

INFORMATIONAL CORRELATES OF SUCCESSFUL BREAST-FEEDING:
A REPLICATION

by

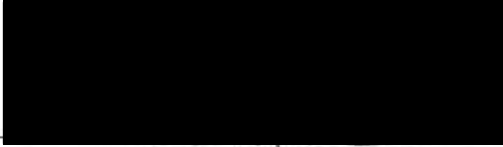
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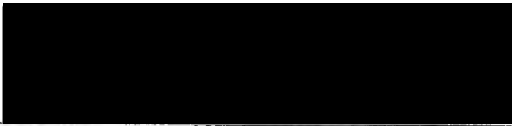
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CHAPTER I

Although a little over one-half of all American mothers are now choosing to breast-feed their infants, fewer than one-fourth of these infants will still be receiving breast-milk at six months of age (Martinez & Nalezienski, 1981). Data from previous decades and other nations show a significant difference in mortality between breast and bottle-fed infants, with breast-fed infants clearly having the advantage (Knodel, 1977). Cunningham (1979) has shown that even within the context of good hygiene, prenatal care, and readily available medical service, breast-feeding protects infants against a variety of illnesses, including intestinal and respiratory disease. In light of the recent evidence suggesting significant morbidity differences between bottle and breast babies, this apparent "epidemic" of lactation failure, which is not limited to the United States, has secured the attention and concern of a variety of health professionals, nursing among them.

Upon observing the effortless ease with which women in traditional rural societies breast-feed, one might comfortably assume that this complex skill is somehow "natural" or instinctual. Reinforcing this assumption is the knowledge that for much of the world's population, successful lactation is necessary for neonatal survival. However, there remains a wide cross-cultural variation in the incidence and duration of breast-feeding that cannot be explained by biologic differences.

Although the physiologic mechanism necessary to initiate lactogenesis rarely fails, the desire or motivation to breast-feed and the skills necessary to maintain lactation apparently are acquired or learned. This breast-feeding "know-how" traditionally has been conveyed from the experienced woman to the inexperienced throughout the centuries,

from mother to daughter, from sister to sister, from neighbor to neighbor. This sum of experience and accumulated knowledge, ("good, old-fashioned lactation education,") is a component of what Helsing (1976) calls the "female culture" and seems to have been lost or forgotten in modern industrialized society.

In an attempt to confidently identify information that will distinguish between successful and unsuccessful breast-feeders, this study will replicate, with some slight modifications in design, a study by Gulick (1982) "directed at identifying those variables that may predict a mother's probable success in breast-feeding" (p.470). Information from this study could provide direction for assessment and intervention in the care of women desiring to breast feed their infants.

Review of the Literature

The review of the literature will give an overview of research findings in regard to the advantages of breast-feeding to mothers, infants, and societies; the physiology and psychology of breast-feeding; and the incidence and duration of breast-feeding. Furthermore, it will attempt to define breast-feeding success as well as identify those variables that have been found to influence success. It will present the proposition that breast-feeding is a learned behavior and that success can be related to the amount and specific kinds of knowledge a mother has about breast-feeding. Ervin Laszlo's theory of acquisition of information through an interconnected three-level hierarchy consisting of physiological, perceptual-cognitive, and cultural levels each influencing the other, will provide a perspective for viewing this study.

Benefits of Breast-feeding to the Infant, Mother, and Society

Jelliffe and Jelliffe (1977) point out that until recently cow's milk-based formulas and human milk were considered, in practice, to be much the same when in fact they are dissimilar in almost all respects except water and lactose composition. Each mammal's milk is a complex biochemical system of large numbers of interdependent and interacting constituents that is species specific. Regardless of the amount of technologic "tinkering", formulas have always been metabolically inferior to human milk for the human baby.

Summarizing data from other decades and other nations Knodel (1977) clearly demonstrates a significant difference in mortality between breast and bottle fed infants. Although these differences in mortality can no longer be found in modern industrialized countries, evidence is accumulating in support of suspected differences in morbidity. The relationship of bottle feeding to malnutrition and gastroenteritis in the first 6 months of life was studied by Kanaaneh (1972) in Arab villages in Israel. It was found that malnutrition was essentially nonexistent among the breast-fed groups and rose gradually to approximate 30% of those who were exclusively bottle fed. The number of hospitalizations increased fifty-fold in the bottle fed group. Similar findings are reported by Bravo, Cabiol, Arcuch, Rivera, and Vargas (1984) in a group of Chilean infants. Cunningham (1979) showed that in rural upstate New York, in a population representing all socioeconomic classes, the proportion of infants suffering any significant episode of illness increased as the extent of breast-feeding declined, independent of the effects of family size, day care exposure and birth weight. Acute respiratory and gastrointestinal infections (Oski & Stockman, 1980) and otitis media

(Bland, 1972) have been shown to occur more frequently in bottle-fed infants in the United States. In addition, breast-feeding and the avoidance of the introduction of semi-solids until four to six months of age seem to be the best prophylactic against food allergy in infancy (Matthew, Taylor & Norman, 1977).

Breast-feeding also provides benefits to the mother, such as facilitation of uterine involution and limited contraceptive protection (Jelliffe & Jelliffe, 1972). The duration of postpartum amenorrhea has been positively related to the duration and frequency of breast-feeding (Ojofeitimi, 1982; Anderson and Schiøler, 1982). It is estimated that prolonged and unrestricted breast-feeding has a "larger statistical effect on couple-years protection than currently available technologic contraceptive programs in developing countries" (Rosa, 1976, p.6). In addition, there is evidence that breast-feeding may enhance attachment and bonding and may facilitate positive maternal-infant interactions (Klaus & Kennell, 1983).

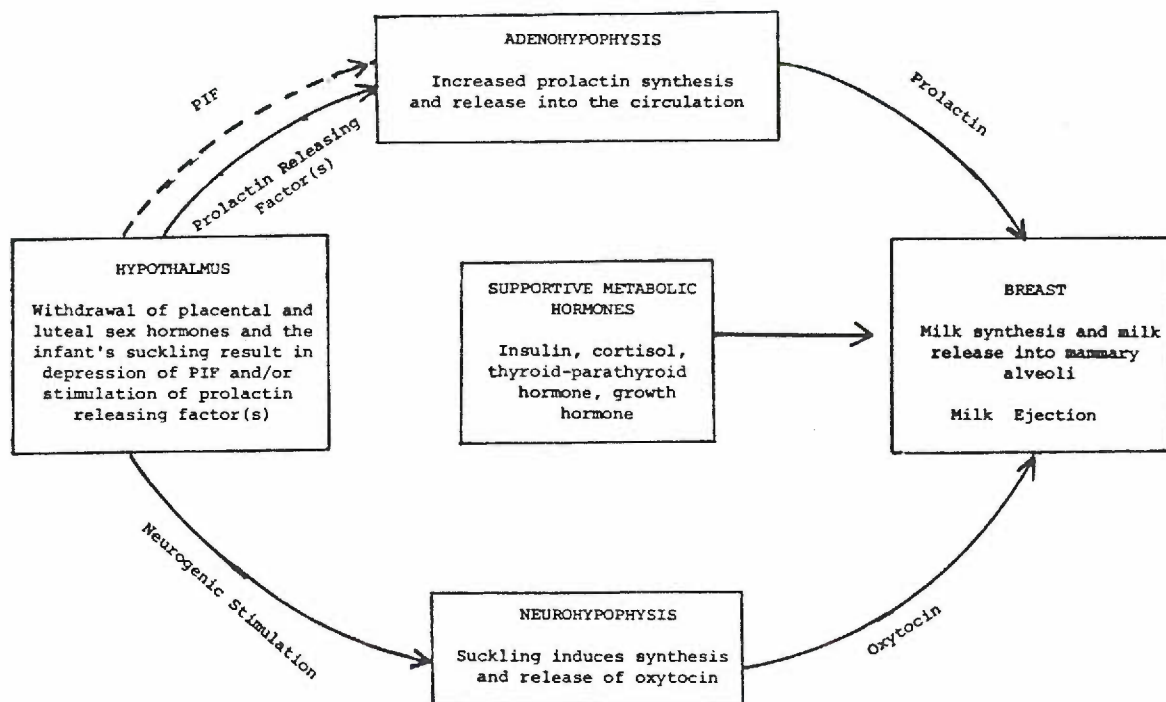
Breast-feeding needs to be considered a major food protein resource in all countries. A loss of the ability to breast-feed in Asia today would need to be compensated for by an increase of 114 million cattle (Jelliffe & Jelliffe, 1972). In many developing countries, 20 to 50 percent or more of a family's income would be needed to provide one baby with adequate quantities of formula. In the United States, it is estimated that bottle feeding is two to three times as expensive as breast-feeding.

In summary, the advantages of breast-feeding for the infant seem to be in the areas of optimal nutrition, defense against infection, avoidance of allergic diseases, and the enhancement of maternal-infant

bonding. The mother, also benefiting from these advantages, further enjoys some contraceptive protection and faster postpartum involution. The economic and public health implications for developing nations, striving to emulate their western "brothers" cannot be ignored.

Physiology and Psychology of Lactation

Lactation, an integral part of the reproductive cycle of all mammals, is governed by a complex interaction of numerous physiologic and psychologic factors. Reproductive and metabolic hormones, neonatal and maternal reflexes, and learned behaviors and emotional responses all play a role. (See Fig. 1).



(Lawrence, 1980, p.31)

Figure 1. Postpartum, Hormonal interactions responsible for lactation.

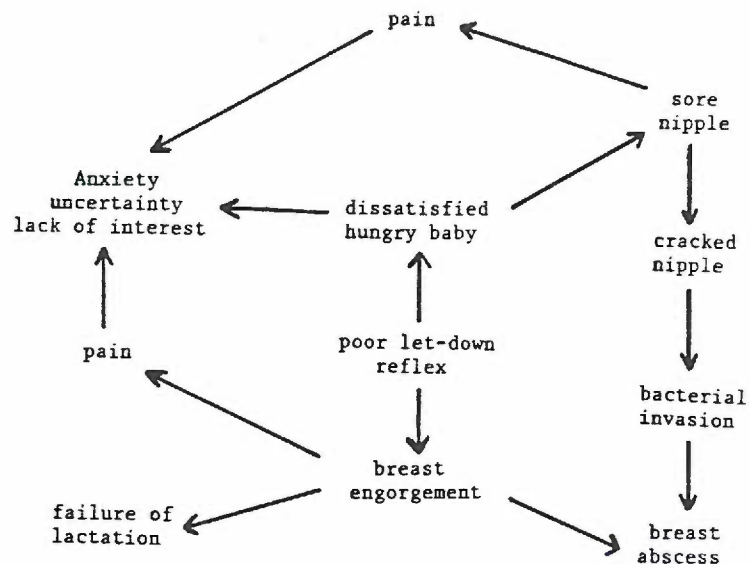
Lactation can be discussed in four overlapping stages (Jelliffe & Jelliffe, 1978). Lactogenesis, the initiation of milk production, is

stimulated postpartum by the rapid fall in inhibitory ovarian and placental steroid levels and by suckling of the newborn, both of which encourage high levels of prolactin. Galactopoiesis, or maintenance of established lactation is primarily dependent upon continued production of prolactin. The movement of milk from the alveoli, where it is secreted, to the terminal lacteals where it is available for the infant, is called milk ejection or milk "let-down". It is stimulated by oxytocin, a posterior pituitary hormone released in response to a neuroendocrine reflex. Milk ingestion by the baby is dependent upon intact oro-facial anatomy and neonatal reflexes (rooting, sucking and swallowing) in addition to the aforementioned processes.

The release of prolactin from the anterior pituitary is under the control of the hypothalamus. The hypothalamus contains a prolactin-inhibiting factor (PIF) and probably also a prolactin-releasing factor (PRF). Thyrotropin-releasing factor (TRF) and serotonin increase release of prolactin while catecholamines and acetylcholine depress prolactin (Meites, 1974). Although the quantity of prolactin secreted is directly related to the amount (frequency, intensity, and duration) of sucking stimulus (Egli & Newton, 1961) severe maternal malnutrition, environmental stress, and pharmacological agents can alter this response. (Lawrence, 1980; Vorherr, 1978; Jelliffe & Jelliffe, 1978).

The milk ejection reflex involves a neural afferent pathway and an endocrine efferent pathway. This reflex has both a somatic and psychological component. Stimulation of the mechanoreceptors in the nipple and areola causes reflex release of oxytocin by the posterior pituitary via the hypothalamus. The reflex can be markedly facilitated

or inhibited by psychologic factors. Conditioning can enhance the response (Schamo, 1976) while stress, anxiety and uncertainty can inhibit or block the let down reflex (Cross, 1955; Newton & Newton, 1950). Inhibition of the let-down reflex associated with these emotional factors has been implicated in lactation failure or "anxiety - nursing - failure cycle" (See Fig. 2).

