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The purpose of this study was to test the reliability and predictive validity of the Breastfeeding Attrition Prediction Tool (BAPT) when administered to first-time breastfeeding mothers, to identify the optimal time for its use, and to determine if responses to the BAPT change between prenatal and postpartum periods. The BAPT was based on the Theory of Planned Behavior that explains behavior as based on constructs of attitude, subjective norm, and perceived behavioral control. Women who attended the prenatal breastfeeding classes during their last trimester of pregnancy, planned to breastfeed for the first time, and planned to breastfeed a minimum of eight weeks comprised the sample. Women completed the BAPT during the breastfeeding class (BAPT 1), and again during the postpartum hospital stay (BAPT 2), and agreed to a brief telephone follow-up at eight weeks post delivery. This study was a subset of a larger, ongoing study. The first 23 women in the larger study who completed all three parts of the study made up this study's sample.

Paired t-tests were performed on the four scales that were used to measure the main constructs of the BAPT: (a) Positive Breastfeeding Sentiment (PBS) Scale, (b) Negative Breastfeeding Sentiment (NBS) Scale, (c) Social and Professional Support (SPS) Scale, and (d) Breastfeeding Control (BFC) Scale. The PBS and NBS measured attitudes toward breastfeeding. The SPS measured subjective norms including professional support and support from family and friends. The BFC measured perception of breastfeeding ease or

difficulty. Results of the study showed that responses to the BAPT did not change much between the prenatal and postpartum period. Although the PBS was slightly higher in the postpartum period, the NBS remained unchanged. Attitudes were strongly positive and weakly negative, and appeared to be set by the third trimester. Social and professional support for breastfeeding was perceived to be higher after delivery of the baby, and after the initiation of the breastfeeding experience. Perceived behavioral control was found to be greater during the postpartum period, and these differences were statistically significant. Discriminant function analysis revealed that breastfeeding control was relatively effective in predicting early attrition when the BAPT was administered prenatally and postnatally. The BFC scales (prenatal and postpartum) accurately predicted 4 out of the 5 women who stopped breastfeeding prior to eight weeks. The control scales also accurately predicted 13 out of 18 women who continued to breastfeed. BFC in the postpartum period was found to contribute more to prediction than in the prenatal period.

Findings also showed that women who stopped breastfeeding prior to eight weeks postpartum did not fit the characteristics of women who were prone to early breastfeeding attrition. Results of the larger study may be more conclusive in predicting women who are prone to early breastfeeding attrition. The larger study also will reveal the reliability and predictive validity of the BAPT, and may identify the optimal time for using the BAPT. These variables could not be determined in this study. The small sample size in this study precluded determining reliability and predictive validity of the BAPT, and determining the optimal time for using the BAPT.

PREDICTION OF EARLY BREASTFEEDING ATTRITION FOR FIRST-TIME

BREASTFEEDING MOTHERS

by

Cynthia Furlow Jeffrey

A Thesis Submitted to
the Faculty of The Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Master of Science in Nursing

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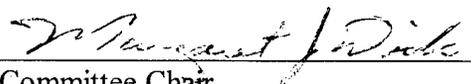
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APPROVAL PAGE

This thesis has been approved by the following committee of the

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CHAPTER I

INTRODUCTION

Statement of the Problem

The physical, nutritional and developmental benefits of breastfeeding for the infant are well documented in the literature. Breast milk is more easily digested (La Leche League International, 1992) and accounts for a lower incidence of gastrointestinal disease (Cunningham, 1977; Dix, 1991). Breast milk provides considerable immunity to viral and bacteriological infections (Cunningham; Lawrence, 1985), such as lower respiratory tract illness, otitis media, bacteremia and meningitis (Cunningham; La Leche League International). A lower incidence of allergic reactions, especially during the first year of life, is another added benefit of breast milk (Janke, 1993). Maternal benefits also result from breastfeeding and include enhanced bonding with the infant, convenience, and minimal cost. The Healthy Children 2000 goals and objectives for the nation specify that by the year 2000, the percentage of women who breastfeed should be increased to 75%, and 50% of the women should breastfeed until their babies are 5-6 months old (U.S. Department of Health and Human Services, 1992). The American Academy of Pediatrics, the American Public Health Association, the American Dietetic Association (Saunders, Carroll, & Johnson, 1988), and the World Health Organization (Lawson & Tulloch, 1995) recognize breastfeeding as the preferred method of infant feeding for the first four to six months of life.

In the early 1900s, breastfeeding infants for more than a year was practiced by over 50% of women in the US (Wiles, 1984). Due to urbanization and advanced technology, breastfeeding sharply declined during the next four decades. During the 1970s and early 1980s, increases in the prevalence of breastfeeding were observed (O'Campo, Faden, Gielen, & Wang, 1992; Ryan, Rush, Krieger, Lewandowski, 1991). Between 1971 and 1982, breastfeeding rates for infants at six months of age increased from 5.4% to 27.1%. However, between 1984-1989, a downward trend was found in the continuation of breastfeeding to at least six months of age. According to Ryan, Rush, Krieger, and Lewandowski (1991), the rate of breastfeeding at six months of age declined 24% (from 23.8% to 18.1%). Breastfeeding at six months of age was most common among mothers who were older, multiparous, better educated, white, and had higher incomes. Despite the well documented benefits of breastfeeding, early termination of breastfeeding continues to remain a problem today. According to Lawrence (1985), there is a 32% - 58% attrition rate within the first three to six weeks postpartum.

A myriad of factors can influence the degree of breastfeeding success, such as time of first feeding (Buxton, Gielen, Faden, Brown, Paige, & Chivalow, 1991; Coreil & Murphy, 1988; Janke, 1988), frequency of feedings (Coreil & Murphy; Feinstein, Berkelhamer, Gruszka, Wong, & Carey, 1986), formula supplementation (Coreil & Murphy; Feinstein et al.; Hawkins, Nichols, & Tanner, 1987; Loughlin, Clapp-Channing, Gehlbach, Pollard, & McCutchen, 1985), mother's perception of milk supply (Buxton et al.; Feinstein et al.; Goodine & Fried, 1984; Hawkins et al.; Houston, 1981; Janke, 1988; Lawson & Tulloch,

1995; Quarles, Williams, Hoyle, Brimeyer, & Williams, 1994; Rentschler, 1991; Ross Laboratories, 1996), breast discomfort (Goodine & Fried; Janke, 1988; Lawson & Tulloch; Quarles et al.; Rentschler), lack of social support (Arafat, Allen, & Fox, 1981; Coreil & Murphy; O'Campo et al., 1992), lack of knowledge, skills, or abilities to breastfeed (Evans, Lyons, & Killien, 1986; Goodine & Fried; Hellings, 1985; Lawson & Tulloch; Rentschler; Wiles, 1984), more positive attitude toward formula feeding (Buxton et al.; Kearney, 1988), return to work or school (Beske & Garvis, 1982; Feinstein et. al, 1986; Hill, 1987; Hill & Aldag, 1996; Janke, 1988; O'Campo et. al; Simopoulos & Grave, 1984; Wilton, 1990), and cigarette smoking (Feinstein et al.; Goodine & Fried; Hill & Aldag,). However, numerous studies have found that a mother's prenatal intention to breastfeed is the strongest predictor of long term duration and breastfeeding success during the infant's first month of life (Buxton et al.; Coreil & Murphy; Entwisle, Doering, & Reilly, 1982; Hauck & Dimmock, 1994; Loughlin et al.; O'Campo et al.; Quarles et al.; Rentschler; Wiles). Janke (1988) found that commitment was the only common factor associated with breastfeeding success, irrespective of birth type.

Many studies have been conducted to identify nonmodifiable and modifiable variables that contribute to breastfeeding attrition. Nonmodifiable variables include education, age, race, socio-economic status, and life's experiences. A woman's psychological make-up and prior socialization are other nonmodifiable variables that play strong roles in her intentions to breastfeed (Entwisle, et al., 1982). Nonmodifiable variables have been shown to be good predictors of attrition, yet they are not amenable to change and little intervention can be done to decrease the attrition rate.

Modifiable variables include attitude, social support, commitment, employment practices, prenatal instruction, and lactation education. Poor attitude, poor support, lack of commitment, work environment not conducive to breastfeeding, lack of prenatal instruction and lactation education can lead to breastfeeding attrition. Modifiable variables are amenable to change and can be altered by interventions, and therefore, should be the focus of predicting attrition.

Modifiable variables may potentially contribute to modifiable behaviors. If a particular behavior can be predicted, and identified as a behavior that is amenable to change, interventions can be developed and implemented to change the behavior. For instance, Hill and Aldag (1996) found that cigarette smoking negatively influenced breastfeeding duration, therefore, smoking cessation classes and literature can be used in an attempt to change the smoking behavior of a pregnant woman who intends to breastfeed. Consequently, the intervention may help prevent early breastfeeding attrition.

Janke (1992) developed the Breastfeeding Attrition Prediction Tool (BAPT) to focus on modifiable variables that contribute to breastfeeding attrition. Janke based the BAPT on the Theory of Planned Behavior (TPB) (Janke, 1992) which is based on three determinants of intentions: attitudes, subjective norms, and perceived behavioral control. The TPB can be used to explain, predict, and influence behavior based on these three concepts (Janke, 1992). According to the TPB (Ajzen, 1988), people intend to engage in a behavior if their evaluations of the behavior are positive (attitudes), if they believe that others would approve of the behavior (subjective norms), and if they believe the behavior will be easy to perform (perceived behavioral control). According to Janke, the TPB is

ideal for predicting breastfeeding attrition because of the close association between attitude, commitment, and support. The BAPT measures attitudes (commitment, feelings, beliefs), subjective norms (support from family, friends, healthcare system), and perceived behavioral control (knowledge, skills, abilities).

The BAPT has been tested in two studies in Alaska (Janke, 1992, 1994) and one in the Southeast (Dick & Evans, 1996). In each of these studies, the BAPT was administered during the postpartum hospital stay and follow-up telephone calls were made at 8 weeks post delivery. The studies revealed that the BAPT has construct and predictive validity, and internal consistency for the three concepts. The results of the studies revealed that modifiable variables, such as attitude toward infant feeding, social and professional support, and sense of control are predictive of early attrition.

All three studies have used the BAPT during the initial postpartum period. While helpful in predicting who might be at risk for early attrition, and thus need more intervention, the initial postpartum period is not a time that is conducive to follow-up. Effective intervention requires time and contact with the mother, and this is easier when the mother is in the prenatal care system. It is important to know if the BAPT is as effective as a predictor when given during the prenatal period.

