decide to breastfeed?
4. Who encouraged you or supported you?
5. Why did you stop breastfeeding?
6. What obstacles did you encounter while breastfeeding?
7. What made breastfeeding successful for you?
8. What things would you like to have changed?
9. What would you share with people who work with expectant mothers and breastfeeding mothers?

Focus Group Interview Guide: Women Who Breastfed for at Least Three Months

1. What does the word “breastfeeding” make you think about?
2. Where did you get information about breastfeeding?
3. Why did you decide to breastfeed?
4. Who encouraged/supported you in breastfeeding?
5. What obstacles did you encounter while breastfeeding?
6. What made breastfeeding successful for you?
7. What things would you like to have changed?
8. What would you share with people who work with expectant mothers and breastfeeding mothers?
APPENDIX B.

LETTER TO PROGRAM ASSISTANTS
TO: Breastfeeding Support Program Assistants

FROM: Susan Baker, EFNEP Coordinator

DATE: May 13, 2003

SUBJECT: Research Study

Thanks to all of you for the important work that you do with breastfeeding mothers. We are asking for your help in collecting information from program participants about the factors that influenced their infant-feeding decisions. Learning the factors that affect women’s decisions on how to feed their infants will help us in planning prenatal education classes.

Enclosed in this packet you will find questionnaires that we are asking you to hand-deliver to some of your participants. The list of participants to be surveyed in your county is also enclosed.

It is important that the individuals on the list enclosed be the only mothers that receive and complete the questionnaire. The names on “your” list were randomly selected by a specific computer program from a list of all the participants in the In-Home Breastfeeding Support Program across the state. Please do not share the questionnaire with any other participants.

Here is what we are asking you to do:

Step 1: Hand-deliver a questionnaire to each participant on the list enclosed.

Step 2: Ask each participant if she would be willing to complete the questionnaire while you wait. Tell her that her envelope will remain sealed until opened by the researchers, so each individual’s identity will remain anonymous and all responses will be confidential. She may need your help watching a busy toddler or holding her baby.

Step 3: Wait while the participant completes the questionnaire and answer any questions she may have. Once she has completed the survey, give her an envelope to put the completed survey in and ask her to seal the envelope. The sealed envelope ensures that none of us (including you!) will know which participant filled out which questionnaire.
Step 4: Place a check mark by each participant’s name on “your” list who completes a questionnaire.

Step 5: When all of your questionnaires are completed, return all of them (in their sealed envelopes) and your list of participants (checked off).

Step 6: Place all of the sealed envelopes into the small (pre-addressed) FedEx box that was given to you, and return. Please return the completed questionnaires as soon as possible. We would like to have all questionnaires returned by June 9.

Questions? If you have any questions about the study, what you’re being asked to do, etc., please call:

Susan Baker  919-515-9157 or 919-906-6254
Jam Gourley  919-790-3954 or 919-906-1220
Linda Cahoon  919-790-3958 or
Deborah Dee  919-790-3945 or 919-801-8102
APPENDIX C.

QUESTIONNAIRE
We are asking mothers what factors influenced how they chose to feed their infants. You were selected as part of a random sample. By participating in this study, you represent a large number of families like yours. Therefore, your participation is important to the outcome of the study. The questions relate to breastmilk and formula only and don’t include solid foods or other liquids.

Thank you for completing this questionnaire. Please choose the answer for each question that best describes your experience. Do NOT put your name on the questionnaire.

1. What are you feeding/did you feed your youngest child (birth to 3 months)? (Check one answer)
   - ____ Breast milk
   - ____ Formula
   - ____ Breast milk and formula

2. When did you decide how you would feed this baby? (Check one answer)
   - ____ I always knew
   - ____ I decided while I was pregnant
   - ____ I decided while I was in the hospital for the birth of my baby
   - ____ Other, please tell us how you decided, _____________________________________________________________

3. Do you have other children? _____ YES _____ NO
   If YES, what did you feed them when they were infants? (Circle one answer for each child)

<table>
<thead>
<tr>
<th></th>
<th>1 = Breast milk</th>
<th>2 = Formula</th>
<th>3 = Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child 1</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Child 2</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Child 3</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Child 4</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
4. **Check one answer to complete each statement below:**

   a). As an infant, I was fed:
       - [ ] Breast milk
       - [ ] Formula
       - [ ] Both breast milk AND formula
       - [ ] I don’t know how I was fed.

   b). Most of my family members fed their babies:
       - [ ] Breast milk
       - [ ] Formula
       - [ ] Breast milk AND formula
       - [ ] I don’t know how family members fed their babies.

   c). Most of my friends fed their babies:
       - [ ] Breast milk
       - [ ] Formula
       - [ ] Breast milk AND formula
       - [ ] I don’t know how friends fed their babies.