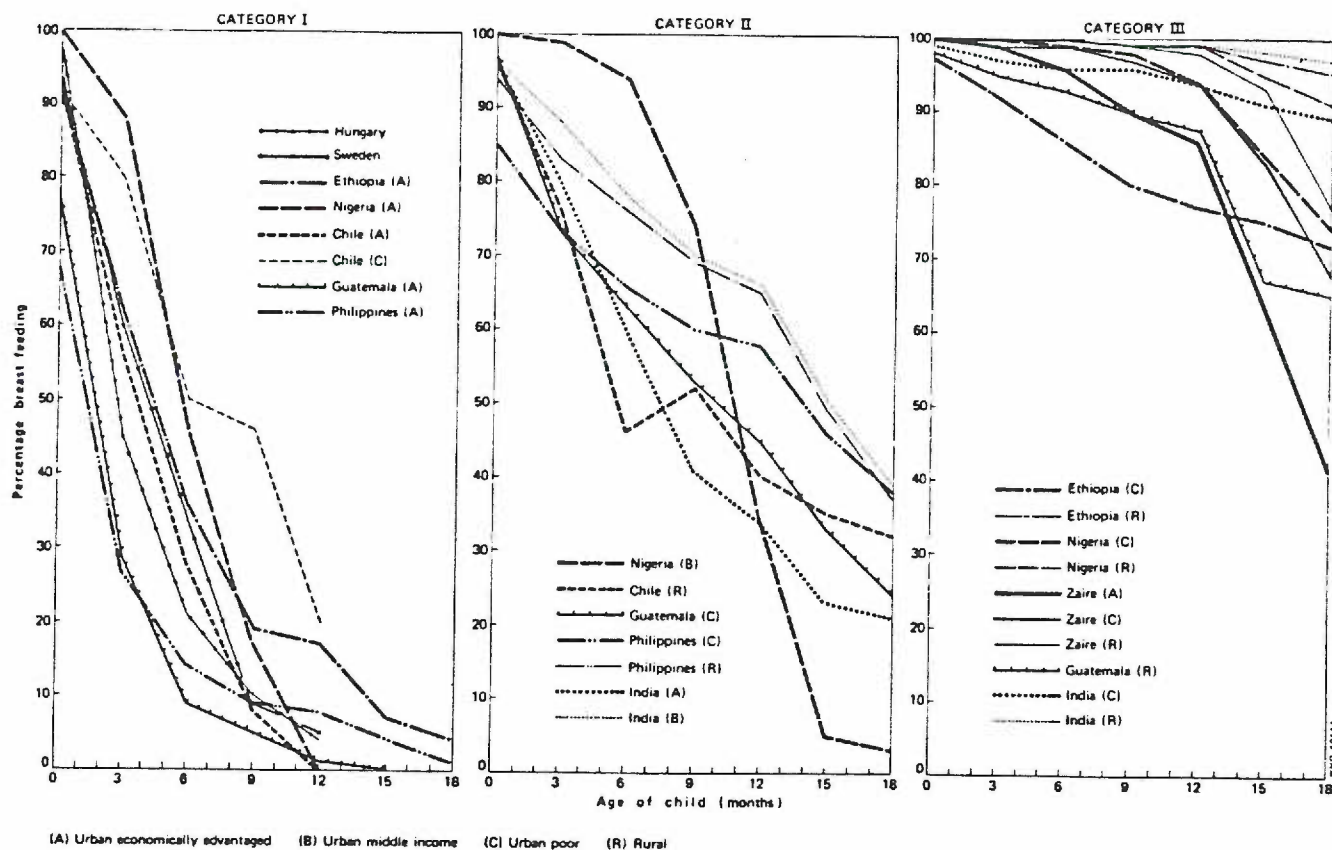


(Jelliffe & Jelliffe, 1978 p.23)

Figure 2. Anxiety - Nursing - Failure Cycle

Incidence and Duration of Breast-Feeding

The largest and most comprehensive cross-cultural descriptive study on the incidence and duration of breast-feeding to date is the World Health Organization Collaborative Study (Contemporary patterns, 1981) where data on nearly 23,000 mother-and-child pairs in nine countries were collected from 1975 through 1978. Three main patterns of prevalence and duration emerged (Figure 3).



(Contemporary Patterns, 1981, p.35)

Figure 3. Percentage of mothers breast-feeding, by age of child and population group (three categories).

From these data it can be seen that long-term breast-feeding is the norm for many cultures and that categories are separated, for the most part, by socioeconomic factors rather than nationality. Examples of similar descriptive studies done in the United States and Canada are summarized in Table 1. While the initiation of breast-feeding appears to have increased in the United States, especially during the last decade, the six-month continuation rate remains quite low. Additionally, the early weeks appear to be the time period in which the majority of women discontinue breast-feeding.

Definition of Breast-Feeding Success

Among professionals there appears to be a consensus regarding optimum breast-feeding duration. In England, the Department of Health and Social Services in 1974 recommended that whenever possible babies should be breast-fed at least for the first 6 months and that solids should not be introduced before 4 months (Whichelow, 1982). The American Academy of Pediatrics (Committee on Nutrition, 1979) in a joint statement with the Canadian Paediatric Society strongly recommends breast-feeding for all full-term infants except where specific contraindications exist. "Ideally breast milk should be practically the only source of nutrients for the first four to six months for most infants....fluoride and possibly vitamin D may be the only supplements which need to be provided to the infant" (p. 597).

Based on his review of the available literature in The Year Book of Pediatrics, (Oski & Stockman, 1981) Oski comments,

"The message is clear--when infants of healthy mothers are exclusively breast-fed they grow in a very satisfactory fashion for at least six months and possibly even longer. There is no need for the introduction of solid foods before age 6 months and no need for supplemental formulas" (p. 314).

Ross (1981) suggests that the optimal time to introduce food other than milk into the infant's diet is at the age of four to six months.

Several investigators have attempted to define breast-feeding success in measurable terms in an effort to correlate it with other

Table 1

Summary of Incidence and Continuation of Breast-Feeding as Reported in Various Studies, 1946 to 1982

Author of Study	Year	Number of Subjects	Incidence of Breast- Feeding in Hospital	Percent of Mothers Continuing to Breast-feed at Various Time Intervals											
				1wk	2wks	1mo	6wks	2mo	3mo	4mo	5mo	6mo			
Meyer	1946	2,513 hospitals	65%												
	1966	1,733 hospitals	28%												
Salber & Feinleib	1965	2,735	22.3%			20.1%		15.9%	11.7%	10.7%	7.8%	5.6%			
Martinez & Nalezienski	1971	9,497	24.7%					13.9%		8.2%		5.5%			
	1975	10,067	35.5%					23.2%		15.5%		14.7%			
	1978	25,926	46.6%					34.9%		26.8%		20.5%			
	1979	26,589		49.7%								23.0%			
Cunningham	1974	326	50%				42%			33%	25%				19%
Cole	1975	332	44%							35%	28.6%	28%			
Foman	1975	Many studies Compiled	20%							20%	12%	10%	8%	5%	
Clark & Beal	1978	421	44-71%							45%	28%				
Griffith	1979	46	100% ^a							95.5%	93.2%	78.3%	66%	65.7%	
Cooksey	1982	101 initial 29 follow up	70.3%											62%	

^a only breastfeeding mothers were studied.
(Adapted from Cooksey, 1982, pp.7-8)

variables. Some of these definitions are more explicit than others. Gulick (1982) defines successful breast-feeders as those mothers who are breast-feeding beyond 4 weeks, the rationale being that "the major problems experienced reportedly occur during the first few days or weeks of breast-feeding" (p. 370). Oliver (1968) states that "the ability of the mother to maintain lactation for a period of at least two to three weeks" was her standard for measuring success. Griffin (1979) defines successful breast-feeding as the ability of the mother to breast-feed, either totally or token, for two months postpartum. Cooksey (1982) has two categories out of a total of four that when chosen by the mother at 3 months postpartum were considered successful--only breast-feeding or breast-feeding and bottle feeding, but mostly breast-feeding. The unsuccessful group chose only bottle feeding or breast-feeding and bottle feeding, but mostly bottle-feeding. Hellings (1984) defines breast feeding success as breast-feeding at four to six weeks of infant age with less than four ounces of formula supplementation. Meara (1976) quotes the La Leche League Association manual, "breast milk alone is the perfect food for 4-6 months of life...." (Meara, 1976 p.23) and it may be inferred that she conceives of success in these terms.

Another study (Rousseau, Lescop, Fontaine, Lambert, & Roy, 1982) correlates duration of breast-feeding with cultural and environmental factors but does not define success. One can assume that their definition would involve duration but the boundaries are not made clear. Whichelow (1982) defines early weaning as discontinuing breast-feeding before the infant reaches the age of six months and finds that complementary bottles are associated with early weaning.

The most unique definition of success is found in a study by Beske and Garvis (1982). A "yes" response to each of two questions on the study questionnaire: 1) Do you feel you have been successful in breast-feeding? and 2) If you have another child, would you breast-feed again? (p.174) denoted success. Using these criteria, 93.6% of the study women were found to have achieved breast-feeding success regardless of the duration of breast-feeding. A great variability in the conceptualization of breast-feeding success between health care providers and nursing-mother consumers seems to exist.

Several components are central to the concept of breast-feeding success. The first has to do with the prevalence rate of breast-feeding in a population, a public health perspective. The second concerns the duration of breast-feeding in populations and individuals. The last component, which deals with exclusivity vs. supplementation and the mother's perceptions of the event will be called quality. Success can be found to a lesser or greater degree along a continuum depending upon the measurement of one or more of these components. There is also some point along this continuum where failure becomes the more descriptive word.

In view of the foregoing discussion on the advantages that breast-feeding offers newborns this investigator will join the majority in defining and operationalizing breast-feeding success in terms of duration and exclusivity. Maternal perceptions will be compared to this definition of success but will not be included within its boundaries.

Factors Affecting Success and Failure at Breast-Feeding

Numerous factors are associated with success or failure at breast-feeding. Some seem to be well substantiated while evidence for others is only suggestive and sometimes contradictory.

Most all studies done in western countries associate advancing maternal age, marriage, higher socioeconomic status, and increasing amounts of education of either mother or father with the decision to breast-feed and very often with duration of breast-feeding (Beske & Garvis 1982; Rousseau, et al., 1982; Ekwo, Dusdieker & Booth, 1983; Sloper, McKean, & Baum 1975). Since the group of women having decided to breast-feed is often very different demographically from bottle feeding mothers it becomes a little more difficult to correlate these same variables with success.

Another common theme found in studies of factors associated with breast-feeding success is early infant/mother contact. Initiation of breast feeding as early as 10 minutes after birth but no later than 2 hours after birth has been associated with later weaning and longer duration of breast-feeding (Whichelow, 1982; Meara, 1976; Salariya, Easton, and Cater, 1978; de Chateau, Holmberg, Jakobsson, and Winberg, 1977; & Johnson, 1976). Beske & Garvis (1982) found that feeding even within the first 4 hours after birth was desirable when compared to controls with contact delayed for 12 hours.

The introduction of supplementary bottles and/or solid foods in association with early weaning was also a common finding (Cole 1975; Sloper et al. 1975; Ekwo et al., 1983; & Whichelow 1982). Support from the family (Hellings, 1984; Cooksey, 1982; Rousseau, et al., 1982) from health care professionals (Cole 1977; Houston & Howie, 1981; Hall, 1978), and from organizations such as the La Leche League (Ladas, 1972; Meara, 1976) has been associated with success as well.

Some sporadic and inconsistently reported variables affecting success are prenatal childbirth classes, the number of sources of information about breast-feeding (Gulick, 1982), analgesia during labor and delivery (Whichelow, 1982), and postpartum rooming in (Cole, 1975). The associations have not been studied well enough to form any conclusions.

Contradictory findings have been published on several variables. The mother who was breast-fed as an infant and her subsequent success at breast-feeding was found to be related by Sloper et al. (1975) but not by Ekwo et al. (1983). The length of time a mother planned to breast-feed was congruent with the actual duration of breast-feeding according to Beske & Garvis (1982). Cole (1975), however, found no such correlation. Gulick (1982) found no difference in success rates for mothers having vaginal versus cesarean deliveries. Whichelow (1982) and Hellings (1984) contends that there is a difference in these two groups.

The effect of parity on breast-feeding success is another confusing finding. While some studies show no independent influence of parity on breast-feeding success (Sloper et al., 1975 and Call, 1975) others suggest that primiparous women are more likely to initiate breast-feeding (Coles, Cotter, and Valman, 1978) but are also more likely to give it up (Jones & Belsey, 1977). There is also a correlation between how previous children were fed and how the subsequent child is fed among multiparous women (Jones & Belsey, 1977).

Knowledge as a Factor in Breast-Feeding Success

Although it is generally agreed that breast-feeding is learned rather than instinctual, there are relatively few studies to be found in the literature concerning the variable of knowledge or information in

relationship to breast-feeding outcome. Perhaps the correlation is too "obvious" to have attracted much interest. The unfortunate result is that while common sense suggests that information is necessary, the kind of information necessary for the would-be breast-feeding mother to achieve success is unclear. Several studies consider education of the mother or her caregivers in relation to breast-feeding success. The first group of studies to be considered are large descriptive public health studies from Great Britain (Jepson, Smith, Pursall, and Emery, 1976; Coles & Valman, 1976; Sloper, Elsdon, and Baum, 1977). The data on incidence of breast-feeding upon discharge from the hospital was collected from a representative sample in the county of interest. Two of the studies obtained a continuation rate: one at one month (Jepson et al., 1976), the other at five months (Sloper et al., 1977).