Purpose of the Study

The purpose of this study was to test the reliability and predictive validity of the BAPT when administered to first-time breastfeeding mothers, to identify the optimal time for its use, and to determine if responses to the BAPT change between prenatal and postpartum periods. The healthcare professional is in an ideal position to assess the pregnant woman's

prenatal intentions for breastfeeding. Based on the healthcare member's assessment, patient education on the advantages, disadvantages, benefits, and techniques of breastfeeding may be effective in building the woman's motivation and confidence to breastfeed. Support and encouragement can also enhance a woman's motivation and confidence to breastfeed. Ample opportunities exist during pregnancy for prenatal breastfeeding education and reinforcement to take place. Because the length of postpartum hospital stays have shortened, there is limited time available for the nurse to teach, support, reinforce, motivate, and problem solve to enhance the breastfeeding duration and prevent early attrition of breastfeeding. By determining in advance which women are at risk of early breastfeeding attrition, more research can be conducted to determine the types of interventions that can be implemented prenatally to provide a greater chance of success in breastfeeding.

Theoretical Framework

Theory of Reasoned Action

The TPB was the theoretical framework used in the development of the BAPT. The TPB was derived from the Theory of Reasoned Action (TRA). The TRA was developed by Ajzen and Fishbein in the 1970s. According to the theory, a person's intention to perform a behavior always precedes the behavior in question. Intentions are indications of how hard a person is willing to try and how much of an effort the person is planning to exert to perform the behavior. Intentions remain behavioral tendencies until they are translated into action (Ajzen, 1988). The stronger a person's intention, and the more effort the person is willing to exert to perform the behavior, the greater is the chance the

behavior will be performed (Ajzen & Madden, 1986). Ajzen determined that intentions are

high predictors of corresponding action or behavior. The TRA has been widely supported

in numerous studies (Ajzen & Madden; Ajzen, Timko, & White, 1982; King, 1975;

Manstead, Proffitt, & Smart 1983; O'Campo et al., 1992; Quarles et al., 1994; Smetana

& Adler, 1980).

Despite the high tendency of intentions to predict behavior, there may not always be a

perfect match between intention and the observed behavior. According to Ajzen (1971), a

number of factors determine the relationship between behavioral intention and overt

behavior. First, the measured intention must relate to a particular behavior in a well-

defined situation. For example, the more general the behavioral intention, the lower the

correlation between behavioral intention and overt behavior. Second, the longer the time

interval between the measured intention and the observed behavior, the greater the chance

that other factors could occur and change the initial intention. Finally, at the time the

intention is measured, the individual must have a reasonably accurate perception of the

behavior's consequences and of the expectations of relevant others. Otherwise, the

attitude toward the act and the normative beliefs may change as the person learns more

about the situation, thereby changing the behavioral intention and decreasing the

previously measured correlation between behavioral intention and overt behavior. Ajzen et

al. (1982), emphasized that intentions are usually measured some time prior to observing

the actual behavior. Upon observing the behavior, the measured intention could differ

from the original intention due to the fact that intentions can change over time. Ajzen et al.

concluded that intention can be a good predictor of behavior only if the intention is

unchanged at the time the behavior is performed. In summary, behavior prediction is less accurate the more generalized the intention (Ajzen, 1971), the longer the interval between intention and behavior (Ajzen & Madden, 1986), and the less accurate a person's perceptions are of the behavior's consequences and of the expectations of others. This proviso supports the need to test the effectiveness of the BAPT when given during the prenatal period.

The TRA emphasizes two predictors of intention: (a) attitude toward the behavior, and (b) subjective norm. Attitude is an individual's positive or negative evaluation of performing a particular behavior. Subjective norm consists of an individual's perception of social pressure of whether or not to engage in a particular behavior. According to Ajzen (1988), a person intends to perform a behavior when the behavior is viewed positively and when the person is influenced by the belief of others that the behavior should be performed. In other words, attitude and subjective norm jointly determine behavioral intention, which in turn influences action. Therefore, changes in attitudes and subjective norms produce changes in intentions, and hence, actions.

The TRA (Ajzen & Madden, 1986) also emphasizes that people's beliefs contribute to their behavior. In particular, two kinds of beliefs are specified as being antecedents of attitudes and subjective norms. Behavioral beliefs affect a person's attitude toward a behavior, and normative beliefs affect subjective norms. A person will hold a more positive attitude toward performing a behavior if that person believes the behavior will lead to a positive outcome. Likewise, a person will have an unfavorable attitude toward a behavior if that person believes the behavior will lead to a negative outcome (Ajzen, 1988).

Normative beliefs deal with the fact that others approve or disapprove of performing a behavior. People will perceive social pressure to perform a behavior when they believe that others (parents, spouses, close friends) with whom they are motivated to comply think they should perform the behavior (Ajzen, 1988). On the other hand, when people believe that others with whom they are motivated to comply will disapprove of a certain behavior they will feel pressure to avoid performing the behavior.

Although the TRA underscores the importance of attitudes and subjective norms in influencing intention, and deals with behaviors under volitional control, the TRA does not address behaviors that are under limited volitional control. Volitional control is when a person can make a conscious choice or decision to perform or not perform a behavior. Many external factors, such as time, opportunity, and dependence on others (Ajzen & Madden, 1986), and internal factors, such as knowledge, skills, abilities, emotions, and stress (Ajzen, 1988) can hinder one's behavioral control. Therefore, not only intention, but the degree to which a person is capable of exerting control over a particular behavior must be assessed when accurately predicting behavior.

Theory of Planned Behavior

The TPB is an extended version of the TRA and includes the concept of perceived behavioral control in addition to attitude and subjective norm. The addition of behavioral control to the TRA concepts helped increase the accuracy of prediction. One noteworthy point is that the TPB does not deal with the amount of control a person actually possesses, rather it deals with the amount of perceived behavioral control the person has over a situation (Ajzen, 1988).

The TPB suggests that beliefs are the foundations of attitudes, subjective norms, and perceived behavioral control. Just as behavioral beliefs and normative beliefs are antecedents of attitudes and subjective norms, respectively, control beliefs are antecedents of perceived behavioral control. Control beliefs are influenced by life's experiences (of oneself or other acquaintances) with the behavior, second-hand information about the behavior, and other factors affecting the perceived difficulty of performing the behavior (Ajzen & Madden, 1986). According to Ajzen (1988), the degree of success in performing a behavior depends not only on one's desire or intention, but also on the availability of opportunities and resources. The unavailability of opportunities, or lack of resources, will affect one's behavioral intentions to perform a behavior, thus influencing one's perceived behavioral control. The more opportunities and resources people think they have, the fewer obstacles they anticipate and the more control they perceive themselves as having over the situation (Ajzen, 1988; Ajzen & Madden).

Janke used the TPB to develop the BAPT because of the nonvolitional aspects of breastfeeding that were reported in the literature (Janke, 1994). Because the numerous variables that have been identified to interfere with a woman's intent to breastfeed closely parallel the TPB's modifiable concepts of attitude, subjective norm, and perceived behavioral control, Janke believes the TPB is an ideal framework for studying breastfeeding attrition behavior. An example of the TPB, in terms of breastfeeding attrition, is illustrated in Figure 1.
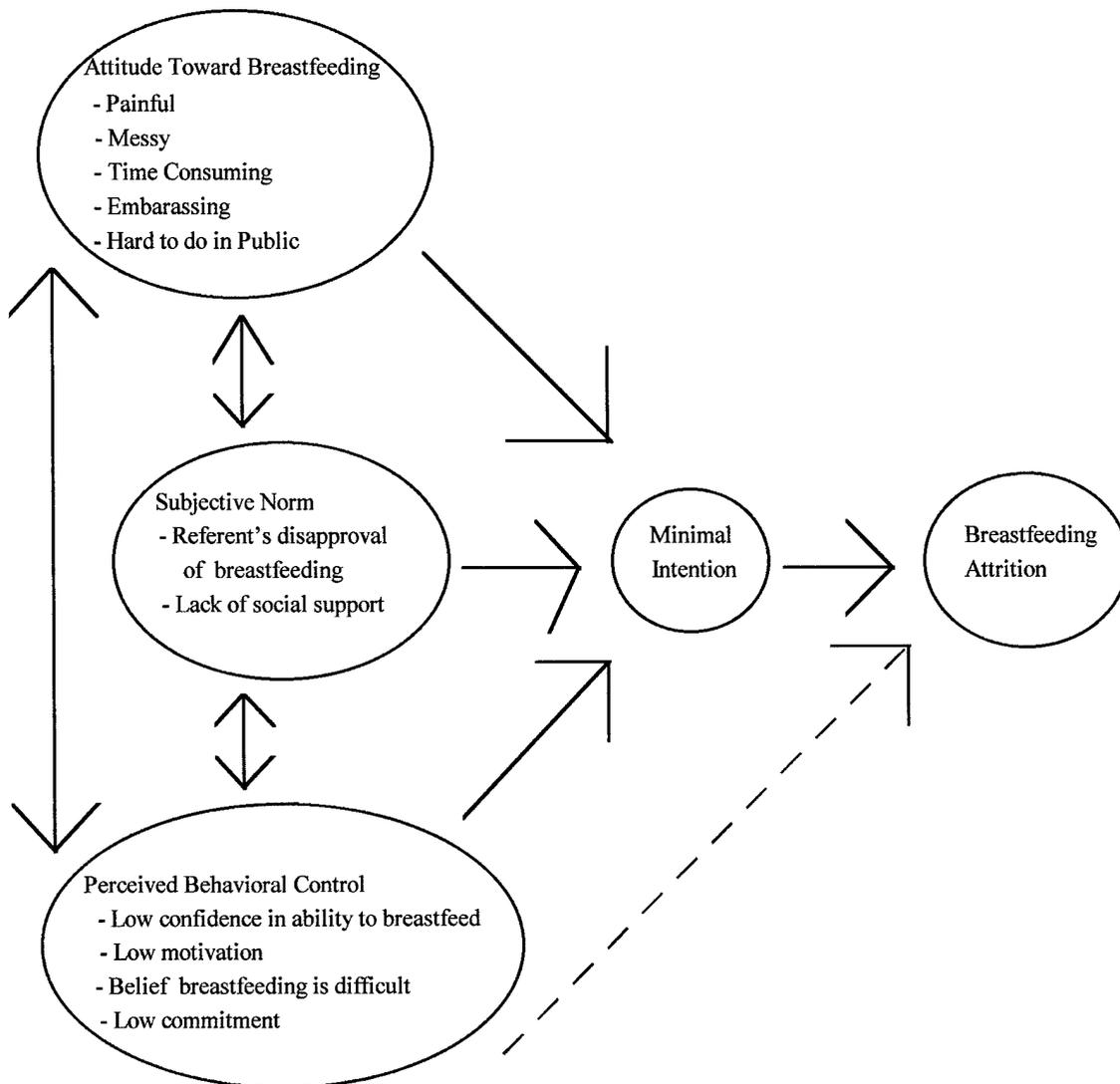
Figure 1. Theory of Planned Behavior in terms of breastfeeding attrition.

Research Questions

1. To what extent is the BAPT a useful predictor of early breastfeeding attrition when administered in the prenatal period?

2. Is prediction of early breastfeeding attrition with the BAPT as effective in the prenatal period as it is in the postpartum period?