5. **Circle the number that best describes how the following persons encouraged you to feed your youngest child. Use the following scale for your answers:**

<table>
<thead>
<tr>
<th></th>
<th>1 = strongly encouraged formula feeding</th>
<th>2 = encouraged formula feeding</th>
<th>3 = did not express an opinion</th>
<th>4 = encouraged breastfeeding</th>
<th>5 = strongly encouraged breastfeeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Father of baby</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b) Your mother</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c) Your grandmother</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d) Your baby’s father’s mother</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e) Your best friends</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>f) Other family members</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
6. Are you planning to, or did you already, return to work or school? (Circle one answer.)
   (Circle one answer.) YES NO

   If you answered NO to question 6, skip questions 7, 8, 9 and 10.

7. Will work or school be full-time or part-time?
   (Circle one answer.) FULL-TIME PART-TIME

8. How old will your baby be (or how old was your baby) when you return(ed) to work or school?
   _____ weeks old

9. Is there a place at work or school where you can express or pump your breast milk?
   (Circle one answer.) YES NO

10. Are you allowed to take time from work or school to express breast milk?
    (Circle one answer.) YES NO
11. **Circle the answer that best describes how you feel:**

   a) It is okay for a woman to breastfeed in public.
      Never   Only if covered   Anytime

   b) It is okay for a woman to breastfeed in front of her family.
      Never   Only if covered   Anytime

   c) It is okay for a woman to breastfeed in front of her friends.
      Never   Only if covered   Anytime

12. Women are told many things about how to feed their babies. Some of this information is correct and some of it is not. Circle the number that best describes how the following information influenced the way you decided to feed your baby. (Some of these items are false.)

<table>
<thead>
<tr>
<th></th>
<th>1 = strongly influenced me to formula feed my baby</th>
<th>2 = influenced me to formula feed my baby</th>
<th>3 = had no influence on my decision</th>
<th>4 = influenced me to breastfeed my baby</th>
<th>5 = strongly influenced me to breastfeed my baby</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) You have to eat a special diet if you breastfeed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b) You can’t take medicine if you breastfeed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c) You can’t smoke if you breastfeed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d) You can’t drink beer or alcohol if you breastfeed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e) Breastfeeding is more time consuming</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1 = strongly influenced me to formula feed my baby</td>
<td>2 = influenced me to formula feed my baby</td>
<td>3 = had no influence on my decision</td>
<td>4= influenced me to breastfeed my baby</td>
<td>5 = strongly influenced me to breastfeed my baby</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------</td>
<td>------------------------------------------</td>
<td>-------------------------------------</td>
<td>---------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>f) If you breastfeed, you’ll be tied down.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>g) I didn’t think I would be able to make enough breast milk.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>h) Breastfeeding is best for my baby’s health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>i) Breastfeeding is best for my health</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>j) Breastfeeding mothers have to visit their doctors regularly</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>k) Breastfeeding hurts.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>l) Breastfeeding would be embarrassing.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>m) It is more convenient to formula feed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>n) It is more convenient to breastfeed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>o) It is cheaper to breastfeed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>p) It is cheaper to formula feed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>q) Breastfed babies have a stronger bond with their mothers.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>r) Other people can feed the baby if I formula feed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>s) Reading handouts/ brochures/ videos/ books about infant feeding.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>t) Attending infant feeding classes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Question</td>
<td>1 = strongly influenced me to formula feed my baby</td>
<td>2 = influenced me to formula feed my baby</td>
<td>3 = had no influence on my decision</td>
<td>4 = influenced me to breastfeed my baby</td>
<td>5 = strongly influenced me to breastfeed my baby</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------</td>
<td>----------------------------------------</td>
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<td>-----------------------------------------------</td>
</tr>
<tr>
<td>u) Commercials I saw on TV.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>v) Fits into my busy lifestyle.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>w) My past experience with breastfeeding</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>x) My past experience with formula feeding</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>y) Other, please describe___________</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

13. How would you describe yourself? (Check one answer.)
   _____ African-American/ Black
   _____ Asian/ Pacific Islander
   _____ American Indian/ Alaskan Native
   _____ Caucasian/ White
   _____ Hispanic/ Latina

14. What is the highest level of education you completed? (Check one answer.)
   _____ Some high school
   _____ High school graduate/ GED
   _____ Some college
   _____ College degree

15. When were you born? (Month/ Day/ Year) __ __/ __ __/ __ __

16. Which best describes you? (Check one answer)
   _____ Single/ Unmarried
   _____ Married
   _____ Separated/ Divorced
   _____ Widowed
17. If you have a romantic partner, what best describes your living arrangement?
   _____ Partner lives/ stays with me all the time
   _____ Partner lives/ stays with me sometimes
   _____ Partner does not live/ stay with me

18. When was your youngest child born?   (Month/ Day/ Year)   ___/ ___/ ___ ___ ___ ___

19. How many people live in your home? (Be sure to include yourself.)   _____ people

20. How many children do you have?   _____

21. Which best describes where you live? (Check one answer.)
   _____ Farm
   _____ Towns under 10,000 people/ Rural non-farm
   _____ Towns and cities 10,000 – 50,000 people
   _____ Suburbs of cities over 50,000 people
   _____ Central cities over 50,000 people