Documentation of the incidence of breast-feeding was followed by a public health program of breast-feeding education (which is not well described) for the public, the health visitors and midwives or both. After the initiation of the education program (average one year) a second incidence and duration statistic was obtained from the same group of hospitals. Significant increases in incidence and duration of breast-feeding were attributed to the education program. While this deduction could certainly prove to be true it is surprising (due to the lack of study controls) that Winikoff and Baer (1980), would conclude that "these studies (among others) provide evidence for the general hypothesis that information...can significantly enhance the chances for successful breast-feeding" (p. 111).

Another group of studies describes increases in the incidence and duration of breast-feeding following the "education" of hospital nursing

staffs and/or midwives. Again these are epidemiologic studies, predominantly from England. Increased incidences and durations of breast-feeding that are observed occurring over time have been associated with improvement in staff attitudes towards breast-feeding, seminars for midwives and health visitors, and changes in advice given by community health personnel (Brimblecombe & Cullen, 1977; Creery, 1973; and Smart & Bamford, 1976). Support for the notion that education of nurses is needed in the United States comes from Crowder (1981) who found, with a sample size of 53, that maternity nurses demonstrated limited knowledge regarding factors associated with successful breast-feeding.

Ladas, (1972) published the first study which specifically looked at the kind of information a woman had about breast-feeding in relationship to the outcome of her breast-feeding experience. On this descriptive study she hypothesized that "women with information of the type given by the La Leche League ... will have a better outcome to their breast-feeding endeavors than women who lack such information" (Ladas, 1972, p.323). She also hypothesized that support would have an effect on outcome, and that the combination of information and support would be the most effective. These hypotheses seem to be borne out by her data.

There are several weaknesses in the design of the Ladas study however, that must be addressed before any conclusions can be drawn. First, the definition of the independent variable, information, is nebulous. "Information of the type given by the La Leche League" and "the practices a woman thinks will help her to breast-feed successfully" (p.323) are so nonspecific that the reader can neither identify, nor critically analyze the content of the questionnaire used to assess information levels of the subjects. The author acknowledges the

limitation of the ex post facto design and warns the reader that the results of the data must be treated with caution. Third, the limitations of the self-administered mail questionnaire must be weighed against the large sample size (756) which resulted from its use. Last, the subjects were drawn from women attending a regularly scheduled meeting of the La Leche League, most probably a biased sample. This study does give us some valuable descriptive data about breast-feeding mothers but it is not particularly helpful in determining the specific kinds of information that would be helpful to them.

In an effort to fill this gap in knowledge Gulick (1982) conducted a study to identify specific kinds of information that distinguish between successful and unsuccessful breast-feeders. A prospective descriptive design was used to study 44 pairs of primigravid mothers matched for age and education. One group (n=44) discontinued breast-feeding before their infants were one month of age (unsuccessful breast-feeders) while the other group (n=44) continued breast-feeding beyond one month (successful breast-feeders). These mothers, while attending expectant parent education classes, completed questionnaires on their breast-feeding knowledge, information sources, and decision making. A mail questionnaire on breast-feeding outcome was completed five to six weeks postpartum and the results of the two questionnaires were correlated. Gulick found that successful breast-feeders had significantly higher overall breast-feeding information scores than unsuccessful breast-feeders. Further, they had higher scores on 22 of the 26 items measured by the Breast-feeding Information Questionnaire. Breast-feeding information scores and number of breast-feeding information sources used by primigravid mothers were also positively correlated. Although many

confounding variables have been controlled for in the design, this study might have benefited by studying a sample drawn from a group at less risk for bias than a prenatal education class. Additionally, it would have been advantageous for the author to be able to include all 251 participants who originally met the study requirements and completed all questionnaires. The rationale for using a much smaller number of matched pairs is not clear. The common practice of formula supplementation is not addressed in the definition of breast-feeding success. Some might differ with the selection of four weeks as the criterion interval for success. Nonetheless, her hypothesis "that expectant mothers having relatively more information on breast-feeding would breast-feed their infant beyond four weeks, whereas expectant mothers with relatively little information on breast-feeding would breast-feed their infants less than four weeks" (Gulick, 1982, p.370), was strongly supported by her data and well-designed analysis.

Summary

The review of the literature suggests that successful breast-feeding is influenced by a variety of physiologic, psychologic and sociocultural factors including the mother's socioeconomic status, the supports in her environment, and accurate information about breast-feeding. Of these variables found to influence breast-feeding success, the present study will focus on identification of specific kinds of information that can be related to breast feeding success in an effort to help nurses predict those mothers likely to be unsuccessful and prescribe effective teaching interventions to enhance the chance of success.

Conceptual Framework

Ervin Laszlo (1969) theorizes that information is acquired through an interconnected and isomorphically related three-level hierarchy consisting of physiological, perceptual/cognitive, and cultural levels, each influencing the other (see Figure 4). There are four essential elements of structure upon which this model is based. Stimuli from the environment are perceived by a receptor which sends a message to a control center. The control center integrates the information and in turn sends a message to an effector which produces a coordinated response to the stimulus. This response also serves as a feedback mechanism to the organism and in this way serves as a homeostatic mechanism. This pattern of stimulus - response occurs at three levels in the human animal (physiologic, perceptual/cognitive, and cultural) with each succeeding level requiring more sophisticated abilities for perception and higher cortical controls to initiate more complex responses. All three levels interact to enhance or inhibit responses. In this way than the human being learns and adapts to his environment.

Breast feeding may be viewed as a physiologic process of milk production and ejection, a neurohormonal reflex, that can be influenced by higher central nervous system centers. Assuming that the skills necessary for successful lactation are learned, it can be theorized that this physiologic mechanism in place in the human mother can be affected positively or negatively by the mother's perceptions, the kind of information she has to solve problems, and the cultural influences affecting her motivation and attitudes. Selected variables which can be associated with successful breast-feeding in each of these three realms are outlined in Table 2. For the purposes of the study, however,

VALUES, VISIONS, INTUITION

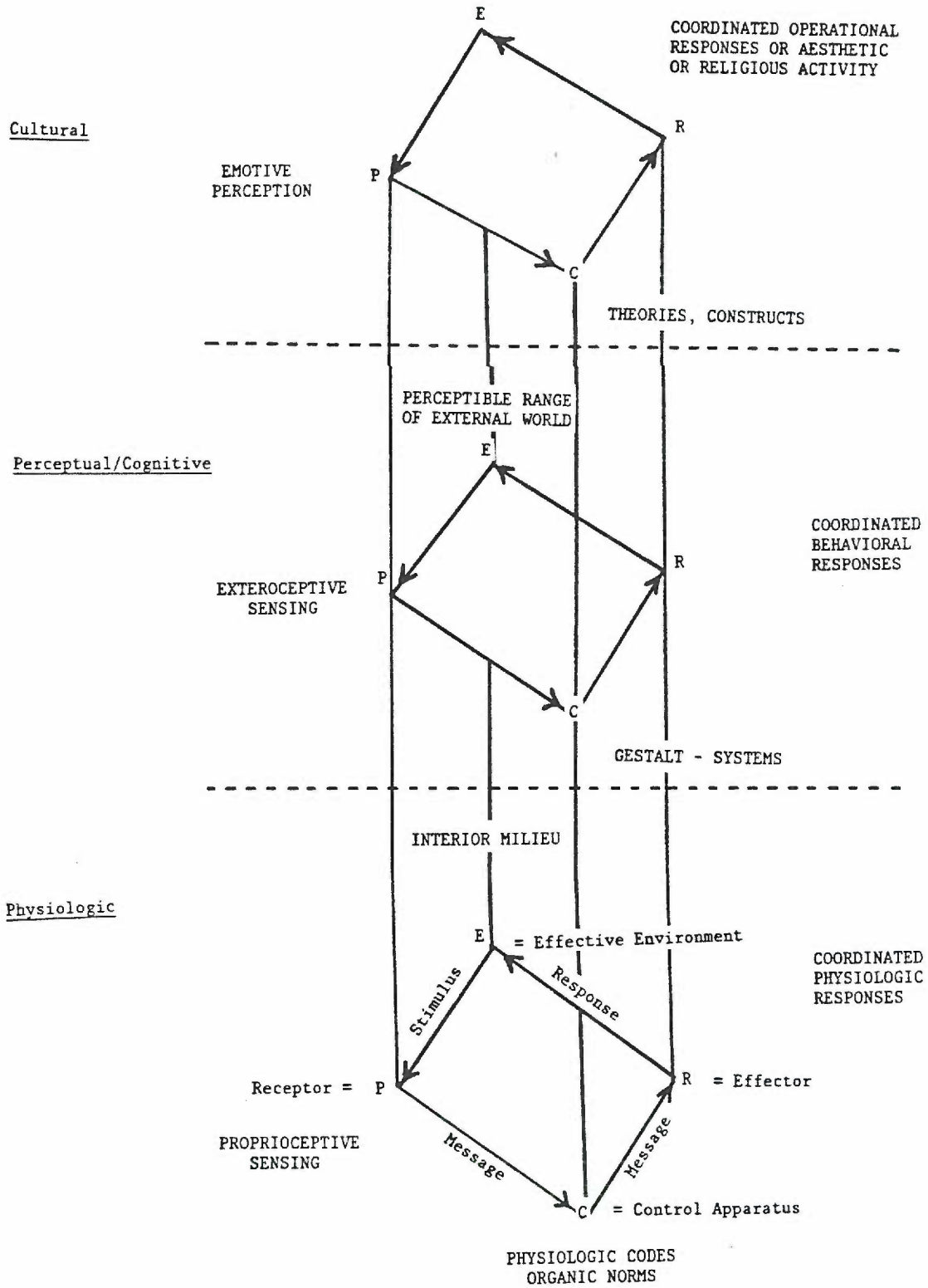


Figure 4. Ervin Laszlo's model for acquisition of information.

Table 2

Laszlo's Framework as Related to the Breast-Feeding Experience

<u>Essential Sensory/Perceptual Experience</u>	<u>Adaptive Response</u>
A. <u>Physiologic</u>	
1. Biologic system intact	1. Prolactin release and milk production
a. neurohormonal reflex function	
b. supportive hormonal milieu operational	2. Let down reflex milk flow
c. normal physiologic homeostatic mechanisms functional	
B. <u>Perceptual/Cognitive</u>	
1. Knowledge	1. Respond to infant cues with behaviors that are necessary to maintain lactation
a. advantages of breast-feeding for mother and infant	a. unrestricted offering of breast
b. skills necessary to initiate and maintain lactation	b. no unnecessary formula supplementation offered
c. skills necessary to solve common problems associated with breast-feeding	
2. Perception of infant's needs and ability to recognize infant "cues"	2. Initiate behaviors that will minimize or solve problem
3. Absence of significant stressors which could override or inhibit ability for response	a. rotating sucking position to infant to avoid sore nipples
4. Confidence in ability to breast feed.	b. recognize S&S mastitis and respond with appropriate treatment
C. <u>Cultural</u>	
1. Tradition of breast-feeding in family or close friends	1. Values her role in society as a breast-feeding mother
2. Breast-feeding valued in society	2. Motivated to initiate and continue breast-feeding
3. Support given to breast-feeding mother by family, friends, health care professionals	3. Desire to prevent or overcome problems
4. Opportunity to women to breast-feed regardless of occupational role	4. Confirmation of mothering/nurturing role
5. Attitude of society of breast as feeding object rather than primarily sexual	
6. Belief that breast-feeding is superior to formula	

knowledge about breast-feeding as it relates to success at breast-feeding, has been selected as the focus of this investigation. It is assumed, using this model, that knowledge is an essential ingredient in assuring that the necessary behavioral responses in the mother for breast-feeding success are elicited. It can be viewed as a subsumption of the control apparatus in the perceptual/cognitive level. Appropriate behavioral responses would be generated, in part, from the knowledge base available to that individual. These responses would be perceived as effective or ineffective and therefore would also serve to stimulate continued learning. Physiologic variables will be controlled by the selection of a population of essentially healthy mothers and babies. Cultural variables will be partially controlled for by the homogeneity (white, middle class) of the population under study. It must be added that not all variables outlined in Table 2 will be addressed, one of the limitations of this study.

Statement of the Problem

In light of the growing evidence that breast-feeding affords many advantages to the American mother and infant and that these advantages seem to be maximized with increasing duration of breast-feeding, it is disconcerting to observe the widespread inability to maintain lactation found among contemporary western women. This "epidemic" may be accounted for, in part, by the absence of the traditional system for transmitting the necessary information from generation to generation due to the typical mobile lifestyle and nuclear family structure found in industrialized countries (Helsing, 1976).

Nursing, with its emphasis on health maintenance, is one group of health professionals particularly suited to provide a missing link in this broken chain. In order to do this intelligently the nurse must be able to identify the woman in need of intervention and provide her with accurate effective information that has been found to make a difference. This study will focus on identifying specific kinds of information that distinguishes between successful and unsuccessful breast-feeding mothers.