3. Do responses to the BAPT change between prenatal and postpartal periods?

Definition of Terms

The terms used in this study are defined as follows:

1. Attitude: an individual's positive or negative evaluation of performing a particular behavior. Attitude can be inferred from verbal or nonverbal responses that reflect a person's perceptions, beliefs, evaluations, and feelings about an object or event (Ajzen, 1988). Attitude was measured by the participants' responses to the Positive and Negative Breastfeeding Sentiment (PBS and NBS) scales on the BAPT. The woman's beliefs concerning the outcome of breastfeeding was multiplied by her evaluation of the importance of her beliefs. The multiplied scores of the PBS were summed. The higher the score, the greater the positive breastfeeding sentiment. The multiplied scores of the NBS were also summed and the lower the score, the greater the negative breastfeeding sentiment.

2. Subjective norms: people's perceptions of social pressure to perform or not to perform a certain behavior. Subjective norms were measured by the Social and Professional Support (SPS) scale on the BAPT. In this study, a woman's belief that

another person wants her to breastfeed or not to breastfeed was multiplied by the woman's self-reported motivation to comply with that other person's desires (Ajzen, 1988). The multiplied scores of the SPS scale were summed. The higher the score, the greater the support for breastfeeding.

3. Perceived behavioral control: a person's perceptions of having control over internal and external factors is influenced by past experiences and anticipated obstacles or events. The perceived ease or difficulty of performing a behavior is characteristic of perceived behavioral control which was measured by the Breastfeeding Control (BFC) scale on the BAPT. The BAPT assessed behavioral control by measuring the woman's perceived ease or difficulty anticipated in breastfeeding her infant. The scores from the BFC were summed. The higher the score, the greater sense of control the woman had over her ability to breastfeed.

4. Breastfeeding: maternal report of breastfeeding exclusively, or breastfeeding with formula supplementation, at 8 weeks post delivery.

5. First-time breastfeeding: women who chose to breastfeed for the first time, irrespective of the number of children in which the woman had given birth.

6. Breastfeeding attrition: cessation of breastfeeding prior to 8 weeks post delivery. Attrition was evaluated during the 8 week follow-up telephone call.

CHAPTER II

LITERATURE REVIEW

According to Ajzen (1988), throughout the course of a lifetime one acquires many beliefs about objects, actions, and events. These beliefs may be formed directly by observations and inferences, or indirectly by information through friends, television, books, etc. Some beliefs may endure over time, others may weaken or vanish, and still new beliefs may be generated. Attitudes are molded from the beliefs people have regarding the object of the attitude. Intentions are formed from the attitudes, and then the intentions produce specific behaviors. In general, people behave in favorable ways toward objects, actions, and events they like, and conversely, people behave in unfavorable ways toward those they dislike.

Theory of Reasoned Action

The two basic determinants of behavioral intentions are attitudes and subjective norms, which are the basis of the theory of reasoned action (TRA) (Ajzen & Madden, 1986). Attitude toward behavior, in conjunction with subjective norms, determines one's intention and thereby the actual performance of the behavior. Since the immediate determinant of any behavior is a person's intention to perform or not to perform the behavior, people are expected to act in accordance with their intentions. Because many behaviors are under volitional control, people can either decide to perform the behaviors or refrain from performing them. Ajzen (1971) notes that any variable can influence

behavioral intentions, and hence behavior, indirectly by affecting either the attitude, normative beliefs, or the relative weights placed on these two variables in determining behavioral intentions.

Numerous studies have provided strong evidence to support the association between attitude, subjective norms, and behavior. These studies have supported the correlation between intentions and volitional behavior. The results from these studies revealed that attitudes and subjective norms provide highly accurate predictions of behaviors. For example, in 1971 Ajzen employed a two-person Prisoner's Dilemma game in which 216 subjects participated in either a cooperative motivational orientation group or a competitive motivational orientation group. Ajzen hypothesized that the behaviors of the paired players could be influenced by persuasive communications designed to change either the attitude toward the act or the normative beliefs regarding the other player. The impacts of the persuasive messages (attitudinal and normative) on behavioral intentions and on game behavior were expected to vary as a function of the motivational orientation (cooperation or competition) of the players. Findings revealed a high correlation (0.887; $p<.01$) between behavioral intentions and overt game behavior. Also, attitude and normative beliefs contributed independently to prediction of intentions. Ajzen found that under the cooperative motivational orientation normative beliefs were the major determinant of behavioral intentions and game behavior. Under the competitive motivational orientation, attitude was the most significant predictor of intention and behavior.

Smetana and Adler (1980) studied the effects of normative, attitudinal, and belief components on behavior, and whether these components are mediated by behavioral intention. They looked at women who were awaiting results of pregnancy tests and assessed their intentions to have or not to have an abortion, their attitudes toward abortion, their beliefs about the consequences of having an abortion, their norms governing the behavior, and their beliefs about the consequences of having a child. The women completed questionnaires which were used to analyze the determinants of behavioral intention, and a smaller subset was used to examine actual behavior. Findings revealed a correlation between intention and behavior which was 0.956, and that intention was directly influenced by the belief component (-0.273) and the normative component (0.463) (p< .001). An additional finding was that the normative component had a direct effect on attitude, as well as its direct effect on intention. Smetana and Adler concluded that intention to have an abortion was a function of attitude toward the act, normative beliefs concerning the act, and beliefs about the consequences of having a child.

Further support for attitudes and subjective norms in determining behavioral intentions was a study conducted by Ajzen, Timko, and White (1982). They looked at the likelihood of college students voting in the 1980 presidential election, and on their use of marijuana. Three weeks prior to the election, students completed a questionnaire that contained several general attitude scales and measures of personality. Two weeks later, more specific beliefs and attitudes were assessed. Respondents were asked to rate their intentions of voting in the forthcoming election, and their likelihood of smoking marijuana in the next

three or four weeks, using a seven point semantic-differential-type scale with endpoints labeled likely and unlikely. Attitudes toward these behaviors were measured on 20-item semantic differential scales. Factor analyses were done on both sets of scales and the seven scales with the highest loadings (exceeding 0.65) were used to compute the attitudinal scores. For ratings of voting, these scales were wise/foolish, strong/weak, motivated/ aimless, useful/useless, active/passive, good/bad, and harmful/beneficial. The same scales were used for ratings of smoking marijuana, except that active/passive was replaced by healthy/sick. Responses to each set of seven scales were summed to provide a measure of attitude.

Subjective norms were assessed by asking the students whether their parents and close friends thought they should (or should not) vote in the presidential election, and whether they should (or should not) smoke marijuana in the next three or four weeks. Seven-point scales with endpoints of "I should" and "I should not" were used to obtain these measures. Seven-point likely/unlikely scales were used to assess the likelihood that the students' parents and close friends would vote in the forthcoming election, and the likelihood that the students' parents, close friends, and most medical experts smoke marijuana. Two weeks after the election the students were contacted by telephone and were asked to reveal whether or not they had voted in the presidential election, and whether or not they had smoked marijuana during the preceding three weeks. The self-report of voting ($r = 0.70$) and marijuana use ($r = 0.72$) correlated with the students' intentions. The researchers found that behavioral intentions could be predicted quite well from attitudes toward the behavior and subjective norms.

The TRA is well supported by studies that have shown how attitude toward a behavior, and one's perceptions of social pressure of whether or not to engage in a particular behavior can predict behavioral intention. The TRA deals only with behavior under volitional control. However, since the development of the TRA in the 1970's, other factors have been found to influence behavior, in particular, factors that are beyond one's control. The ability to predict behavior was found to be no longer dependent, solely on attitudes and subjective norms. External factors, such as time, opportunity, and dependence on others (Ajzen & Madden, 1986), and internal factors, such as knowledge, skills, and abilities (Ajzen, 1988) have been found to influence the degree of control a person has over a behavior. The TRA addresses the correlation between attitude, subjective norms, and behavior under volitional control, but it does not address the correlation between attitude, subjective norms, and behavior under limited volitional control (Ajzen & Madden). When predicting behavior, the degree to which a person is capable of exerting control over a particular behavior must be assessed in conjunction with attitudes and subjective norms. The addition of perceived behavioral control to the concepts of attitudes and subjective norms resulted in the theory of planned behavior.

Theory of Planned Behavior

The theory of planned behavior (TPB) addresses behavior under limited volitional control by including the concept of perceived behavioral control in addition to attitude and subjective norm. Ajzen and Madden (1986) conducted two studies which support the TPB. The first study looked at regular class attendance for college students. Attendance data were collected and students completed a questionnaire. The questionnaire addressed

students' beliefs and attitudes about attending class regularly or missing some sessions, subjective norms (such as expectations of the instructor, and the student's parents, husband or wife, girlfriend or boyfriend, relatives/children, and friends/peers/classmates), perceived behavioral control (such as frequency of upcoming events - conflicting events, sickness, family obligations, employment, being tired or listless, transportation problems, oversleeping or forgetting, and failure to prepare class assignment), and intentions about the likelihood of attending every class session. The findings revealed a correlation between beliefs and attitudes (0.51), subjective norms (0.47), and perceived behavioral control (0.54), all significant beyond the 0.01 level. Attitude and subjective norm contributed significantly to the prediction of intentions with a multiple correlation of 0.55. Perceived behavioral control improved the predictive power of the TPB and increased the multiple correlation from 0.55 to 0.68.

The second study looked at students' intentions to attempt getting an "A" in a course as well as their attitudes, subjective norms, and perceived behavioral control over this behavioral goal. The students completed a questionnaire at two different times during the semester. Similar to the first study, the findings of the second study also revealed a strong correlation between beliefs and attitudes (0.47-0.58), subjective norms (0.57-0.51), and perceived behavioral control (0.55-0.63). Just as in the first study, attitude, subjective norm, and behavioral control contributed significantly to the prediction of intentions, but perceived behavioral control also added significantly to the prediction of behaviors (0.63).

Schifter and Ajzen (1985) applied the TPB to the prediction of weight loss intentions, and actual weight reduction, among female college students. Attitude toward losing

weight referred to the degree to which the woman had a favorable or unfavorable evaluation of this particular behavioral goal. Subjective norm referred to the woman's perceived social pressure to lose or not to lose weight. And perceived behavioral control referred to the woman's perceived ease or difficulty of losing weight to include past experiences and anticipated impediments and obstacles. Schifter and Ajzen hypothesized that the more favorable the attitude and subjective norm with respect to losing weight, and the greater the perceived behavioral control, the stronger the woman's intention would be to lose weight. The stronger the woman's intentions were to lose weight, the more successful she was predicted to be. The degree of success, though, did not depend only on the woman's desire or intention to lose weight, but also on her actual control over her body weight. Schifter and Ajzen emphasized that although intentions to lose weight often reflect one's personal and social desirability of this goal, perceived control is more likely to take into account some of the realistic constraints that may exist.

Eighty three female college students were weighed, and then completed a set of questionnaires. Six weeks later, they were weighed a second time, and completed another set of questionnaires. Findings revealed that weight loss intentions correlated significantly with attitude (0.79), subjective norm (0.17), and perceived control (0.30) ($p< .01$ in each case). The multiple correlation was 0.74. Each variable made independent contributions to the prediction of intentions.