The major limitations of the previous study by Gulick (1982), are that the population studied was all women who had attended prenatal classes; the definition of success did not consider breast and bottle feeding at the same time, the questionnaire was completed in the antepartum period, over half the study participants were excluded by matching, and the follow up time for determining success was very short. Therefore, this study will attempt to broaden the scope of application of Gulick's findings by replicating the study in another population group with some modifications made in design. The hypothesis for this study is:

Primiparous women who successfully breast-feed their infants for two months will score significantly higher on a written test of breast-feeding knowledge than women who do not successfully breast-feed for two months.

In addition the following research questions will be asked:

1. Are there any specific items on the questionnaire related to breast-feeding knowledge that are significant in discriminating between successful and unsuccessful breast-feeders?

2. Does the number of breast-feeding information sources used by the study subjects affect their information scores?
3. Is there a significant discrepancy in conceptualization of breast-feeding success between mothers and this author?

CHAPTER II

Methods

The purpose of this study was to attempt to replicate the relationships found by Gulick between the amount and kind of knowledge a new mother has about breast-feeding and the length of time she breast-feeds.

Setting

A convenience sample of 33 subjects was drawn from women meeting the criteria of the study who gave birth at two selected hospitals in northwest Oregon. These hospitals are nonprofit hospitals serving private patients. There are between 70 and 200 births per month. The majority of the population (>90%) are white, middle socioeconomic class and English speaking. The Cesarean birth rate is approximately 20%. The incidence of breast-feeding on the first postpartum day is approximately 80%.

Subjects

To be eligible for this study, the subjects must have been at least 17 years old, have achieved at least a 10th grade education and speak English as their first language. These criteria served to limit the sample to those most likely to be able to read and understand the questionnaire. Their infants must have been full term (37-42 weeks) as determined by the Ballard newborn gestational age assessment at the time of the initial nursing assessment. Infants included in the study must have been free from any disease or abnormality which could influence their ability to suck. This was determined by a notation on the newborn physical examination of an "essentially normal" or "healthy" infant. Use of the criteria of full term and healthy infant status served to control

for any possible influence of prematurity/postmaturity or sickness in the infants on breast-feeding success. Only single births were included to control for the effect that multiple births might have on success. Only primiparas who had chosen to breast-feed were included to control for the effect of a previous feeding experience on breast-feeding success.

Design and Procedure

The design of the study was nonexperimental, prospective and correlational. The investigator or nurse research assistant contacted each mother who met the criteria for the study between 12 and 36 hours postpartum and asked her to participate in the study. A structured approach was used to assure as much uniformity as possible in the procedure used with each mother. The investigator or nurse research assistant introduced herself to the mother as a graduate nurse or her assistant doing research with new mothers. The mother was told that "The purpose of the study is to gather information that would assist nurses and physicians to better meet the needs of mothers wishing to breast-feed their infants." If the mother verbally agreed to participate, a statement of Informed Consent (Appendix A) was explained and completed. Personal data was collected using a Personal Data Inventory form (Appendix B) and a questionnaire, the Information on Breast-feeding Questionnaire (IBFQ) was given to her to complete with verbal and written instructions (Appendix C). Each mother was asked to "answer each question as well as you are able". The investigator left the room for 20 minutes to avoid helping the subject in choosing correct answers.

When the Personal Data Inventory and Information on Breast-feeding Questionnaire were completed, the investigator picked up the forms and gave the mother two preprinted forms with stamped, addressed envelopes

to return to the investigator at one month intervals for the next two months. With these follow up questionnaires the mother answered questions about the duration of breast-feeding, introduction of other food or fluids, and feelings about breast-feeding (Appendix D). If the mother did not return the information within a week of the scheduled time period, the investigator contacted her by phone and obtained answers to the above questions. Any questions the subject might ask about breast-feeding were referred to her physician.

Instruments

Four instruments were used to obtain data for this study. They were the Infant's Chart Review (Appendix E), a self-administered Personal Data Inventory (Appendix B), a self-administered Information on Breast-feeding Questionnaire (Appendix C), and a self-administered Follow-up Questionnaire (Appendix D). These instruments were used to ensure the infant met the study criteria, to gather descriptive data on selected variables which might effect the dependent variable, to measure the expectant mother's knowledge about breast-feeding and to assess success at breast-feeding. The questionnaire required about 20 minutes of the mother's time in the hospital and approximately 10 minutes to complete each follow-up questionnaire at home.

Infant's Chart Review

The Infant's Chart Review is found in Appendix E. Information about the infant's health status and gestational age was obtained from the infant's chart. The infant was considered free from disease or anomalies if the examining physician noted that the child was "essentially normal" or "healthy". Full term was defined as a gestational period of 37-42 weeks.

Personal Data Inventory

Information regarding the mother's age, address, telephone number, marital status, education, socioeconomic status, type of delivery, intended duration of breast-feeding and sources of breast-feeding information was obtained by this inventory. Socioeconomic status was determined by the Hollingshead Two Factor Index of Social Position. The Hollingshead score is derived from weighted scores for education and occupation and ranges from 1 to 5 with 1 being the highest socioeconomic status and 5 being the lowest. Length of time, in hours, of the first breast-feeding experience after birth, attendance at childbirth classes, and how the subject was fed as an infant are additional pieces of information that were obtained. These variables, according to the literature review, may influence success in breast-feeding.

Information on Breast-feeding Questionnaires

The Information on Breast-feeding Questionnaire is a 26-item, multiple-choice questionnaire, developed by Gulick (1982), to measure the expectant mother's knowledge about breast-feeding.

Content for the items was derived from reports in the literature citing breast-feeding myths or problems. The items reflected information generally available through paperbacks as well as written and oral information available through health agencies, expectant parent programs, and La Leche League groups (Gulick, 1982, p. 370).

Content validity was claimed by Gulick's use of four judges with expertise in maternal-child nursing. It was not, however, confirmed by judges during this investigation, an issue that is discussed in later

chapters. The questionnaire has yielded a two-week test-retest reliability of .87 and a reliability coefficient for internal consistency of .72, both acceptable levels according to Polit and Hungler (1983). This instrument, as it appeared to be valid and reliable, and would provide data that can be compared to earlier findings by Gulick was used without change. One point was given for each correct answer so that the scores could range from 0 - 26.

Follow-up Questionnaire

The Follow-up Questionnaire included questions about duration of breast-feeding, introduction of other foods and fluids, feelings about breast-feeding, and factors influencing the duration of breast-feeding. The mother was considered to be "successful" at breast-feeding if she continued to breast-feed at the second month postpartum and was giving the infant no more than one four-ounce bottle of formula or cow's milk per day. A mother was considered to be "unsuccessful" at breast-feeding if she was not breast-feeding at the second month postpartum or was breast-feeding and giving her infant more than one four-ounce bottle of formula or cow's milk per day.

Questions regarding the mother's perception of the breast-feeding experience were compared to the investigator's definition of successful and unsuccessful breast-feeding. The reasons given for early weaning were compared to earlier studies on duration of breast-feeding. Descriptive data was added by asking about the timing of introduction of solid foods to the diet of the infant.

The Personal Data Inventory form and Information on Breast-feeding Questionnaire were pretested on a pilot sample of 5 postpartum mothers to determine the adequacy of the instructions and comprehension of

terminology. All were able to understand the instructions and complete the questionnaires without difficulty. Content validity for these instruments is supported by the review of the literature.

CHAPTER III

Results

The findings of the study are reported in this chapter. First, the sample is described. Second, the findings relevant to the study hypothesis and the three research questions are presented. A discussion of findings related to the content validity of the Information on Breast-feeding Questionnaire conclude this chapter. The accepted level of statistical significance for all findings is $p < .05$.

Description of the Sample

Thirty-three postpartum women, 20 (60.6%) of whom delivered at Setting A and 13 (39.4%) delivering at Setting B met the criteria for inclusion in the study and completed the initial questionnaires. Twenty-nine (88%) of these women completed both follow-up questionnaires. The four women who did not complete the follow-up questionnaires were not able to be contacted by telephone because they had not given a telephone number in the initial questionnaire (1), had given an incorrect number (1), or had a disconnected telephone number (2).

Demographic data is summarized in Table 3. Ages of the subjects ranged from 17 to 40 years with a mean age of 24.8 years. Thirty-one (94%) of the women were married. Eighteen or 54.5% of the sample had at least 1 year or more of college. Only 2 (6.1%) had less than a high school education. Using the Hollingshead Two-Factor Index for Social Position, subjects were assigned to one of 5 groups (1-5) with 1 representing the highest socioeconomic status and 5 the lowest. The

Table 3

Selected Demographic Variables for the Sample

Variable	Absolute Frequency	Relative Frequency (%)
<u>Age</u>		
1. 17-20	6	18.2%
2. 21-24	13	39.5%
3. 25-29	6	18.2%
4. 30-40	8	24.1%
mean	24.82	
<u>Marital Status</u>		
1. Married	31	94.0%
2. Divorced	1	3.0%
3. Living with	1	3.0%
<u>Education</u>		
1. Graduate School	4	12.1%
2. 16 years	5	15.2%
3. 13-16 yrs.	9	27.3%
4. 12 years	13	39.4%
5. 10-11 yrs.	2	6.0%
mean	13.7	
<u>Holingshead Two-factor Index of Social Position</u>		
High 1	1	3.0%
2	7	21.2%
3	11	33.3%
4	7	21.2%
Low 5	7	21.3%
mean	3.36	

distribution of socioeconomic scores is found in Table 3 demonstrating a primarily middle class group.

Vaginal deliveries were more common (78.8%) than C-sections (21.2%). Fifteen percent (5) of the vaginal delivery group reported having forceps assisted deliveries. Fourteen or 42.4% of the sample planned to breast-feed beyond 4 months. Nineteen (57.6%) planned to return to work and of this group one-half planned to return within 4 months of the infant's birth. Thirteen or 39.4% were breast-fed themselves as infants and 81.8% (27) had taken childbirth classes. Fifteen or 45.5% had first breast-fed their infant at less than 1 hour of age. Nine or 27.3% did not breast-feed until their infants were 4 hours of age or older.

When asked, "Where have you learned about breast-feeding?" the sources most frequently cited were books (84.8%), friends (54.5%), childbirth classes (81.8%), and nurses (63.6%). The least reported responses were mother (33.3%), sister (12.1%), physicians (33.3%), and relatives (15.2%). The total number of sources used per subject ranged from 1 to 7 with 4 sources being the most frequently cited number. Twenty-two or 66.7% reported using 4 or more sources of information.

The group of 4 women who did not participate in the follow-up process were comparable to the whole group on most characteristics. The mean age was 22.5 (range 17-31), 3 were married, and 3 had a high school education or above. Occupational status and socioeconomic status, however, tended to be somewhat lower than the average for the entire group. Three were delivered by C-section. Only 1 intended to breast-feed beyond 4 months and 2 planned to return to work. Only 1 fed her infant within the first hour of life. Two had been breast-fed as

infants and 3 had taken childbirth classes. The mean score for total number of sources consulted about breast-feeding was 4.

The group of women delivering at Setting A was compared to those delivering at Setting B to determine whether the two populations were similar enough to be considered one population for the purposes of the investigation. There were no significant differences in age, marital status, education, Hollingshead score, or mean score on the Information on Breast-feeding Questionnaire. Therefore, for the remainder of the analysis subjects from both settings will be considered as one group.

Description of Sample by Results of Information on Breast Feeding Questionnaire

The scores for the Information on Breast-feeding Questionnaire are found in Table 4. The mean score for the sample was 18.061 with a standard deviation of 3.354. The questionnaire yielded a reliability coefficient for internal consistency of 0.61 which was similar to Gulick's finding of 0.72. Three doctorally prepared judges with more than 37 combined years of experience in maternal-child nursing reviewed the questionnaire and all were in disagreement with Gulick's assertion of content validity for certain aspects of the test. This will be discussed further in Chapter IV.

The total score on the Information on Breast-feeding Questionnaire (IBFQ) was compared to selected demographic variables using the Pearson's product moment correlation coefficient (See Table 5). Age, education, occupation, Hollingshead score, and total number of sources of information about breast-feeding were all significantly positively correlated with the total score on the IBFQ while no significant correlation of knowledge with attendance at childbirth classes was found.

Table 4

Frequency Distribution for Information on Breast-feeding Questionnaire

Total Score (# correct)	Absolute Frequency	Relative Frequency (Pct)	Cumulative Frequency (Pct)
9	1	3.0	3.0
13	1	3.0	6.1
14	2	6.1	12.1
15	5	15.2	27.3
16	2	6.1	33.3
17	2	6.1	39.4
18	6	18.2	57.6
19	1	3.0	60.6
20	4	12.1	72.7
21	3	9.1	81.8
22	3	9.1	90.9
23	3	9.1	100.0
Total	33	100.0	

Table 5

Comparison of Total Score on Information on Breast-feeding
Questionnaire With Selected Variables

Variable	Pearson's r	p value
Age	0.32	0.035
Education	0.60	0.001
Occupation	0.30	0.044
Hollingshead Two-Factor Index of Social Position	0.41	0.008
Total sources of breast- information	0.47	0.003
Childbirth classes	0.20	N.S.

Description of Sample by One and Two Month Follow-Up

As noted earlier there were 29 mothers out of 33 who completed both follow-up questionnaires. All of the mothers who completed the one-month follow-up also completed the two-month follow-up. Both questionnaires were identical with the exception that there were two additional items on the first which were related to the effect the questionnaire had upon seeking additional knowledge. The difference in responses between the two follow-up questionnaires is described in Table 6. Fewer mothers were breast-feeding at two months than one month and more mothers were supplementing with formula and solid foods at two months. Response to the questions "Do you feel successful at breast-feeding?" changed from one month to two months but responses to "Would you breast-feed again?" remained unchanged.

At one month 20 (69%) women reported that they had sought answers to specific questions on the Information on Breast-feeding Questionnaire. Twenty-one (72.4%), however, reported that they would have done more research on breast-feeding despite their participation in this study.

Table 7 summarizes the findings related to duration of breast-feeding. Of the 29 who initiated breast-feeding in the hospital, 20 were still breast-feeding at the 2-month follow-up. Of those who had discontinued breast-feeding slightly over half had done so between the first and second month. The reasons given for weaning were varied: not enough milk (2), physician's request (1), endometritis (1), infant required phototherapy and formula supplement (1), desired pregnancy (1), went back to work (1), mastitis (1), and baby would not nurse (1).

Table 6

Differences in Response on Follow-up Questionnaires at
One and Two Months

Characteristics	One Month Follow-up n=29	Two Months Follow-up n=29
Continue to breast-feed	24 (82.8%)	20 (69.0%)
Feeding Formula	9 (31.0%)	14 (48.3%)
< 4 oz.	3 (10.3%)	2 (6.9%)
> 4 oz.	6 (20.7%)	12 (41.4%)
Feeding Solids	1 (3.4%)	5 (17.2%)
Felt Successful at		
Breast-feeding	24 (82.8%)	25 (86.2%)
Would Breast-feed again	28 (96.6%)	28 (96.6%)

Table 7
Length of Breast-feeding

Baby's Age When Breast-feeding Discontinued	Number of Mothers	Percent of Mothers
1-2 weeks	2	6.9%
2-3 weeks	1	3.5%
3-4 weeks	1	3.5%
4-6 weeks	3	10.3%
6-8 weeks	2	6.9%
Still Breast-feeding with > 4 oz supplement/day	3	10.3%
Still Breast-feeding with < 4 oz supplement/day	17	58.6%
TOTAL	29	100.0%

Description of Sample by Success at Breast-Feeding

As noted in Chapter II, a mother was considered to be "successful" at breast-feeding if she continued to breast-feed at two months postpartum and was supplementing with no more than 4 ounces of formula per day. Conversely, a mother was considered "unsuccessful" if she was either not breast-feeding at two months postpartum or was breast-feeding and supplementing with more than 4 ounces of formula per day. In Table 8 the demographic characteristics of mothers who succeeded at breast-feeding are compared to those of mothers who did not succeed. Of the 29 mothers who completed the follow-up questionnaires, 17 (58.6%) continued to breast-feed and 12 (41.4%) continued to breast-feed supplementing with more than 4 ounces of formula per day or had switched entirely to bottle-feeding. The two groups differed significantly only in regard to the infant's age at the first feeding. There was no significant difference in age, education, occupation, Hollingshead score, marital status, type of delivery, attendance at childbirth classes, length of intent to breast-feed, number of sources of breast-feeding information, how the mother was fed as an infant, or intent to return to work.

The typical mother who was successful at breast-feeding was 26 years old, married, and middle socioeconomic class. She had attended childbirth education classes, had a vaginal delivery, nursed her baby within one hour of birth, and intended to breast-feed for more than 4 months. She was somewhat more likely to have been bottle-fed than breast-fed as an infant and was equally likely to return to work as stay at home.

The typical mother who was not successful at breast-feeding was 24 years old, married, and middle socioeconomic class. She had attended

Table 8
 Comparison of Successful And Unsuccessful Breast-feeding;
 on Selected Characteristics

Variable	Success at Breast-feeding		Test	p
	Successful n=17	Unsuccessful n=12		
AGE				
Mean	26.06	23.83	t= 1.13	N.S.
EDUCATION				
1= graduate school	17.6%	8.3%		
2= 16	11.8%	25.0%		
3= 13-15	23.5%	25.0%		
4= 12	41.2%	33.3%		
5= 10-12	0.0%	8.3%		
Mean	2.88	3.17		
OCCUPATION (range 1-7)				
Mean	4.29	4.33	t= -0.05	N.S.
HOLLINGSHEAD Two-Factor Index of Social Position				
Mean	3.12	3.33	t= -0.51	N.S.
MARITAL STATUS				
Married	100%	92.0%		
Unmarried	0	8.0%		
TYPE OF DELIVERY				
Vaginal	58.8%	83.3%	X ² = 0.37	N.S.
Vaginal w/forceps	23.5%	8.3%		
C-Section	17.6%	8.3%		
CHILDBIRTH CLASS ATTENDANCE				
Yes	88.2%	75.0%	X ² = 0.86	N.S.
No	11.8%	25.0%		
INTENT TO BREAST-FEED				
1= Less than 1 mo.	0	0	t= -1.04	N.S.
2= 1-2 months	0	8.3%		
3= 2-4 months	29.4%	25.0%		
4= 4	58.8%	25.0%		
5= undecided	11.8%	41.7%		
TOTAL SOURCES OF BREAST-FEEDING INFORMATION				
Mean	3.71	4.00	t= -0.53	N.S.
BREAST FED AS AN INFANT				
Yes	35.3%	41.7%	X ² = 1.27	N.S.
No	58.8%	41.7%		
Don't know	5.9%	16.7%		
AGE OF INFANT WHEN FIRST BREAST-FED				
Less than 1 hour	58.8%	33.3%	t= 4.68	<.001
1-2 hours	11.8%	0		
2-4 hours	5.9%	25.0%		
More than 4 hours	23.5%	41.7%		
Mean	1.74 hrs.	2.92		
RETURN TO WORK				
Yes	47.1%	75.0%	X ² = 2.30	N.S.
No	52.9%	25.0%		

childbirth classes, had a vaginal delivery, nursed her baby from 2 to 4 hours after birth, and was often undecided about how long she would breast-feed. She was equally likely to have been bottle-fed as breast-fed as an infant, and more likely to return to work than stay at home.

There was a significant difference in the age of the infant in hours at the time the mother first breast-fed. Successful mothers generally breast-fed their infants within the first hour of life whereas those who were unsuccessful fed their infants between 2-4 hours of age and often did not feed until the infant was more than four hours old ($p < .001$). The number of sources a mother used to gather information about breast-feeding was not related to success at breast-feeding in this study.

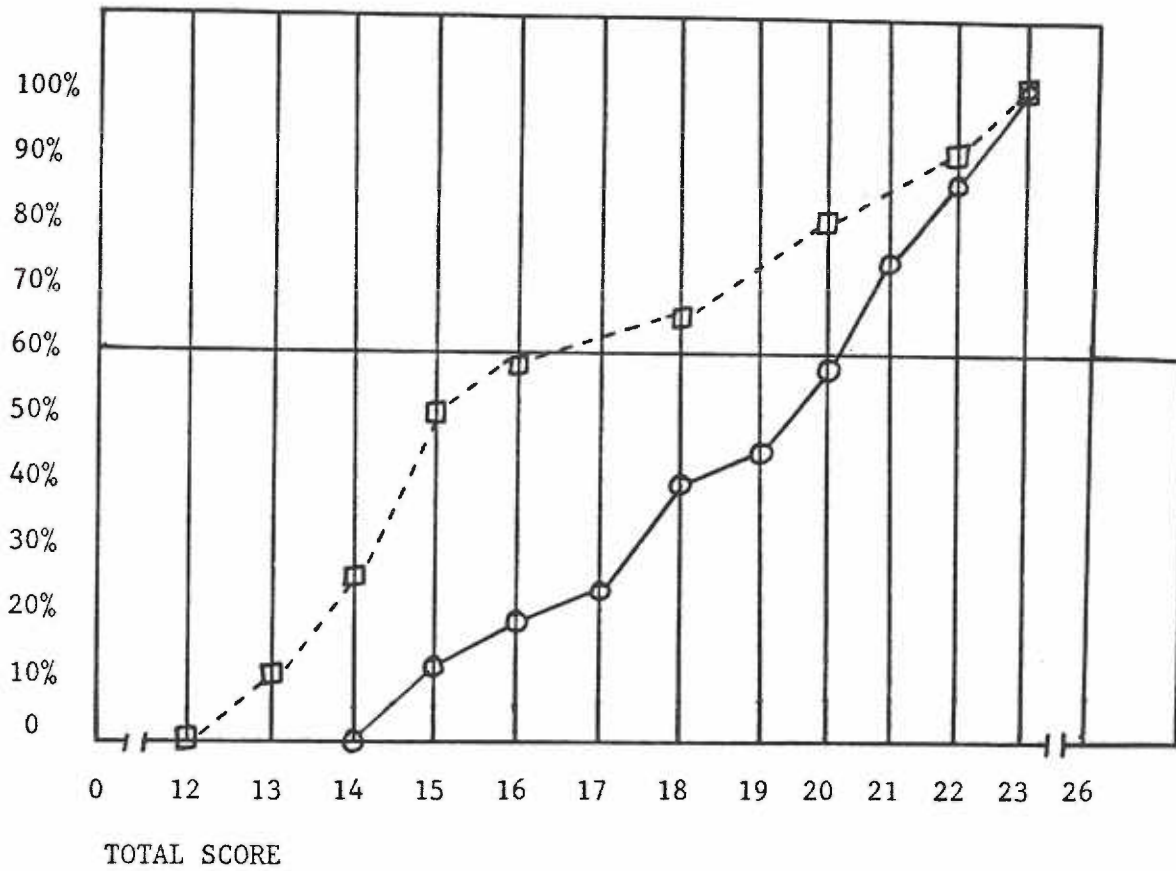
Findings Related to the Research Hypothesis

The hypothesis was that primiparous women who successfully breast-feed their infants for two months would score significantly higher on a written test of breast-feeding knowledge than women who do not successfully breast-feed for two months. This hypothesis was not supported by the findings of this study. Although the mean score for successful mothers was higher than the mean score for unsuccessful mothers, there was no statistically significant difference (Table 9).

Table 9
 Comparison of Mean Score on Information on Breast-feeding
 Questionnaires With Success at Breast-feeding

Variable	N	Mean	S.D.	F value	T value	One-tail Probability
Successful	17	19.00	2.76	1.63	1.21	.118
Unsuccessful	12	17.58	3.53			

When the data were analyzed in terms of cumulative frequencies, a significant difference was found between successful and unsuccessful mothers when scores of sixteen (60%) or below were compared. More unsuccessful mothers scored in the very low range. This difference is graphically illustrated in Figure 5, an Ogive comparing the cumulative frequencies (%) of the total score on the Information on Breast-feeding Questionnaire for both groups. The absolute frequency for scores of sixteen or less was compared for both groups using chi square analysis and the difference was found to be significant (Table 10). There were significantly more mothers who were unsuccessful scoring in the failing range (60% correct or less) while higher levels of knowledge did not discriminate between unsuccessful and successful mothers.



0— = Successful breast-feeders

□---- = Unsuccessful breast-feeders

Figure 5. Ogive of total score on Information on Breast-Feeding Questionnaire comparing successful and unsuccessful breast-feeders

Table 10
 Comparison of Total Scores of 16 or Less on Information on
 Breast-feeding Questionnaire With Success at Breast-feeding

Total Score	Successful (n=17)	Unsuccessful (n=12)	X ²	p
≤ 16	3	7	5.22	<0.05
> 16 (<60%)	14	5		

Findings Related to the First Research Question

The question was asked, are there any specific items on the questionnaire related to breast-feeding knowledge that are significant in discriminating between successful and unsuccessful breast-feeders? A one-way analysis of variance was performed on each item of the Information on Breast-Feeding Questionnaire to test for differences between the successful mothers and the unsuccessful mothers. Although the analysis revealed several items which approached statistical significance, none reached the acceptable level of 0.05.

A comparison of Gulick's findings of the item analysis with those of this investigation is found in Appendix F. Gulick found that the mean score for successful breast-feeders was equal to or above the mean score for unsuccessful breast-feeders on 24 of the 26 items. This investigator found that to be the case for only 14 items. In addition, those items for which statistical significance was approached in this study were the

same as Gulick's findings in only one instance, the question which was related to nipple care during pregnancy.

There were three items for which the higher scores of the successful breast-feeding group approached significance in this study: nipple care during pregnancy ($p= 0.07$), establishing an ample milk supply ($p= 0.06$), and alternating breasts at feedings ($p=0.06$). Gulick had originally found four items with statistical significance: benefits of breast-feeding to the mother ($p= 0.02$), nipple care during pregnancy ($p= 0.03$), waking a sleepy baby for feedings ($p=0.05$), and bowel movement characteristics ($p=0.04$).

Findings Related to the Second Research Question

Are the number of breast-feeding information sources used by the study subjects associated with their information scores? The results of this investigation support a positive relationship between the number of sources and scores on the IBFQ ($p= <.003$).