Actual weight reduction correlated significantly with perceived control and intention, but perceived control was the best single predictor of actual weight loss. Schifter and Ajzen found that a strong intention to lose weight increased actual weight loss only for

those women who believed that they could control attainment of this goal. Perceived

control led to the intention to lose weight, which in turn induced a behavioral attempt. At

low levels of perceived control, degree of intention had no effect on weight reduction. In

conclusion, the researchers found that the TPB was very successful in predicting intentions

to lose weight, and moderately successful in its prediction of actual weight loss.

Variables That Influence Breastfeeding Attrition

Research on breastfeeding has identified a number of nonmodifiable and modifiable

variables that negatively impact breastfeeding duration, thereby leading to attrition

(Buxton et al., 1991; Coreil & Murphy, 1988; Entwisle et al., 1982; Goodine & Fried,

1984; Hauck & Dimmock, 1994; Hawkins et al., 1987; Hellings, 1985; Hill, 1987; Janke,

1988; Janke, 1993; Lawson & Tulloch, 1995; Loughlin et al., 1985; O'Campo et al., 1992;

Quarles et al., 1994; Rentschler, 1991; Wiles, 1984). Nonmodifiable variables include age,

ethnicity, marital status, educational level, socioeconomic status, previous breastfeeding

success, and history of own feeding method as an infant. Modifiable variables include

social support, intention to breastfeed, commitment, attitude toward breastfeeding,

formula supplementation, employment, confidence in ability, preparedness, and perception

of inadequate milk supply.

Nonmodifiable variables, such as age, educational level, socioeconomic status, and

previous breastfeeding success have been linked with breastfeeding duration. Quarles et al.

(1994) found that age and education are significantly associated with breastfeeding

duration. Age and education contributed to 30% of the variance in actual duration of

breastfeeding among 161 women who were examined for breastfeeding duration. Women

who were significantly older and better educated breastfed longer (M = 3.1 months,

SD = 0.2) than those who were younger and less educated (M = 2.4 months, SD = 1.2).

Hawkins, Nichols, and Tanner (1987) looked at 47 breastfeeding women and found

that educational level contributed to 52% of the variance in the duration of breastfeeding.

Women with the highest levels of education breastfed longer. For each year of education

completed beyond 11.5 years, the duration of breastfeeding increased by 3.1 weeks. All of

the women who had some college education were moderate or long-term breastfeeders.

Kurinij, Shiono, and Rhoads (1988) found that duration of breastfeeding was correlated to

maternal educational level. Women with some college or some graduate school education

were 2.6 and 5.2 times more likely to breastfeed than women with a high school education

or less.

West (1980) studied 216 breastfeeding women over a six month period to identify

factors that influence breastfeeding duration. Results of the study showed that although

parity and maternal age had no influence on the duration of breastfeeding, continuation of

breastfeeding was significantly influenced by social class. Sixty eight percent of the women

from higher social class were still breastfeeding at 12 weeks, compared with only 45% of

women from lower social class (p<0.01). Previous breastfeeding success also positively

influenced breastfeeding duration. Seventy three percent of those who had previous

success at breastfeeding were still breastfeeding at 12 weeks, compared with 30% of those

who were previously less successful.

Modifiable variables, such as beliefs and attitudes, can influence breastfeeding success.

Gielen et al. (1992) used Fishbein and Ajzen's TRA as a basis to perform prenatal

interviews on 198 women during their third trimester of pregnancy, and a second interview within one to three weeks postpartum to identify demographic and psychosocial factors important in a woman's decision to breastfeed. Behavioral beliefs were found to be the strongest predictors of breastfeeding initiation. The researchers concluded that a positive attitude toward breastfeeding was the strongest predictor of intending to breastfeed.

Kearney (1988) believes that opinions toward breastfeeding arise from the family of origin, friendship groups, the spouse and his family, the media, and healthcare providers. These sources help a woman form certain attitudes and beliefs about breastfeeding, and provide her with ongoing advice, support, or negative reactions to the breastfeeding experience. Mothers are more likely to choose and succeed at breastfeeding when their immediate circles of family and friends encourage and support breastfeeding (Kearney). A non-supportive social environment may strongly influence the decision to discontinue breastfeeding early (Arafat, Allen, & Fox, 1981). Beske and Garvis (1982) found that the most often identified sources of discouragement were the maternal grandmother, the baby's father, the paternal grandmother, and other family members and friends. The attitudes a woman develops affect her choice of feeding method and her reactions to the experiences of breastfeeding or bottle feeding. For the mother who is breastfeeding, these attitudes can affect her confidence and persistence in breastfeeding.

Kearney (1988) also emphasized risk factors for psychosocial difficulty with breastfeeding. Some of these factors included personality (dependency, immaturity, anxiety, low self-esteem), family setting (partner's dislike or jealousy of breastfeeding,

marital instability, lack of extended family support where valued), personal attitudes (beliefs that breastfeeding is inconvenient, embarrassing, demanding, physically or emotionally uncomfortable, in conflict with other responsibilities; beliefs that bottle feeding is convenient, more satisfying to infant, less restrictive to mother, conducive to father-infant attachment), social environment (lack of friends who have breastfed, ambivalence of health professionals, lifestyle requiring frequent separation from infant), emotional state (fatigue, discomfort, frustration with infant, depression, anxiety), and infant behavior (irritability, excessive crying, weak or ineffective sucking, early feeding difficulties).

Breastfeeding behaviors and attitudes were studied by Hawkins, Nichols, and Tanner (1987) in predicting the duration of breastfeeding. Behaviors and attitudes that were assessed included when the mother decided to breastfeed, who influenced the mother's decision to breastfeed, mother's anticipated length of breastfeeding, and mother's perceived success at breastfeeding. Maternal report of perceived success was found to be an important aspect of long-term breastfeeding. For each increase of one point on the 7-point Likert scale that measured perceived success, the mother breastfed 2.3 weeks longer.

Modifiable variables, such as prenatal intention and maternal confidence in ability to breastfeed, have also been linked strongly with breastfeeding duration. Studies measuring breastfeeding duration have consistently found that intended duration and a mother's confidence in her ability to breastfeed are significant predictors in breastfeeding duration (Buxton et al., 1991; Coreil & Murphy, 1988; Lawson & Tulloch, 1995; Loughlin et al.,

1985; O'Campo et al., 1992; Quarles et. al, 1994). For example, Loughlin et al. found that out of 94 mothers, 30% had stopped breastfeeding within the first two months, and in more than 90% of the cases, this was before the mother's anticipated weaning. The high rate of attrition correlated strongly with the mother's lack of confidence in breastfeeding. The researchers concluded that a mother's anticipated duration of breastfeeding is an indirect measurement of confidence and/or commitment to breastfeeding. In other words, her prenatal intentions are the strongest predictors of breastfeeding success in the first month.

Loughlin et al.(1985) also found that by determining the degree of maternal confidence and anticipated duration of breastfeeding, and obtaining the nursery staffs' assessments of feeding problems (by asking the mother and nursery staff six short questions before discharge), it was possible to identify more than 75% of mothers at high risk for early cessation of breastfeeding. Examples of the questions the mothers were asked were (a) How long do you plan to breastfeed the baby?, (b) How confident do you feel about feeding your baby?, and (c) How helpful has the father been in supporting your feeding choices? These questions measured duration, confidence, and support. Examples of questions asked to the nursery staff were (a) Compared with the average baby, how much crying does this baby do?, (b) Compared with the average baby, how much trouble has this baby had with feeding?, and (c) Compared with the average baby, how much trouble would you expect this baby to have with feeding in the future? These questions measured infant behavior.

Coreil and Murphy (1988) conducted a study that measured a woman's intended duration of breastfeeding during the third trimester of pregnancy. Prior to delivery, participants completed a questionnaire which covered intended duration of breastfeeding, expected timing of return to work, and demographic information. Four to six weeks after birth, participants were interviewed in their homes and were asked questions on preparation for and confidence in breastfeeding, birth and infant experiences in the hospital, feeding practices at home, and social support for breastfeeding available to the mother. A one year follow up questionnaire was administered and included questions pertaining to the current milk feeding status of the infant, age at weaning, and timing and current extent of maternal employment. Four psychosocial variables (age, intended duration, confidence in ability to breastfeed, and degree of social support) and four biobehavioral variables (early first feeding, continuity of breastfeeding, milk expression, and absence of formula supplementation at home) were significant predictors of breastfeeding duration. Bivariate and multivariate analyses revealed that prenatal intent was the strongest predictor of long-term duration. And when controlling for intent, formula supplementation had a negative effect on duration. Formula supplementation during the first six weeks postpartum increased the risk of early weaning.

O'Campo et al. (1992) found that the anticipated length of breastfeeding was an important prenatal factor associated with breastfeeding duration. Eight variables were examined during prenatal and postpartum interviews in 192 women who planned to breastfeed. The eight variables included behavioral beliefs, normative beliefs about breastfeeding, social learning, maternal confidence, anticipated length of breastfeeding,

medical complications, plans to return to work or school, and breastfeeding duration. The purpose was to determine which factors influenced breastfeeding duration. Results of the study revealed that anticipated length of breastfeeding, normative beliefs, maternal confidence, social learning, and behavioral beliefs about breastfeeding were important influences on breastfeeding duration. Methods of multivariate linear regression analyses were performed and parity, plans to return to work or school by six months postpartum, and maternal confidence were the most significant factors affecting anticipated length of breastfeeding.

Buxton et al. (1991) conducted prenatal and postpartum interviews with 187 women, all of whom intended to breastfeed their infants. Four variables were identified as significant predictors of failure to breastfeed for more than seven days: (a) lower confidence in ability to breastfeed, (b) less certainty in the decision to breastfeed, (c) delayed first breastfeeding experience, and (d) lack of rooming-in with the baby. Women who were less confident and less certain about breastfeeding were four to five times more likely to terminate breastfeeding at seven days or less after delivery. Women who did not breastfeed in the delivery or recovery room, or who didn't room-in with the baby were three times more likely to quit breastfeeding. The researchers concluded that the initial commitment to breastfeed was lower among women who didn't successfully translate their prenatal intentions to breastfeed into actual breastfeeding behavior. Among women who initiated breastfeeding, low confidence levels and less certainty in their decision to breastfeed emerged as significant predictors of failure.

Many studies support the strong association between education and breastfeeding duration (Cunningham, 1977; Goodine & Fried, 1984; Hawkins, Nichols, & Tanner, 1987; Hellings, 1985; Janke, 1988; Kurinij, Shiono, & Rhoads, 1988; Lawson & Tulloch, 1995; Quandt, 1985; Quarles et. al, 1994; Switzky, Vietze, & Switzky, 1979; Wiles, 1984). According to Quandt, low levels of maternal education predict shorter duration of breastfeeding. Women with more formal education are more supportive of prolonged breastfeeding than women with less formal education. Wiles looked at 20 women who attended a prenatal breastfeeding education class and 20 women who did not. She found that women who attended the class reported a significantly higher frequency of success at one month postpartum than those women who did not attend the class (Chi Sq = 9.449, P = 0.01). Mothers enrolled in the class reported that the prenatal breastfeeding education class was the primary factor contributing to their success. "Support from significant other" rated second, and "baby is a good nurser" rated third. Women who did not attend the class reported significantly lower success in breastfeeding.