Findings Related to the Third Research Question

The final research question asked if there was a significant discrepancy in conceptualization of breast-feeding success between mothers and this author. A chi square analysis was done comparing the mothers' answer to the question "Do you feel you were/are successful at breast-feeding" with the investigator's criteria for success (breast-feeding and supplementing with less than 4 ounces of formula per day). The results, showing a significant difference, are presented in Table 11. More mothers considered themselves successful than were considered successful by the author.

Table 11
 Comparison of Mother's Perception of Success at
 Breast-feeding With Investigator's Criteria

Characteristic	Mother's Perception (n=29)	Investigators Perception (n=29)	χ^2	p
Successful	25	17	9.21	<0.01
Unsuccessful	4	12		

Other Findings

During the course of the follow-up process several interesting observations were made. First, several of the mothers who had not sent in the one-month follow-up questionnaire and who were subsequently contacted by telephone, reported that they had not done so because they had discontinued breast-feeding and thought that their responses would no longer be of interest to the investigator. Second, approximately midway through the second-month follow-up, the postal rates were raised and mail response declined. Therefore, almost half of the 2-month follow-up questionnaires were gathered by telephone interview. The women who had weaned their infants gave detailed explanations as to why they had done so and seemed to need reassurance that their decision to switch to bottle-feeding was justified.

Findings Related to Validity of the Information on Breast-feeding
Questionnaire

Three doctorally prepared judges whose area of expertise was in maternal-child nursing reviewed the Information on Breast-feeding Questionnaire. Their scores ranged from 19-22 with a mean of 20.7. All three disagreed with Gulick's answers on questions number 9, 14, and 16. Two of three disagreed with the answer on question number 12, and at least one disagreed with the answers to questions 2, 8, 18, and 25. They were all in agreement that the way the test was structured made it difficult to understand many of the questions. The use of "all except" tended to confuse the reader - that is, the wrong answer was the correct answer. In a diverse group of women, many of whom may not have completed high school and are not comfortable with test taking, the test itself rather than lack of knowledge could be responsible for low scores.

Chapter IV

Discussion

The purpose of this study was to examine the relationship between the amount and kind of knowledge a new mother has about breast-feeding and her subsequent success at breast-feeding. The study replicated an investigation by Gulick (1982) with 29 new mothers delivering at two selected hospitals in northwest Oregon. Ervin Laslo's theory of acquisition of information was used as the conceptual framework. This chapter discusses the findings as they relate to the research hypothesis and the three research questions. Significant findings related to breast-feeding success and implications for nursing practice are also included.

Major Research Findings

The research hypothesis, based on Gulick's findings (1982), which predicted that new mothers who were successful at breast-feeding would score higher on a written test (IBFQ) of breast-feeding knowledge, was not supported. Additionally, there were no specific items on the questionnaire (IFBQ) that were found to be significant in discriminating between successful and unsuccessful breast-feeders. Because these findings are so closely related, they will be discussed together.

There are several explanations for these findings. First, the sample size of this study was small (29). Differences were found between the successful and unsuccessful groups in terms of mean score on the IBFQ in the direction predicted and on three of the 26 test questions. These differences, however, were not large enough to be statistically significant. The sample size was not large enough to perform a discriminant analysis on the test questions. Therefore the difference

between Gulick's findings (n=88) and the present investigation might be explained by differences in sample size.

Second, the follow-up time in determining success was one month for Gulick and two months for this study. Perhaps there are differences in reasons for discontinuing breast-feeding in the first month versus the second month. The problems encountered in initiation of lactation and continuation of lactation may well be different. In addition, other life style factors may come into play at two months. An example is the need to return to work and subsequent supplementation of breast-feeding with formula in amounts exceeding 4 ounces per day. Therefore, the definition of success may need to be reconsidered.

Third, other variables which can be significant in determining success at breast-feeding were not measured in this investigation. Support, which has been found to be significant by many authors (Cole, 1977; Cooksey, 1982; Hall, 1978; Hellings, 1984; Houston & Howie, 1981; Ladas, 1972; Rousseau, 1982; Meara, 1976) and motivation, which has not been studied, are two such factors.

Gulick's tool, the Information on Breast-feeding Questionnaire, is open to scrutiny. Does this tool measure what it was designed to measure? Does it accurately reflect a subject's knowledge about breast-feeding? Could the act of taking the test be a factor influencing success for some women? Could the test, by its structure, bias results in favor of the more educated? Is there any cultural bias inherent which could affect test scores? Were the "right" answers truly accurate? Does it cover knowledge needed to solve many of the problems commonly encountered with breast-feeding? Finally, it may be that knowledge is not a significant contributor to breast-feeding success.

Because many questions regarding the tool's validity were raised, a panel of doctorally prepared judges, with experience in maternal-child nursing were asked to review this tool. The first area of concern expressed by this panel had to do with the structure of the test questions. Ten of the 26 questions were asked in the negative. "Which of the following is not true", "Benefits include all of the following except" or "Which actions should the mother avoid" are examples. When a question is structured in this manner, it may be difficult to determine what is being asked. In another 8 questions, the subject was asked to choose the most correct answer from a list of five correct answers. In a test which is structured in this manner it would not be easy to separate out the effect of education, familiarity with test taking and the author's bias on the outcome of test scores. And, in fact, education was one demographic variable which was positively correlated with test scores (Table 5).

Another area of concern was found in differences regarding the correct answer as proposed by Gulick and the three judges. The three questions with which all three judges disagreed were #9, length of initial sucking, #14, avoidance of sore nipples, and #16, establishing an ample milk supply (See Appendix C). According to Gulick, the baby should be permitted to nurse only 5 minutes at each breast the first day while all three judges agreed the correct answer was "As long as the baby wishes". Gulick contends that limiting sucking time would be one thing the mother could do to avoid sore nipples while the judges agree this has not been shown to be helpful. Question #16 asks "Which of the following.....will best help the mother establish an ample milk supply?" The three judges answered, "Nurse the baby whenever he/she cries."

Gulick's answer was, "Nurse the baby every 2-3 hours". All three questions center around the issue of limiting the frequency and duration of nursing, practices which have not been found to be helpful in the initiation or maintenance of lactation nor in preventing sore nipples (Brown, 1975; Whitley, 1978; Newton, 1952; and Riordan and Countryman, 1980). It is interesting to note, however, that the majority of the subjects answered questions #9 and #14 correctly according to Gulick, but incorrectly on question #16 according to both Gulick and the three judges. The answer given most often by subjects for #26 was "Begin breast-feeding immediately or soon as possible after delivery" an answer which could also be considered correct according to the literature (Beske & Garvis, 1982; de Chateau et al., 1977; Johnson, 1976; Meara, 1976; Saleriya et al., 1978; and Whichelow, 1982).

There were five other questions with which at least one judge had difficulty, making a total of eight questions or 31% of the total under dispute. Under these circumstances, the validity of the tool (IFBQ) may be questioned.

The second research question asked if the total score on the IFBQ would be positively correlated with the total number of sources of information about breast-feeding. Results of this study support that relationship (Table 5). This is in agreement with Gulick's (1982) findings. There were, however, some differences with Gulick's findings in regard to the most frequently cited sources of information. Like Gulick, books (84.8%) were the most frequently cited source. Unlike Gulick, however, childbirth classes (81.8%) were the next most frequent, followed by nurses (63.6%), friends (54.5%), mother (33.3%), physicians (33.3%), relatives (15.2%), and sister (12.2%). Gulick found family and

friends (52.2%) to be second after books, followed by childbirth classes (28.7%), physicians (10%), and nurses (5.6%). The finding that mother, relatives, and sister were among the least cited sources of information agrees with Helsing's (1976) assertion that there is a loss of the traditional mechanism for transmitting lactation education from mother to daughters and sister to sister, in modern industrialized countries. It was encouraging to note that nurses were high on the list of sources of information, reinforcing the notion that nurses may have some impact on successful breast-feeding. The reason that nurses could have been so low on Gulick's list may have been the difference in sampling time. Gulick tested the subjects prenatally when exposure to nursing care would have been lower while this study sampled postnatally in the hospital with nursing care exposure at a maximum.

The number of sources of information used may also be an indirect measure of motivation and enthusiasm for breast-feeding. The act of seeking out information from many sources would logically indicate a desire to succeed at the task. The fact that books are the most frequently cited source of information about breast-feeding should lead nurses to review the lay literature on breast-feeding and have at their fingertips a list of books that they could recommend with accurate, practical information for mothers.

The third research question asked whether there was a significant discrepancy in conceptualization of breast-feeding success between nursing mothers and this author. The findings support the assertion that there is a difference (Table 13). Of the group of 12 mothers who this author had labeled unsuccessful, only 4 felt that they had been unsuccessful. Three of these women were still breast-feeding but feeding

more than 4 ounces of formula per day. The remaining 5 had discontinued breast-feeding altogether so that the issue of supplementation with formula was not likely to be the sole cause of the discrepancy.

Perhaps long-term breast-feeding is not the goal of many women and breast-feeding for any length of time would seem successful, particularly since it is not essential to the infant's survival. Perhaps supplementation with less than 4 ounces of formula is not a realistic goal since some women will return to work and wish to continue breast-feeding. There may also be an element of rationalization at work. That is, it is possible to see oneself as successful because of influences outside of a woman's control (illness, for example) interfering with her plans to breast-feed. It would be interesting to survey mothers who were going to breast-feed to find out what they would define as successful breast-feeding prior to the experience. This finding underscores the need to include formula supplementation in the definition of breast-feeding success.

Other Findings

The incidence of breast-feeding in the hospitals selected for study was higher (80%) than the national average (51%) reported by Martinez and Nalezienski (1981). However, it was comparable to the 70.3% found in Cooksey's study (1982), which was also done in the Northwest. The reader is referred to Table 1 for comparison of data from previous studies. The continuation rates of the study at 1 and 2 months were 86.2% and 58.6% respectively, which were similar to the 78.3% and 65.7% found by Griffith (1979). It is encouraging to see the trend towards initiating breast-feeding continue while at the same time it is discouraging to find only 1/2 continuing at two months. The reasons given for discontinuing

breast-feeding were more varied than that usually reported. However, "not enough milk" was the reason most often cited, a finding commonly reported in the literature (Cooksey, 1982; Ladas, 1970; Salber & Feinleib, 1966).

The typical mother who chose to breast-feed in this sample was very similar to that reported in the literature. She was 24 years of age, married, middle socioeconomic status, and had at least one year of college education (Beske & Garvis, 1982; Ekwo et al., 1983; Cooksey, 1982; Rousseau, et al., 1982; Sloper, et al., 1975; Martinez & Nalezienski, 1981). She had attended childbirth classes (Jeffs, 1977), had a vaginal delivery (Hellings, 1984; Whichelow, 1982) and was equally likely to have been bottle-fed as breast-fed by her mother (Ekwo, et al., 1983).

Of particular importance was the finding that successful mothers generally get their infants to breast-feed within the first hour of life. This finding is consistently reported in the literature (de Chateau, 1977; Johnson, 1976; Meara, 1976; Salariya, 1978; Whichelow, 1982). It is one variable over which the nurse may have some influence. New mothers should be encouraged to breast-feed their infants during those early moments whenever possible.

It is interesting to note that, unlike many other studies, no other demographic variable was significantly related to success at breast-feeding. Hellings (1984) found that, of all variables related to success, income level education and vaginal delivery were, in combination, variables which could predict successful breast-feeding 72% of the time. Education, age, and socioeconomic status are frequently reported variables associated with success (Beske & Garvis, 1982; Ekwo et

al., 1984; Sloper, et al., 1975). The differences may have been due to sample size or restriction of range on the education variable. On the other hand, in this homogeneous population those factors may truly have not been significant.

In summary, the results of this study have several implications for nursing. Nurses have the potential for increasing the duration of breast-feeding with mothers who wish to breast-feed. They may do so by identifying areas of knowledge deficit and providing education directly or acting as a referral source for good lay literature. The nurse can also be instrumental in influencing practices in the hospital that have been found to be important in successful breast-feeding, such as early initiation of breast-feeding.

Chapter V

Summary, Conclusions, Limitations, and Recommendations

This chapter includes a summary of the findings of the study and conclusions which may be derived from the findings. The limitations of the study and recommendations for further research are also discussed.

Summary

A variety of physiological, psychological, and sociocultural factors affect breast-feeding success. The purpose of this study was to examine the relationship between one variable, knowledge about breast-feeding, and subsequent outcome of the breast-feeding experience. One of the few studies available which looks at this relationship (Gulick, 1982) included only mothers who had attended prenatal classes with a follow-up interval of one month. In addition, supplementation with formula was not addressed in the definition of breast-feeding outcomes. The present investigation attempted to broaden the scope of application of Gulick's findings by replicating the study in another population group with some modifications made in design. The hypothesis for the study was that primiparous women who successfully breast-feed their infants for two months will score significantly higher on a written test of breast-feeding knowledge than women who do not successfully breast-feed for two months.

In addition, the following research questions were asked:

- 1) Are there any specific items on the questionnaires related to breast-feeding knowledge that are significant in discriminating between successful and unsuccessful breast-feeders?

- 2) Does the number of breast-feeding information sources used by the study subjects affect their information scores?
- 3) Is there a discrepancy in conceptualization of breast-feeding success between mothers and this author?

The research hypothesis was not supported by the findings of this study. Although the mean score of successful breast-feeders was higher on the Information on Breast-feeding Questionnaire (IBFQ) than unsuccessful breast-feeders, this difference was not found to be significant ($p = 0.118$). There were, however, a greater number of unsuccessful mothers than successful mothers with very low scores ($p < 0.05$) on the IFBQ.

There were no specific items on the IBFQ which were found to discriminate between successful and unsuccessful breast-feeders. Three items approached significance: nipple care during pregnancy ($p = 0.07$), establishing an ample milk supply ($p = 0.07$), and alternating breasts at feedings ($p = 0.06$) (See Appendix F). Only one of these items, nipple care during pregnancy, was found by Gulick to be significant.

The results related to the second research question indicated that the number of sources of information about breast-feeding was significantly positively correlated with the score on the IBFQ ($p = 0.003$). Like Gulick, books were the most frequently cited source of information.

There was a difference in conceptualization of successful breast-feeding between mothers and this author ($p = <0.01$). Since the author defined success in terms of duration and frequency of breast-feeding as the majority of researchers have, it would be

interesting to know where the majority opinion lies among lay women on this subject.

There was one other significant finding of the study. The only variable studied which was found to be significantly correlated to success at breast-feeding was the timing of the first breast-feeding. Successful mothers were significantly more likely to have breast-fed their infants within the first hour of life than unsuccessful mothers. Unlike many other studies, there were no demographic variables in this homogeneous population which were found to be related to breast-feeding success.

Conclusions

No conclusion can be drawn from this study regarding the relationship between the amount of knowledge a woman has about breast-feeding and her subsequent success at breast-feeding. However, more research needs to be done in this area before any definitive conclusions can be made. In addition, there have been no specific items of knowledge identified that are related to a successful breast-feeding experience. The number of sources of information a woman has about breast-feeding increases her likelihood of achieving a higher score on a test of knowledge about breast-feeding. Again, however, the link between knowledge about breast-feeding and subsequent success at breast-feeding has not been made. New mothers who are breast feeding do not conceive of success at breast-feeding in the same way as this author and many other researchers. Lastly, early breast-feeding after delivery is significantly associated with success at breast feeding.

Limitations

There were several limitations to this study. The small, nonrandom sample size and homogeneity of the population under scrutiny limit generalizations which can be made from any of the findings. In addition, there were several variables not controlled. These include social support, which has previously been found to be associated with success at breast-feeding. The restriction of range of some of the responses such as education and socioeconomic status made it difficult to find potential differences in the small sample.

The validity of the instrument for measuring knowledge about breast-feeding was not confirmed, making results obtained by its use inconclusive. Additionally, the instrument has not been tested in a population of women of lower socioeconomic or educational status.

Since many authorities advocate breast-feeding for a duration of 4 to 6 months, it would have been useful to have had a longer follow-up period. The method of follow-up (self-addressed envelopes with preprinted questionnaires) led to a lower response rate as time went on so that many women had to be contacted by telephone, a factor that may have biased follow-up results. Because of the aforementioned limitations, caution should be used in generalizing the findings of this study.

Recommendations for Future Research

The following are suggestions offered for future research:

- 1) Further development and testing of a tool designed to measure knowledge about breast-feeding is necessary before further research concerning the link between knowledge and breast-feeding success can be carried out.

- 2) Development and refinement of tools to measure support and motivation for breast-feeding would be helpful to assess their effect on success.
- 3) A similar study done in other population, with larger sample sizes and longer follow-up periods would expand knowledge and increase confidence in the results.
- 4) The use of the Information on Breast-feeding Questionnaire or a similar tool in an experimental design, would test the effect of taking a test as an intervention to influence success.
- 5) Further exploration of the concept of successful breast-feeding with nursing mothers would be helpful in defining the goals for nursing intervention.

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APPENDIX A
Informed Consent Form

THE OREGON HEALTH SCIENCES UNIVERSITY

INFORMED CONSENT FORM

I, _____, agree
first name middle name last name

to participate in a study which is designed to gather information that will assist nurses and physicians to better meet the needs of mothers wishing to breast-feed their infants. I understand that this study will be conducted by Kathleen Steinmetz, R.N., under the supervision of Carol Howe, C.N.M., D.N.Sc.

If I agree to participate, I understand that I will be asked to complete a questionnaire that will ask about my background, some of the events surrounding the birth of my child, and the amount of time I intend to breast-feed. I will also be asked to complete a 26-item, multiple choice questionnaire which will ask about the process of breast-feeding. The questionnaires are written and will be completed during the first day of my hospital stay. They will take about twenty minutes to complete. I will also receive three stamped envelopes with questionnaires to complete and return to the investigator at one month intervals for the next two months. This questionnaire will ask about my experience with breast-feeding after leaving the hospital. Each one will take about ten minutes to complete. I understand that if I forget to return a questionnaire I will receive a telephone call asking the same information. I agree to permit Kathleen Steinmetz to review my baby's hospital chart.

I understand that I will not benefit directly from this study but my participation may provide nurses and physicians with information that will help them better advise mothers wishing to breast-feed.

It is my understanding that the information obtained will be kept confidential. My name will not appear in any reports and anonymity will be insured by the use of code numbers. I agree that the information that I give by participation in this study will be used in reporting the study results and for other research and educational purposes.

Kathleen Steinmetz has offered to answer any questions that I might have concerning my participation in this study. I understand that I am free to refuse to participate in this study and am free to withdraw at any time from the study without affecting my relationship or my infant's relationship with, or treatment at,

I have read the foregoing and agree to participate in this study.

Date

Signature

Witness's Signature

APPENDIX B

Personal Data Inventory Form

PERSONAL DATA INVENTORY FORM

CODE # _____

Date _____

Name _____

Telephone Number _____

Address _____

Computer use
Only

- _____ 1. Age _____
- _____ 2. What is your marital status? (Circle one)
1. Married
 2. Divorced
 3. Single
 4. Separated
 5. Widow
 6. Living with
- _____ 3. How many years of school have you completed?
1. Graduate school
 2. 16 years
 3. 13-15 years
 4. 12 years/High school graduate
 5. 10-11 years
- _____ 4. What is your occupation?
- _____
- _____ 5. What type of delivery did you have?
1. Vaginal birth
 2. Vaginal birth with forceps
 3. Cesarean birth
- _____ 6. How long do you intend to breast-feed?
1. less than one month
 2. one to two months
 3. two to four months
 4. more than four months
 5. haven't decided yet
- _____ 7. Do you intend to return to work?
1. yes
 2. no
- _____ 8. If yes, when?
1. less than one month
 2. one to two months
 3. two to four months
 4. more than four months
 5. haven't decided yet

_____ 9. Where have you learned about breast-feeding-
(please circle as many as apply)

- | | |
|------------|-----------------------|
| 1. books | 5. childbirth classes |
| 2. mother | 6. nurses |
| 3. friends | 7. physicians |
| 4. sister | 8. relatives |
| | 9. Other _____ |

_____ 10. How did your mother feed you?

1. breast-feed
2. bottle-feed
3. don't know

_____ 11. How old was your baby when you first breast-fed
him or her?

1. less than 1 hour old
2. from 1 to 2 hours old
3. from 2 to 4 hours old
4. more than 4 hours old
5. not sure

_____ 12. Did you attend childbirth classes before this
delivery?

1. yes
2. no

_____ 13. If yes, what kind?

1. birth preparation
2. infant care
3. pregnancy classes
4. all of the above

APPENDIX C
Information on Breast-feeding Questionnaire

VERBAL INSTRUCTIONS FOR INFORMATION
ON BREAST-FEEDING QUESTIONNAIRE

This questionnaire should take about 20 minutes to complete. Please answer each question as best you can. Please check only one answer to each question. I will need to leave the room while you complete the questionnaire but will be available to clarify the wording of the questions if necessary. Thank you so much for your time in helping me with this study.

INFORMATION ON BREAST-FEEDING QUESTIONNAIRE*

ID NUMBER _____

The following 26 questions are about breast-feeding. They include: (1) what some people think are advantages or disadvantages of breast-feeding, (2) activities that an expectant mother might do during pregnancy in order to prepare for breast-feeding and (3) actions which occur between the mother and infant related to breast-feeding.

Read the question and select and circle the letter before the one best answer.

1. Advantages of human milk over formula for the infant include all of the following except
 - A. easier digested
 - B. less chance of gastrointestinal infection
 - C. less chance of developing allergies
 - D. more rapid weight gain
 - E. contains right amount of needed nutrients

2. Benefits of breast-feeding over bottle feeding for the mother include all of the following except
 - A. prevents further pregnancy
 - B. good for the figure
 - C. convenience
 - D. economical
 - E. enjoyment

3. The best breast size for a mother to be successful in nursing her baby is
 - A. even size
 - B. small breasts
 - C. average size breasts
 - D. large breasts
 - E. no particular size

4. Which of the following is not true about the expectant mother who want to breast-feed her baby but finds that she has a tendency for inverted nipples?
 - A. should forget about wanting to breast-feed
 - B. the nipples may work themselves out without any special attention.
 - C. should start nipple-rolling exercises
 - D. should start nipple-pulling exercises
 - E. try wearing special breast shields for inverted nipples.

5. Breast changes occurring during pregnancy include all of the following except
- A. growth of the milk duct system
 - B. development of milk sacs
 - C. development of mature milk
 - D. development of colostrum
 - E. increase in breast size
6. Toughening the nipples during the last 6 to 8 weeks of pregnancy can be accomplished by all of the following ways except
- A. rub nipples briskly with a rough towel or washcloth following the shower
 - B. expose nipples to direct sun or sun lamp in increasing safe doses.
 - C. daily applications of alcohol
 - D. nipple-rolling once or twice a day
 - E. allow nipples to rub against clothing by removing bra or cut small hole in bra over nipple area
7. The best way to get the baby to begin sucking is
- A. hold the baby's head and guide his face toward the nipple
 - B. touch the corner of baby's mouth with your nipple
 - C. open the baby's mouth by pressing in on both of his cheeks
 - D. press down on his chin to open his mouth
 - E. when the baby cries quick pop in the nipple
8. Which of the following statements does not characterize a correct infant sucking action?
- A. the baby's lips fall on the dark area (areola) around the nipple
 - B. the nipple rests between the upper tongue surface and the roof of his mouth
 - C. rapid, short chewing motions occur at the beginning of the feeding
 - D. slow, rhythmical up and down jaw motions occur during active nursing
 - E. a satisfied sound accompanies infant nursing
9. The length of time the baby should be permitted to nurse at each breast during each feeding the first day is
- A. no more than 2 minutes
 - B. approximately 5 minutes
 - C. approximately 10 minutes
 - D. approximately 15 minutes
 - E. as long as the baby wishes

10. The best way to remove the baby from the nipple and breast is to
- A. grasp baby's head and gently push away from the breast
 - B. gently pull your breast away from the baby
 - C. tickle his feet
 - D. tickle his chin and cheek
 - E. insert your finger inside his mouth to break suction
11. The best time to burp the baby to remove any air that he may have swallowed is
- A. midway through each breast-feeding session
 - B. after he finishes nursing from one breast
 - C. after every two minutes of sucking
 - D. after every five minutes of sucking
 - E. breast-fed babies don't need burping
12. Which of the following actions should the mother avoid in dealing with a sleepy baby who isn't interested in nursing?
- A. let him sleep as long as he wishes
 - B. loosen his blankets and clothes
 - C. change his diaper
 - D. rub his tummy and pat his feet
 - E. talk and play with him
13. The most important factor in producing breast milk is
- A. drinking at least 1 quart of milk every day
 - B. getting extra sleep
 - C. infant sucking at the breast
 - D. restricting the number of visitors
 - E. receiving help from others with routine housework
14. The nursing mother can avoid sore nipples by doing any of the following actions except
- A. keeping nipples clean by daily bathing with soap and water
 - B. applying pure lanolin after each feeding
 - C. exposing nipples to sun light or sun lamp several times a day
 - D. using manual expression at the start of feeding to stimulate milk letdown
 - E. limiting initial sucking during each feeding to five minutes for each breast

15. If a breast-feeding mother has difficulty in establishing milk letdown she could try any of the following actions except
- A. sitting down with a warm beverage for a few minutes before the feeding
 - B. taking a tranquilizer just before the feeding
 - C. taking a hot shower shortly before the feeding
 - D. eating a healthful snack just before a feeding
 - E. lying down a few minutes before the feeding and continue to nurse while lying down.
16. Which of the following statements will best help the mother establish an ample milk supply?
- A. begin expressing milk from the breasts one week before the expected delivery date
 - B. begin breast-feeding immediately or soon as possible after delivery of the baby
 - C. nurse the baby every 1-2 hours
 - D. nurse the baby every 2-3 hours
 - E. nurse the baby whenever he/she cries
17. The most important action a mother can do to prevent or control the development of breast engorgement is
- A. wear a tight bra
 - B. restrict the amount of fluid that she drinks
 - C. have the baby nurse more frequently or manually express some of the milk
 - D. ask for medicine to control milk production
 - E. do nothing because it is only temporary
18. The most important factor in promoting milk let down so the baby can obtain milk that is present within the breast is
- A. eating nutritious meals
 - B. drinking a glass of milk before or during the nursing period
 - C. nurse the baby frequently
 - D. continuous sucking of the baby
 - E. remain calm, relaxed with a positive attitude
19. In subsequent breast-feedings the mother should
- A. begin feeding with the same breast that she started with at the last feeding
 - B. begin feeding with the breast she ended with at the last feeding
 - C. it doesn't matter which breast you begin feeding with
 - D. begin feeding with the breast which baby likes best
 - E. begin feeding with the breast which is most convenient for the mother