However, Hill (1987) found that although women who attended a breastfeeding education program had more knowledge about breastfeeding after instruction than before, there was no significant difference in the duration of breastfeeding between this group of women and women who didn't attend the class. An increase in factual knowledge alone did not insure that women would breastfeed for a longer duration.

Hellings (1985) used a discriminant model to predict breastfeeding success. The study examined eight factors: (a) education, (b) feelings about the pregnancy, (c) income, (d) ethnicity, (e) method of feeding as an infant, (f) family support, (g) health problems during

pregnancy, and (h) type of delivery. Out of 84 women, 70% were categorized correctly into their predicted group of successful or non-successful breastfeeding. Forty six of the 64 women who were actually successful at breastfeeding had been predicted to be so by the model, and 13 of the 20 who were not successful had been correctly identified. Hellings concluded that more years of education, positive feelings about the pregnancy, higher income, and a normal vaginal delivery contributed to the success of breastfeeding.

Other modifiable variables that affect breastfeeding duration include influence of significant others, formula supplementation in the hospital, and returning to work or school. Support and encouragement from family and friends may lead to success and prolongation of breastfeeding. Kessler, Gielen, Diener-West, and Paige (1995) found that a mother's intention to breastfeed is strongly and statistically significantly affected by her attitude toward breastfeeding and the preference of her significant other regarding breastfeeding. The researchers concluded that because breastfeeding initiation and successful continuation are mediated by intention, the preference of the significant other is influential in her intention, initiation, and continuation of breastfeeding for at least seven days.

Formula supplementation in the hospital has been correlated positively with early breastfeeding attrition (Feinstein et al, 1986; Goodine & Fried, 1984; Kurinij, Shiono, & Rhoads, 1988). Kurinij, Shiono, and Rhoads studied 431 white breastfeeding women and 324 black breastfeeding women and found that formula supplementation in the hospital was associated with early breastfeeding attrition. Thirty five percent of the black women who breastfed and supplemented with formula in the hospital stopped breastfeeding by one

month postpartum, and 70% stopped by four months postpartum. Premature weaning as a result of formula supplementation has also been supported by Coreil and Murphy (1988), Hawkins, Nichols, and Tanner (1987), and Loughlin et. al (1985). Hawkins, Nichols, and Tanner studied 46 breastfeeding infants and concluded that the earlier the mother introduced formula supplements, the more likely she was to terminate breastfeeding early. The researchers found that for each week the mother delayed introducing formula supplements, the duration of breastfeeding increased by 0.3 weeks. Loughlin et. al studied 94 infants who were breastfeeding and had been supplemented with formula and found that 76% were exclusively breastfeeding at two weeks, 63% were exclusively breastfeeding at four weeks, and at eight weeks only 48% were exclusively breastfeeding. In all, 30% of the mothers had switched to formula by eight weeks.

However, several studies have found that breastfeeding duration is not affected by formula samples given at discharge from the hospital. Feinstein et. al (1986) found no significant differences in feeding method at 4, 10, or 16 weeks postpartum among 76 mothers who received a discharge packet with formula and 90 mothers who received a discharge packet without formula. Evans, Lyons, and Killien (1986) reported that the relationship between receipt of formula samples and feeding method at six weeks postpartum among 110 women was nonsignificant.

Maternal employment is a risk factor for early termination of breastfeeding (Beske & Garvis, 1982; Feinstein et. al, 1986; Hill, 1987; Hill & Aldag, 1996; Janke, 1988; O'Campo et. al, 1992; Simopoulos & Grave, 1984; Wilton, 1990). In studying 166 breastfeeding mothers, Feinstein et. al found that returning to work was the second most

common reason cited for terminating breastfeeding prior to 11 weeks postpartum.

Between 87% and 100% of health professionals working with pregnant women and/or

new mothers in a study conducted by Lazzaro, Anderson, and Auld (1995) rated the

mother's return to work or school as the number one reason for early cessation of

breastfeeding.

Cigarette smoking also has been linked to breastfeeding attrition (Feinstein et al., 1986;

Goodine & Fried, 1984; Hill & Aldag, 1996). Women who smoke are more likely to wean

their babies earlier than women who don't smoke (Minchin, 1991). One reason is because

they fear that the inevitable contamination of their milk is a greater risk to the baby than is

formula. Hill and Aldag (1996) studied the association between smoking and nonsmoking

mothers of term and low birthweight infants and early termination of breastfeeding. Prior

to eight weeks postpartum, more smokers than nonsmokers had weaned their infants.

Multivariate analysis showed that mothers of term and low birthweight infants who

smoked were, respectively, 1.9 and 8.6 times less likely to be breastfeeding at eight weeks

post delivery compared with nonsmokers.

Several breastfeeding studies have used the TRA as a basis for looking at variables that

can lead to breastfeeding attrition. Attitudes and subjective norms are two factors that

have been closely associated with breastfeeding behavior. Attitudes, such as commitment,

feelings, and beliefs toward breastfeeding, and subjective norms, such as professional and

social support in regards to breastfeeding, have been strongly linked to influencing a

woman's intention to breastfeed. The TRA focuses on the relationship between attitudes,

subjective norms and behavior, and therefore provides a strong foundation from which to study breastfeeding attrition because of the association between these constructs.

<u>Studies That Test Breastfeeding From The TRA Approach</u>

A study conducted by Manstead, Proffitt, and Smart (1983) looked at infant feeding practices. During the last trimester of pregnancy, women completed a questionnaire that assessed their attitudes toward breastfeeding (as opposed to bottle feeding) their infants, subjective norms relating to breastfeeding and bottle feeding, and behavioral intentions to breastfeed or bottlefeed. Attitudes were measured by the women's beliefs about the consequences of breastfeeding or bottle feeding (e.g. breastfeeding is convenient, breastfeeding is cheaper, breastfeeding is best for baby's health). Subjective norms were measured by assessing the woman's perceptions of what specific others (baby's father, her own mother, her closest female friend, and medical adviser) expected her to do and her motivation to comply with each one's expectations. Behavioral intentions were measured by asking the woman, "How do you intend to feed your baby?". A seven point scale with the following end points was used: "I shall definitely breastfeed my baby" and "I shall definitely bottle feed my baby". The midpoint was labeled "I cannot decide at the moment." Actual behavior was measured by assessing whether the woman breastfed or bottle fed.

Six weeks following delivery, the women completed another questionnaire pertaining to their actual feeding practices during the previous six weeks. The mothers' attitudes toward the two feeding practices, subjective norms, and behavioral intentions had a correlation of 0.67, 0.49, and 0.82, respectively, with the feeding method they actually employed.

Findings from a study conducted by O'Campo et al. (1992) revealed that several factors are associated with intended duration of breastfeeding, two of which are attitudes and normative beliefs. Women were interviewed once during their last trimester of pregnancy, and from one to three times during eight months postpartum. Attitudes were measured by the woman's beliefs about the convenience of breastfeeding, health benefits of breastfeeding, ease or difficulty of returning to work or school while breastfeeding, whether breastfeeding in public is embarrassing, and whether breastfeeding saves money. Normative beliefs were measured by the woman's perceptions of whether the baby's father, her own mother, other female relatives, close friends, caregivers, and pediatric caregivers wanted her to breastfeed or bottle feed. O'Campo et al. found that women who had negative attitudes toward breastfeeding were 95% more likely to quit breastfeeding by six months than women who had positive attitudes. Also, women with little or no support were at greater risk for breastfeeding cessation than women who had a supportive network. By 10 weeks, 50% of the women with little or no support had stopped breastfeeding, whereas by 25 weeks, 50% of the women who had a supportive network were still breastfeeding. The researchers also found that simply asking women how long they intended to breastfeed was an efficient method of identifying those at risk for short breastfeeding duration. Ninety five percent of those who prenatally intended to breastfeed actually did.

Breastfeeding Attrition Prediction Tool

Janke (1992) developed the BAPT to identify women who were at risk for premature weaning. Janke believes that the TPB is an ideal framework for guiding the development

and testing of interventions directed toward increasing breastfeeding duration among women who are at risk for attrition. The psychometric properties of the BAPT were first studied in Alaska to determine the BAPT's potential for clinical use.

During development of the BAPT, a two-part Likert-type questionnaire was designed to obtain demographic data, and to measure the TPB concepts of attitude, subjective norm, and perceived behavioral control. The TPB's definitions for attitude, subjective norm, and perceived behavioral control were used to guide item development for each concept. Additionally, personal clinical experience, review of the literature, interviews with hospitalized postpartum women, and feedback from 10 lactation experts contributed to the development of the TPB items (Janke, 1992).

Attitudes were operationally defined as the woman's beliefs about the consequences of breastfeeding and formula feeding. Forty attitudinal items were developed. Ten items were developed for each of the following four categories: advantages and disadvantages of breastfeeding, and advantages and disadvantages of formula feeding. Examples of attitudinal questions used on the BAPT were to ask the woman how much she agreed with the beliefs that "breastfeeding tires the mother", "breastfeeding is messy", "breastfeeding makes breasts sag", "breastfeeding is economical", "breastfeeding is convenient", "formula feeding is easy", "formula feeding lets father be close to baby", "formula feeding babies tend to get sick", and "formula feeding babies are fussy" (Janke, 1992).

Subjective norms were operationally defined as the woman's perceptions that professional and social referents believed she should or should not breastfeed or formula feed. Examples of how subjective norms were operationalized were to ask the woman

how much she agreed with the beliefs that "the baby's father thinks I should breastfeed", "the baby's doctor thinks I should breastfeed", "my sister thinks I should breastfeed", "the La Leche League thinks I should breastfeed", and "the hospital nurse thinks I should breastfeed" (Janke, 1992). Eleven social and professional support sources were used to develop the subjective norm scale items.

Perceived behavioral control was operationally defined as the woman's beliefs pertaining to the ease or difficulty associated with breastfeeding and formula feeding. Twelve items were developed regarding knowledge, skill, and ability to feed the infant; feelings about breastfeeding and formula feeding; and the need for outside resources to overcome infant feeding problems. Examples of how control was operationalized were to ask the woman the extent to which she agreed with the statements "I am confident I can breastfeed.", "I am physically able to breastfeed.", "I am determined to breastfeed.", "I am emotionally ready to breastfeed.", and "I know someone who can help me breastfeed." (Janke, 1992).