20. The most important factor which determines the amount of milk that the mother produces is
- A. the amount of milk that the baby demands
 - B. the amount of fluid the mother drinks
 - C. the amount of rest and sleep the mother gets
 - D. the amount of exercise the mother gets
 - E. how adequate the mother's diet is
21. Bowel movements of a breast-fed baby are
- A. the same as the formula fed baby
 - B. usually more constipated than formula fed
 - C. usually looser and more frequent than formula fed
 - D. brown in color
 - E. foul smelling
22. Supplementing breast-feeding with artificial formula
- A. is a good idea the first few days following delivery or until mother's milk is well established
 - B. is a good way to involve the baby's father in infant care
 - C. should be encouraged during the first month
 - D. should be discouraged during the first month
 - E. has no effect on the baby or mother
23. During the first few weeks the baby will probably want to nurse
- A. every two hours
 - B. every two to three hours
 - C. every four hours
 - D. every four to five hours
 - E. every five to six hours
24. You can be confident that baby gets enough milk if
- A. you weigh him each morning and find a daily weight gain
 - B. he gains the same weight as your friend's baby who is bottle fed
 - C. he gains the same weight as your friend's baby who is breast fed
 - D. your baby cries for feedings, appears contented after feedings and has several wet diapers
 - E. the baby sleeps for long periods and rarely cries

25. Which of the following food groups should not be increased in order to meet the additional 1,000 calorie intake needed by the nursing mother?
- A. milk and/or milk products
 - B. meat, fish or poultry
 - C. fruits
 - D. vegetables
 - E. whole grain or enriched cereals, breads, macaroni
26. The relationship between sexual feelings and breast-feeding is that
- A. all mothers become sexually aroused
 - B. no mother becomes sexually aroused
 - C. some mothers may become sexually aroused
 - D. a mother doesn't become sexually aroused if she engages in sexual intercourse
 - E. nursing a baby is not related to sex

INFORMATION ON BREAST-FEEDING QUESTIONNAIRE

ANSWER KEY:

- | | |
|-------|-------|
| 1. D | 14. A |
| 2. A | 15. B |
| 3. E | 16. D |
| 4. A | 17. C |
| 5. C | 18. E |
| 6. C | 19. B |
| 7. B | 20. A |
| 8. C | 21. C |
| 9. B | 22. D |
| 10. E | 23. B |
| 11. B | 24. D |
| 12. A | 25. E |
| 13. C | 26. C |

APPENDIX D

Follow-up Questionnaire

Code # _____

Date _____

Follow-up Questionnaire

Computer use
Only

(circle one answer to each question)

- _____ 1. Are you still breast feeding?
1. yes
2. no
- _____ 2. If you have stopped, how old was your baby when you did so?
1. less than one week
2. one to two weeks
3. two to three weeks
4. three to four weeks
5. four to six weeks
6. six to eight weeks
- _____ 3. What was your reason for stopping?
1. not enough milk
2. sore nipples/breasts
3. physician told me to
4. discouraged by relatives or friends
5. other _____

- _____ 4. Are you feeding your baby any cow's milk or formula?
1. yes
2. no
- _____ 5. If yes, how much per day?
1. less than two oz.
2. two to four oz.
3. four to six oz.
4. six to eight oz.
5. more than eight oz.

- _____ 6. Are you feeding your baby any solid foods?
1. yes
2. no
- _____ 7. If yes, how old was your baby when you started?
1. less than one week
2. one to two weeks
3. two to three weeks
4. three to four weeks
5. four to six weeks
6. six to eight weeks
- _____ 8. If yes, why did you start?
1. baby not gaining weight
2. wanted baby to sleep through the night
3. baby fussy after bottle feedings
4. physician told me to
5. other _____

- _____ 9. Do you feel that you were/are "successful" at breast-feeding?
1. yes
2. no
- _____ 10. Would you breast-feed again?
1. yes
2. no
- _____ 11. After completing the questionnaire at the beginning of this study, did you later seek answers to any of the questions by reading a book about breast-feeding or asking a nurse or physician?
1. yes
2. no
- _____ 12. Would you have sought more information about breast-feeding even if you had not participated in this study?
1. yes
2. no

Code # _____

Date _____

Follow-up Questionnaire

Computer use
Only

(circle one answer to each question)

1. Are you still breast feeding?

1. yes
2. no

2. If you have stopped, how old was your baby when you did so?

1. less than one week
2. one to two weeks
3. two to three weeks
4. three to four weeks
5. four to six weeks
6. six to eight weeks

3. What was your reason for stopping?

1. not enough milk
2. sore nipples/breasts
3. physician told me to
4. discouraged by relative or friends
5. other _____

4. Are you feeding your baby any cow's milk or formula?

1. yes
2. no

5. If yes, how much per day?

1. less than two oz.
2. two to four oz.
3. four to six oz.
4. six to eight oz.
5. more than eight oz.

6. Are you feeding your baby any solid foods?

1. yes
2. no

- _____
7. If yes, how old was your baby when you started?
1. less than one week
 2. one to two weeks
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 4. three to four weeks
 5. four to six weeks
 6. six to eight weeks

- _____
8. If yes, why did you start
1. baby not gaining weight
 2. wanted baby to sleep through the night
 3. baby fussy after bottle feedings
 4. physician told me to
 5. other _____
- _____
- _____

- _____
9. Do you feel that you were/are "successful" at breast-feeding?
1. yes
 2. no

- _____
10. Would you breast-feed again?
1. yes
 2. no

Appendix E
Infant's Chart Review

Infant's Chart Review

Infant's gestational age

Health status as indicated on Physical Exam

Appendix F

Table 12

One-way Analysis of Variance Comparing Successful and Unsuccessful
Breast-feeders Questionnaire Responses: Gulick versus Steinmetz

Item	Group	Mean		Standard		F ratio		F prob	
		Percent	Score	Deviation	St	G	St	G	St
1. Advantage of breast-feeding for infant	S	79	47	0.40	0.51	0.55	0.02	0.45	0.88
	U	72	50	0.45	0.52				
2. Benefit of breast-feeding to mother	S	95	82	0.21	0.39	5.28	0.47	0.02	0.49
	U	79	92	0.40	0.29				
3. Influence of breast size	S	100	100	0.0	0.0	1.0	-	0.32	-
	U	97	100	0.15	0.0				
4. Care for inverted nipples	S	70	71	0.46	0.47	0.0	0.06	1.00	0.80
	U	70	75	0.46	0.45				
5. Breast changes during pregnancy	S	75	88	0.43	0.33	1.33	0.13	0.25	0.72
	U	63	83	0.48	0.39				
6. Nipple care during pregnancy	S	65	88	0.47	0.33	4.72	3.63	0.03	0.07
	U	43	58	0.50	0.51				
7. Getting baby to suck	S	79	88	0.40	0.33	0.00	0.08	1.00	0.77
	U	79	92	0.40	0.29				
8. Infant sucking action	S	47	53	0.50	0.51	0.04	2.28	0.83	0.14
	U	45	25	0.50	0.45				
9. Length of initial sucking	S	50	65	0.5	0.49	0.17	0.33	0.67	0.57
	U	45	75	0.5	0.45				

10. Removal of baby from nipple	S	84	88	0.37	0.33	1.67	0.08	0.20	0.77
	U	72	92	0.45	0.29				
11. Burping breast-fed babies	S	77	94	0.42	0.24	1.38	2.18	0.25	0.15
	U	65	75	0.47	0.45				
12. Waking a sleepy baby for feeding	S	70	71	0.46	0.47	3.93	2.47	0.05	0.13
	U	50	42	0.50	0.51				
13. Production of breast-milk	S	75	82	0.43	0.39	0.05	0.49	.081	0.49
	U	72	92	0.45	0.29				
14. Avoidance of sore nipples	S	29	59	0.46	0.51	0.52	0.80	0.47	0.38
	U	22	42	0.42	0.51				
15. Promoting milk let down	S	84	82	0.37	0.39	0.30	0.91	0.58	0.35
	U	79	67	0.40	0.49				
16. Establishing ample milk supply	S	15	17	0.37	0.39	0.38	3.63	0.54	0.07
	U	11	50	0.32	0.52				
17. Preventing/controlling engorgement	S	59	71	0.49	0.47	0.40	0.06	0.52	0.80
	U	52	75	0.50	0.45				
18. Promoting milk let-down	S	72	76	0.45	0.44	0.21	1.05	0.64	0.32
	U	68	58	0.47	0.51				
19. Alternating breasts at	S	63	94	0.48	0.24	0.42	3.97	0.52	0.06
	U	56	67	0.50	0.49				
20. Determiner of milk production	S	65	94	0.47	0.24	2.29	2.16	0.13	0.15
	U	50	75	0.50	0.45				
21. Bowel movement characteristics	S	95	94	0.21	0.24	4.16	0.84	0.04	0.37
	U	81	83	0.39	0.39				

22. Supplementing breast milk	S	54	41	0.50	0.51	2.96	0.78	0.08	0.38
	U	36	23	0.48	0.45				
23. Frequency of breast-feeding	S	56	76	0.50	0.44	0.18	0.01	0.66	0.93
	U	61	75	0.49	0.45				
24. Adequacy of milk supply	S	77	94	0.42	0.24	0.52	0.85	0.47	0.37
	U	70	83	0.46	0.39				
25. Nutrition of nursing mother	S	88	53	0.32	0.51	1.38	0.52	0.24	0.48
	U	95	67	0.21	0.49				
26. Sexual feelings and breast-feeding	S	59	29	0.49	0.47	2.94	0.44	0.09	0.51
	U	40	42	0.49	0.51				

S= Successful breast-feeders (Gulick =, n=44) (Steinmetz, n=17)

U= Unsuccessful breast-feeders (Gulick, n=44) (Steinmetz, n=12)

G= Gulick

ST= Steinmetz

mean percent score = percent of the total group which answered the question correctly.

AN ABSTRACT OF THE THESIS OF
KATHLEEN SACK STEINMETZ, R.N., B.S.
FOR THE MASTER OF NURSING

DATE RECEIVING THIS DEGREE: June, 1985

TITLE: INFORMATIONAL CORRELATES OF SUCCESSFUL BREAST-FEEDING: A
REPLICATION

APPROVED: _____

Carol Howe, CNM, DNSc

Thesis Advisor

The purpose of this study was to examine the relationships between the amount and kind of knowledge a new mother has about breast-feeding and her subsequent success at breast-feeding. The study replicated an investigation by Gulick (1982) with some modifications made in design, using her tool to assess knowledge about breast-feeding.

The hypothesis for this study based on Gulick's findings was that primiparous women who successfully breast-feed their infants for two months will score significantly higher on a written test of breast-feeding knowledge than women who do not successfully breast-feed for two months.

In addition the following research questions were asked:

- 1) Are there any specific items on the questionnaire related to breast-feeding knowledge that are significant in discriminating between successful and unsuccessful breast-feeders?
- 2) Does the number of breast-feeding information sources used by the study subjects affect their information scores?
- 3) Is there a discrepancy in conceptualization of breast-feeding success between mothers and this author?

A convenience sample of 37 primiparas met the following criteria: must have been at least 17 years old, had at least a 10th grade education, spoke English as their first language, and had a healthy full-term single infant.

Subjects were contacted between 12 and 36 hours postpartum at which time they completed the Information on Breast-feeding Questionnaire and Personal Data Inventory. They were given two follow-up questionnaires to return at one month and two months postpartum to assess success at breast-feeding.

The research hypothesis was not supported by the findings of this study. Successful breast-feeders had somewhat higher scores on the Information on Breast-Feeding Questionnaire (IBFQ) than unsuccessful breast-feeders, but this difference was not statistically significant. However, a greater number of unsuccessful breast-feeders received very low scores (< 60%) on the IBFQ. There were no specific items on the IBFQ which were found to discriminate between successful and unsuccessful breast-feeders. The number of sources of information about breast-feeding was significantly positively correlated with the score on the IBFQ. There was a significant difference in conceptualization of successful breast-feeding between mothers and this author. More mothers considered themselves successful than were considered successful by the author.

The only variable studied which was found to be significantly correlated to success at breast-feeding was the timing of the first breast feeding. Successful mothers were significantly more likely to have breast-fed their infants within the first hour of life than unsuccessful mothers.

The data provided by the study may be helpful in the process of refinement of a tool to assess breast-feeding knowledge. In addition, it supports the finding that the one hospital practice over which nurses may have some control, infant age at first breast-feeding, may be significant in influencing success at breast-feeding.