Janke (1992) tested the BAPT in a pilot study in 1989-1990. The BAPT was administered to 228 women during their postpartum hospital stays. Two follow-up phone calls were conducted at six and 16 weeks post delivery. The findings of the study supported the need for further modification and refinement of the BAPT. Factor analysis was used to analyze the data. Upon completion of the data analysis, 12 attitudinal items, two subjective norm items, and five behavioral control items were deleted. Deletion of these items enhanced the content validity of the BAPT. The remaining items received minor editing, and seven new items were added based on input from the study's

participants and the researcher's experience. The revised instrument consisted of 29 attitudinal items, 12 subjective norm items, and 10 control items.

The revised version added the evaluation component of the attitudinal items which was operationalized by asking questions, such as how important it was for her to "use a feeding method that is not messy", "use a feeding method that is nutritious", "use a feeding method that causes fewer allergies", and "use a feeding method that promotes father and baby bonding" (Janke, 1994). The motivation to comply component was added to the subjective norm items. The motivational component was operationalized by asking questions, such as "How much do you care about the father's opinion on how you should feed your baby?", "How much do you care about your mother-in-law's opinion on how you should feed your baby?", "How much do you care about your doctor's or midwife's opinion on how you should feed your baby?", and "How much do you care about your closest friend's opinion on how you should feed your baby?" (Janke, 1994).

The main study (1994) was conducted, and took place on the same postpartum units in hospitals that were used for the pilot study. Women completed the BAPT during their postpartum hospitalizations and consented to a follow-up phone call at 8 weeks post delivery. Confirmatory factor analysis was used to assess validity of the BAPT, and Cronbach alphas were used to assess reliability of the subscales. Four scales were identified: Negative Breastfeeding Sentiment (NBS), Positive Breastfeeding Sentiment (PBS), Social and Professional Support (SPS), and Breastfeeding Control (BFC). The PBS and NBS contained the 29 attitudinal items. The SPS contained the 12 subjective norm items, and the BFC contained the 10 control items.

The NBS contained 15 attitudinal items. These items were labeled NBS because they focused on the disadvantages of breastfeeding and the advantages of formula feeding. The NBS items on the BAPT were similar to reasons that women gave for premature weaning. Examples of NBS items included (a) breastfeeding ties you down, (b) it's hard to breastfeed in public, (c) breastfeeding is time consuming, (d) breastfeeding causes pain, (e) breastfeeding makes going to work hard, (f) no one can help if you breastfeed, (g) formula feeding is easy, (h) formula feeding mothers get more rest, (i) formula feeding mothers have more freedom, and (j) formula feeding babies are easier to satisfy (Janke, 1994).

The PBS contained the remaining 14 attitudinal items. These items were labeled PBS because they focused on the advantages of breastfeeding and the disadvantages of formula feeding. Examples of PBS items included (a) breastfeeding helps bond with baby, (b) breastfeeding is natural, (c) breast milk is nutritious, (d) breastfeeding is convenient, (e) breastfeeding is economical, (f) formula feeding babies are fussy, (g) formula feeding causes constipation, (h) formula causes allergies, (i) formula feeding makes baby overweight, and (j) formula makes baby sick (Janke, 1994).

The SPS consisted of the 12 subjective norm items, which included professional support and support from family and friends. Examples of SPS items included the following referents: (a) mother's best friend, (b) people important to the mother, (c) other relatives, (d) mother's mother-in-law, (e) mother's mother, (f) mother's sister, (g) childbirth educator, (h) mother's doctor, (i) baby's doctor, (j) La Leche League, (k) mother's midwife, and (l) baby's father (Janke, 1994).

The BFC contained the 10 control items that measured perception of breastfeeding ease or difficulty and included (a) I know how to breastfeed, (b) I am confident I can breastfeed, (c) I have breastfeeding skills, (d) breastfeeding is easy, (e) I have control over breastfeeding, (f) I am ready to breastfeed, (g) I am physically able to breastfeed, (h) I am determined to breastfeed, (i) I will need help to breastfeed, and (j) I'll have enough milk (Janke, 1994).

Predictive validity was assessed by determining whether there was a statistically significant difference between women who were breastfeeding and women who were formula feeding. Results from t-tests indicated that the NBS, BFC, and SPS were statistically related to infant feeding at 8 weeks. The PBS scale failed to show a significant difference between the two groups. Reliability was evaluated using Cronbach's alpha and all scales were found to have moderate internal consistency ranging from 0.70 to 0.86.

A discriminant analysis was done to determine the ability of the four scales to predict the method of infant feeding at 8 weeks. Three of the four factors loaded, resulting in a linear discrimination function (LDF) that included the NBS, SPS, and BFC scales. According to Janke (1994), the LDF identified 73% of the women who weaned prematurely.

Janke (1992) indicated that future testing of the BAPT would involve revising the instrument and retesting it for content, construct, and criterion validity and reliability. Following the 1994 study, the BAPT was revised slightly. The current instrument contains 27 attitudinal items toward infant feeding, 10 referents who may influence the initiation, maintenance, and duration of breastfeeding, and 12 statements reflecting internal and

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external control factors that may influence the mother's intentions to breastfeed or formula feed. The attitudinal items include: convenient, painful, best for mom, fewer allergies, healthy for baby, other people can help feed, hard to do in public, nutritious, sagging breasts, easy, fussy baby, mom and baby bonding, hard to return to work or school, satisfied baby, overweight baby, low cost, easy to tell how much baby gets, restful for mom, time consuming, father and baby bonding, healthy for mom, best for baby, personally satisfying, messy, ties mom down, baby sleeps well, and enjoyable. The BAPT measures attitude in two ways. First, the mother is asked if the 27 items best describe breast or formula feeding. Second, using the same 27 items, the mother is asked how important these items were in her choice to breastfeed or formula feed. Corresponding items are multiplied and summed for composite attitude scales.

Ten referents make up the subjective norm items and include the baby's father, and the mother's mother, mother-in-law, sister, closest friend, doctor, midwife, baby's doctor, people at work, other relatives, and other important people in the mother's life. The BAPT measures subjective norms in two parts. First, the mother is asked how the above referents think she should feed the baby. Second, using the same list of referents, the mother is asked how much she cares about these people's opinions. The second part measures the motivational component (Janke, 1994). Corresponding items are multiplied and summed for a composite social and professional support measure.

The control items reflect the internal and external control factors mentioned by Ajzen (1988): information, skills, abilities, feelings, and dependence on others. The last part of the BAPT consists of 12 statements that ask the mother to agree or disagree:

1. Information: I know how to breastfeed.

2. Skills: I have the skills to breastfeed.; Breastfeeding is easy to learn.

3. Abilities: I am physically able to breastfeed.; I know that I will have enough milk for the baby.

4. Feelings: I feel ready to breastfeed.; I am confident I can breastfeed.; I am determined to breastfeed.

5. Dependence on others: I have someone who will help me breastfeed, if needed.

6. General: I feel in control over my breastfeeding.; I can overcome any breastfeeding problems that occur.; There is nothing that will stop me from breastfeeding.

The control items are summed to reflect the perceived ease or difficulty with which the mother views the act of breastfeeding, and ultimately reflect the mother's perception of having control over the behavior.

Dick and Evans assessed the reliability and validity of the current version of the BAPT in 1996. Two hundred twenty one women were recruited from the postpartum units of three hospitals in North Carolina (one rural, one semi-rural, and one urban), and one suburban hospital in Florida. The women represented broader ethnic and educational backgrounds than those in Janke's study. Subjects included both women who were breastfeeding for the first time and those who had breastfed before. The BAPT was administered during their postpartum hospital stays. A follow-up phone call was made at 8 weeks post delivery. Factor analysis identified the four scales (NBS, PBS, SPS, BFC) that measured the TPB's constructs of attitude, subjective norm, and perceived behavioral control. The findings of the study revealed the BAPT to have good internal consistency.

Cronbach alpha estimates of reliability for the four scales were: NBS (0.78), PBS (0.82), SPS (0.83), and BFC (0.85). Discriminant function analysis was used to determine predictive validity of the BAPT. Results indicated that the BAPT accurately predicted 68% of those who were still breastfeeding and 61% of those who stopped prior to 8 weeks.

Dick and Evans performed further analysis on the first-time breastfeeders and found that the BAPT had a higher accuracy rate (70.6%) in predicting the number of women who stopped breastfeeding before 8 weeks. The accuracy rate for overall participants was 70%. They concluded that in this study, the BAPT was a better predictor of early breastfeeding cessation for women who were first-time breastfeeders. This study also supported the predictive capability of the BAPT when it was administered in the first 24 hours postpartum. To date, all studies using the BAPT have been conducted in the postpartum setting.

The purpose of the BAPT is to identify women who are at risk for early breastfeeding attrition. Support for the BAPT's predictive ability has been established when it is administered in the first 24 hours postpartum. Dick and Evan's (1996) study suggested that the BAPT's predictive capability has a higher rate of accuracy when used on first-time breastfeeding mothers. However, it was unknown whether the BAPT was a useful predictor of early breastfeeding attrition when administered in the prenatal period. It was also unknown whether the BAPT's predictive ability was as effective in the prenatal period as it was in the postpartum period. The BAPT was used in this study to address these areas.

CHAPTER III

METHODOLOGY

Research Design

The psychometric design selected for this study was used to identify the reliability and predictive validity of the BAPT when it was administered to first-time breastfeeding mothers during the prenatal period and in the immediate postpartum period. The study was designed to allow the researchers to determine if the BAPT was an equal, or better, predictor of breastfeeding attrition when administered during pregnancy, rather than solely in the immediate postpartum period. The BAPT was administered during the last trimester of pregnancy and again during the hospital postpartum stay. At 8 weeks post delivery, participants were asked the method, or combination of feeding methods, they were using for their infants. If they were no longer breastfeeding, they were asked when and why they stopped.

Setting

The study was conducted at The Women's Hospital of Greensboro, located in Greensboro, North Carolina. Participants were recruited from the prenatal breastfeeding classes conducted at the hospital from July 1997 to October 1997. The BAPT was administered during the prenatal breastfeeding classes and again on the postpartum unit after delivery. The 8 week follow-up was a phone call to the phone number provided by the participant.

Population

The population consisted of women who decided to breastfeed. The target population

consisted of first-time breastfeeding women. The accessible population included first-time

breastfeeding women who attended the prenatal breastfeeding classes provided at The

Women's Hospital of Greensboro.

Sample

A convenience sample was used. The sampling frame consisted of the list of women

who attended the prenatal breastfeeding classes and who met the eligibility criteria for the

study. To be eligible for the study, the woman must have:

1. Planned to breastfeed for the first time. This criterion eliminated women who had

earlier breastfeeding experiences that may have masked the predictive ability of the BAPT.

2. Planned to breastfeed for at least 8 weeks. This criterion eliminated conflicting

results with data from women who planned to stop breastfeeding before 8 weeks.

3. Attended the prenatal breastfeeding classes at The Women's Hospital of Greensboro

during her last trimester of pregnancy

4. Been at least 18 years of age

5. Been able to speak and read English

6. Planned to deliver at The Women's Hospital of Greensboro

All women who met the eligibility criteria and consented to participate in the study

completed the BAPT at the identified times and responded to the follow-up telephone call

post delivery. Data from participants (or their infants) who developed medical

complications and who were unable to initiate breastfeeding during the first 24 hours after

delivery were not included in the data analysis.

This study was a subset of a larger study whose sample size was approximately 120 women. Sample size calculation was based on the fact that discriminant function is related to multiple regression. Therefore, the recommended number of participants per independent variable in the equation was at least 30 (Nunnally, 1978). In the equation, the independent measures were the times of administration of the BAPT. This resulted in a sample size of 60. For this subset of the larger study, data from the first 23 women who completed all three parts were used.

Protection of Human Subjects

Approval for conducting the study was obtained from The University of North Carolina at Greensboro Institutional Review Board, and the Moses H. Cone Health System's Institutional Review Board. The purpose of the study, and what was expected of the participants, was fully explained to women attending the prenatal breastfeeding classes. Confidentiality was stressed. A list of participants was kept to identify when subjects delivered. After completion of the second BAPT, names were deleted from the list. The participant's first name and telephone number were used for the 8 week follow-up. Informed consent was obtained by virtue of the woman's completion of the BAPT and the provision of a telephone number for the 8 week follow-up phone call. No identifying data was kept once the entire study was completed.

Instrument

The BAPT was used in this study to collect information related to attitudes, subjective norms, and perceived behavioral control. Demographic data and delivery information were

also obtained. The BAPT took approximately 10 minutes to complete. The 8 week follow-up phone call obtained information regarding the feeding method (breast milk only, breast milk with supplementation, or formula only) used for the infant.

The BAPT was developed by Janke using the concepts of the TPB. The BAPT is a Likert type scale with each item having a possible score of 1 to 5. The attitudinal section consists of 27 positive and negative ideas about breastfeeding, and consists of questions pertaining to the importance of each idea in the woman's choice to breastfeed or formula feed. The BAPT asks the woman about her beliefs concerning infant feeding by addressing factors, such as healthy for baby, convenient, enjoyable, painful, time consuming, and hard to do in public, and asking which of these factors best describes breast or formula. The BAPT also asks how important these factors were in her choice to breastfeed or formula feed. The two scores are multiplied to obtain the Positive Breastfeeding Sentiment (PBS) and Negative Breastfeeding Sentiment (NBS) scales which provide a measurement of attitude (Janke, 1995). The PBS focuses on the advantages of breastfeeding and the disadvantages of formula feeding. Examples of PBS items include (a) breastfeeding helps bond with baby, (b) breastfeeding is convenient, (c) breast milk is nutritious, (d) formula causes allergies, (e) formula makes baby sick, and (f) formula feeding babies are fussy. The NBS focuses on the disadvantages of breastfeeding and the advantages of formula feeding. Examples of NBS items include (a) breastfeeding ties you down, (b) no one can help you breastfeed, (c) it's hard to breastfeed in public, (d) formula feeding is easy, (e) formula feeding babies are easier to satisfy, and (f) formula feeding mothers get more rest (Janke, 1994).

The subjective norms section of the BAPT is comprised of a list of 10 referents (individuals or groups who serve as points of reference to guide behavior). The Social and Professional Support (SPS) scale asks the woman how she thinks referents, such as the baby's father, her mother, her closest friend, the baby's doctor, and other relatives think she should feed the baby, and how much she cares about their opinions. The two scores are multiplied to obtain the SPS scale which provides a measurement of the subjective norms (Janke, 1995).

The perceived behavioral control section of the BAPT consists of twelve questions that pertain to the perceived ease or difficulty anticipated in actually breastfeeding. The questions ask the woman how much she agrees or disagrees with statements, such as (a) I am determined to breastfeed, (b) I feel confident that I can breastfeed, (c) Breastfeeding is easy to learn, and (d) I have the skills to breastfeed. The sum of the items make up the Breastfeeding Control (BFC) scale (Janke, 1995).

The BAPT has been found to have reliability, and predictive validity (Janke, 1992, 1994; Dick & Evans, 1996). The BAPT from Janke's 1994 study was tested for reliability in Dick and Evan's 1996 study, and was found to have a reliability factor of 0.78 for the NBS, 0.82 for the PBS, 0.83 for the SPS, and 0.85 for the BFC. The predictive validity of the BAPT is high as evidenced by Janke's 1994 study and Dick and Evan's 1996 study where 73% and 70% of the women, respectively, were accurately classified as having ceased breastfeeding prior to 8 weeks.

The BAPT's predictive validity was tested again in this study when it was administered prenatally as well as postnatally. The BAPT's reliability could not be determined because

of the small sample size. However, reliability will be tested in the larger study. As a measure of reliability, the larger study will measure the current BAPT's internal consistency using Cronbach's alpha. Internal consistency looks at the relationship of items within the BAPT and within each of the four scales: NBS, PBS, SPS, and BFC. According to Polit and Hungler (1995), a correlation coefficient of > 0.70 is satisfactory. Results of previous studies (Dick & Evans, 1996; Janke, 1992; Janke, 1994) that used the BAPT found moderate internal consistency ranging from 0.75-0.83 for NBS, 0.70-0.81 for PBS, 0.80-0.86 for SPS, and 0.75-0.84 for BFC.

Data Collection

Potential candidates for the study were approached in the first of the series of prenatal breastfeeding classes for their interest in the study. The researchers explained the study and procedures to the class. The class was informed that a baby development calendar would be given to women after they completed the BAPT in the hospital. Women who met the eligibility criteria and who agreed to participate in the study completed the BAPT during the prenatal class. Participants were asked for their expected delivery dates. They were asked to complete the BAPT again during their postpartum hospital stay.

Beginning two weeks before the earliest expected delivery date, the researchers checked the hospital delivery log every day to ascertain if any of the participants had delivered. Daily visits were essential since the second BAPT had to be completed during the postpartum hospital stay. The delivery log provided the most reliable information because it was checked every day.

When a woman from the list of participants was identified, the researcher asked her to complete the BAPT a second time. At that time, the researcher reminded her of the 8 week follow-up phone call and obtained a phone number for contact.

Eight weeks following delivery the researcher called the participant and inquired about the method, or combination of methods, she was using to feed her baby. If she was no longer breastfeeding, she was asked when she stopped and her reasons for stopping. At the end of the phone interview she was thanked for her participation. This entire process continued until the desired sample size was obtained.

Data Analysis

Paired t-tests were planned for the four scales (PBS, NBS, SPS, and BFC) that were used to measure the main constructs of the BAPT. The t-tests allowed me to determine if there was a difference in responses between the BAPT I and BAPT II. This approach had not been used in the previous studies of the BAPT.

Separate discriminant function analyses (a form of multiple regression) were planned with the different administrations of the BAPT as predictor variables and type of feeding as the dependent variable in each equation. This allowed me to look at accuracy and improvement of prediction of each use of the BAPT. This also was consistent with the approach used by Janke (1991, 1994) in the development of the BAPT.

Limitations

The study had a high potential for sampling bias to occur because of the over-representation of private patients and under-representation of clinic patients. Although the breastfeeding classes were open to all women, and included private and clinic patients,

there was a greater proportion of private patients than clinic patients. Sampling bias limited the representativeness of the study. A later study is planned to recruit participants from prenatal clinic settings to enhance the representativeness of the sample.

A confounding variable that could have occurred was the presence of a maternal complication, or a perinatal complication, such as preterm delivery or neonatal infection that required admission to the Neonatal Intensive Care Unit and thus, prevented early establishment of breastfeeding. To control for this effect, women who were unable to begin breastfeeding in the first 24 hours post delivery, because of maternal or neonatal medical reasons, were eliminated from the study.

Another limitation was testing. Some of the questions on the BAPT may have caused some women to answer in a manner that they felt the researcher wanted them to answer. Testing could have been very harmful to the true validity of the study's results.

A final limitation was first-time breastfeeding mothers usually wanted to ensure that they were doing everything right. The need to do the right thing may have influenced how a woman answered the questions on the BAPT. Her true responses may not have appeared on the BAPT because she wanted the researchers to think she was at one level and actually her true feelings and beliefs put her at another level.

CHAPTER IV

RESULTS

Data Collection and Sample Description

Women who attended the prenatal breastfeeding classes during their last trimester of pregnancy, spoke English, were at least 18 years of age, planned to breastfeed for the first time, and planned to breastfeed a minimum of eight weeks were asked to participate in the study. Those willing to participate filled out the Breastfeeding Attrition Prediction Tool (BAPT) at the breastfeeding class (BAPT 1). Participants completed the BAPT again during the postpartum hospital stay (BAPT 2), and agreed to a brief telephone follow-up at eight weeks post delivery.

Data collection began on July 9, 1997 with recruiting women from the prenatal breastfeeding classes, and collecting the BAPT 1. Beginning two weeks before the earliest expected delivery date, the researchers checked the hospital delivery log book every day to determine if any of the participants had delivered. When a woman from the list of participants was identified, the researcher asked her to complete the BAPT a second time (BAPT 2). At that time, the researcher reminded her of the eight week follow-up phone call and obtained a phone number for contact. Eight weeks following delivery the researcher called the participant and inquired about the method, or combination of methods, she was using to feed her baby. If she had quit breastfeeding, she was asked when she stopped and her reasons for stopping.

The sample consisted of 23 women, a subset of a larger, ongoing study with a sample size of 129 women. The first 23 women in the larger study who completed all three parts of the study by November 4, 1997 made up this study's sample. No participants in this study were lost to follow-up.

Demographic data are described for the sample in Table 1. Subjects' ages ranged from 21 to 40. The majority of participants were between the ages of 27 to 33 years old. Most (84%) of participants in the study were Caucasian. All subjects had at least a high school degree. Sixty one percent had a baccalaureate degree and 13% had some graduate education. An overwhelming majority of the participants were married, and were having their first child.

The status of participants with relatives who breastfed is described in Table 2. Nineteen out of 23 women indicated that they had at least one close relative who breastfed. Eleven out of the 19 women had multiple relatives who breastfed.

Table 3 identifies information related to the type of delivery and anesthesia used, the sex and weight of the baby, and the time of first breastfeeding. Most of the women delivered vaginally with the epidural being the main form of anesthesia used. The sex of the baby was distributed fairly equally with 13 males and 10 females. The majority of the babies weighed in the 6 - 8.15 pounds range. The majority of the newborns breastfed within the first hour of birth. Only three women initiated the first feeding at more than four hours after delivery.

Table 1.

Description of Sample: Demographic Variables

Variable	n	%
Age		
21-23	1	4.3
24-26	2	8.7
27-30	9	39.1
31-33	7	30.4
34-36	3	13.0
37-40	1	4.3
Ethnic		
Afro-American	4	17.4
Caucasian	19	82.6
Education		
High School	3	13.0
Some College	1	4.3
Assoc. Degree	2	8.7
BS Degree	14	60.9
Graduate Degree	3	13.0
Marital Status		
Single	1	4.3
Married	21	91.3
Number of Children		
1	20	87.0
2	3	13.0

Note. Total participants in study (n = 23). Uneven "n" related to missing data on some variables.

Table 2.

Status of Participants With Relatives Who Breastfed

Variable	n	%
Participants With Relatives Who Breastfed		
Yes	19	82.6
No	4	17.4
Relative Who Breastfed		
Mother	1	4.3
Mother-in-law	1	4.3
Sister	1	4.3
Sister-in-law	3	13.0
Other	2	8.7
Multiples	11	47.8

Note. Total participants in study (n = 23). Uneven "n" related to missing data on some variables.

Table 3.

Description of Sample: Obstetrical Variables

Variable	n	%
Delivery Type		
Vaginal	18	78.3
Cesarean	5	21.7
Anesthesia		
Local	1	4.3
Epidural	16	69.6
Spinal	2	8.7
None	4	17.4
Sex		
Male	13	56.5
Female	10	43.5
Weight		
5 to 5.15	2	8.7
6 to 6.15	5	21.7
7 to 7.15	8	34.8
8 to 8.15	6	26.1
9 to 9.15	1	4.3
10 or larger	1	4.3
First Feeding After Delivery		
First Hour	14	60.9
By 2nd Hour	2	8.7
By 3rd Hour	1	4.3
By 4th Hour	2	8.7
After 4 Hours	3	13.0

Note. Total participants in study (n = 23).

Breastfeeding Status at Eight Weeks

At the completion of the 8 week follow-up, 78% of the participants were still breastfeeding (Table 4). Of the women who were breastfeeding, half were supplementing with formula. Five of the women had stopped breastfeeding prior to the end of the study period. Three stopped by the third week and two stopped in the sixth week. The earliest time period for quitting was at one week.

Table 4.

Breastfeeding Status at Eight Weeks

Variable	n	%
Still Breastfeeding		
Yes	18	78.3
No	5	21.7
Degree		
Breast Only	9	39.1
Supplementation	9	39.1
Duration of Breastfeeding		
1 Week	1	4.3
2 Weeks	1	4.3
3 Weeks	1	4.3
6 Weeks	2	8.7

Note. Total participants in study (n = 23).

Table 5 presents data on assistance received in the hospital and after going home. All of the women received assistance while in the hospital, primarily from the nurse or lactation consultant. Eighteen women received assistance at home, and the lactation consultant was the primary source of aid. The two most common sources the women

sought for answering questions pertaining to breastfeeding were the lactation consultant and course materials received from the prenatal breastfeeding classes. Although five of the women did not receive any assistance with breastfeeding at home, four of them were still breastfeeding at the time of the 8 week follow-up.

Table 5.

Assistance Reported by All Participants

Variable	n	%
BF Assistance in Hospital		
Yes	23	100.0
Assistance in Hospital		
Lactation Consultant	20	87.0
Nurse	17	74.0
Friend	1	4.3
BF Assistance at Home		
Yes	18	78.3
No	5	21.7
Assistance at Home		
Lactation Consultant	16	70.0
Friend	4	17.3
Pediatrician	1	4.3

Note. Total participants in study (n = 23).

Table 6 shows the characteristics of the women who stopped breastfeeding prior to eight weeks postpartum. The majority were Caucasian, in their late 20s, married, had a college education, fed the baby within the first hour of delivery, and had one or more relatives who breastfed. All five women received assistance with breastfeeding in the hospital, and only one did not receive any assistance after she went home. The reasons for

Table 6.

Characteristics of Participants Who Stopped Breastfeeding

Variable	n	%
Age		
21-23	1	20.0
27-30	3	60.0
31-33	1	20.0
Ethnic		
Caucasian	4	80.0
Afro-American	1	20.0
Education		
High School	2	40.0
Baccalaureate	3	60.0
Marital Status		
Single	1	20.0
Married	4	80.0
Number of Children		
First Child	5	100.0
Delivery Type		
Vaginal	5	100.0
Anesthesia		
Epidural	5	100.0
First Feeding After Delivery		
Within 1 hour	3	60.0
By 4th hour	1	20.0
After 4 hours	1	20.0
Duration of Breastfeeding		
1 Week	1	20.0
2 Weeks	1	20.0
3 Weeks	1	20.0
6 Weeks	2	40.0

(table continues)

Variable	n	%
Assistance in Hospital		
Yes	5	100.0
Assistance at Home		
Yes	4	80.0
No	1	20.0
Number Relatives Breastfed		
None	1	20.0
1	2	40.0
2	2	40.0
Relative Who Breastfed		
Mother	2	
Sister	1	
Sister-in-law	2	
Cousin	1	
Reasons for Stopping		
Baby not satisfied		
Poor suck		
Maternal surgeries		
Pain when latching onto breast		
Insufficient milk		
Baby didn't want to latch onto breast		

Note. Total participants who quit (n = 5). Uneven "n" related to missing data or multiple responses on some variables.

stopping breastfeeding varied. Some reasons that were cited were baby was not satisfied, baby had a poor suck, insufficient milk, mother experienced pain when baby latched onto the breast, and baby didn't want to latch onto the breast.

Scores on the Breastfeeding Attrition Prediction Tool Subscales

The four scales in the Breastfeeding Attrition Prediction Tool (BAPT) are presented for the BAPT 1 and BAPT 2 in Table 7. Attitudinal factors are reflected by the Positive Breastfeeding Sentiment (PBS) scale and the Negative Breastfeeding Sentiment (NBS) scale. The PBS focuses on the advantages of breastfeeding and the disadvantages of formula feeding. The higher the PBS score, the greater the positive breastfeeding sentiment. The possible range for the PBS score was 18-450. The range of actual PBS scores in the sample was 226-399. The mean PBS scores for the BAPT 1 and BAPT 2 were at the upper end of the range. Overall, women had positive attitudes toward breastfeeding during both the prenatal and postpartum periods. Paired t-tests were performed on the PBS to determine if there was a difference in responses between the BAPT 1 and BAPT 2. Results of the comparisons showed that the PBS score was slightly higher postpartally. However, the change in PBS was not statistically or practically significant.

The NBS focuses on the disadvantages of breastfeeding and the advantages of formula feeding. The higher the NBS score, the greater the negative breastfeeding sentiment. The possible range for the NBS score was 9-225. The range of actual NBS scores in the sample was 35-151. The mean NBS score for both BAPTs was 80, which meant that overall, women had few negative attitudes toward breastfeeding prenatally and

Table 7.

Breastfeeding Attrition Prediction Tool Scales at Prenatal (I) and Postpartum (II)

Scale (n = 23)	Mean	SD	t-score
Attitudinal Factors			
Positive Breastfeeding Sentiment I	297.05	40.02	- 0.60
Positive Breastfeeding Sentiment II	303.00	46.20	
Negative Breastfeeding Sentiment I	79.64	17.57	- 0.02
Negative Breastfeeding Sentiment II	79.73	21.37	
Support Scale I	107.22	39.44	- 1.41
Support Scale II	119.65	45.65	
Control Scale I	46.00	6.19	- 3.33 *
Control Scale II	50.83	4.81	

*$p < .05$

postpartally. Paired t-tests revealed that there were no differences in NBS scores between the BAPT 1 and BAPT 2.

The Social and Professional Support (SPS) scale represents the subjective norm items including professional support and support from family and friends. The higher the score on the SPS scale, the greater the support for breastfeeding. The possible range for the SPS score was 10-250. The range of actual SPS scores was 25-215. The mean SPS scores were slightly less than midrange for both BAPTs, which meant that overall, women perceived an adequate amount of professional and social support. Paired t-tests revealed that although both mean SPS scores were close to midrange, professional and social support was higher in the postpartum period than in the prenatal period. This difference was not statistically significant.

The Breastfeeding Control (BFC) scale represents items that measure perception of breastfeeding ease or difficulty. The higher the score on the BFC scale, the greater the sense of control the woman has over her ability to breastfeed. The possible range for the BFC score was 12-60, and the range of actual BFC scores was 36-59. The mean BFC scores for both BAPTs were at the upper range, which meant that overall, women felt they had control over their ability to breastfeed. Paired t-tests showed that differences existed in breastfeeding control, between the BAPT 1 and BAPT 2, and these differences were statistically significant. During the postpartum period, women felt they had more control over their breastfeeding experiences than they did prenatally.

Prediction of Breastfeeding Status

In earlier studies the BAPT was found to be an effective predictor of breastfeeding status at eight weeks postpartum. Because this study involved working with a subset of data, the small sample size didn't allow for all of the variables to be entered into the prediction equation. A discriminant function analysis (see Table 8) was performed. Breastfeeding control at prenatal (BFC 1) and postpartum (BFC 2) were used to predict breastfeeding status at eight weeks. The BFC scale was used because of the statistical difference found between the BAPT 1 and BAPT 2.

Table 8.

Discriminant Function Analysis With Prenatal and Postpartum Control Scores Predicting

Breastfeeding Status at Eight Weeks

Functions

Eigen Value	Wilks' Lambda	Chi Sq	Sig.
0.19498	0.8368	3.563	0.168

Classification Results

Actual Group	Number of Cases	Predicted Group Membership	
		1	2
Group 1 (Still Breastfeeding)	18	13 72.2%	5 27.8%
Group 2 (Stopped)	5	1 20.0%	4 80.0%

Percent of "Grouped" Cases Correctly Classified: 74.0%

The discriminant function analysis allowed me to look at the relative effectiveness of the BFC scale as a predictor of breastfeeding attrition when the BAPT was given prenatally, compared to postnatally. In the function analysis, Wilks' Lambda was 0.8368, indicating that the BAPT accounted for 16% of the difference between those still breastfeeding and early cessation. However, the Chi Square test indicated that this prediction equation was not statistically significant.

For exploratory purposes, the classification results were also examined. These indicated that the two control scales accurately predicted that 4 out of 5 women stopped breastfeeding prior to eight weeks. The BFC 1 and 2 also accurately predicted 13 out of 18 women who continued to breastfeed. Overall, 74% of "grouped" cases were accurately predicted for the participants. In other words, according to equal probability, women in this study had a 50% chance of stopping breastfeeding prior to eight weeks, but the BAPT increased the correct prediction of breastfeeding attrition by 24%.

To assess relative predictive ability of the two administrations of the BFC, standardized coefficients were examined (BFC 1 = 0.6055; BFC 2 = 0.7185). Sense of control (BFC) in the postpartum period (BFC II) seemed to contribute more to prediction than in the prenatal period (BFC 1). Yet, overall, the BFC 1 and BFC 2 together appeared to be good predictors when predicting breastfeeding status. The trends found in this study may hold true at the completion of the entire study.

CHAPTER V

DISCUSSION AND IMPLICATIONS

The purpose of this study was to test the reliability and predictive validity of the Breastfeeding Attrition Prediction Tool (BAPT) when administered to first-time breastfeeding mothers, to identify the optimal time for its use, and to determine if responses to the BAPT change between prenatal and postpartum periods. This section includes a discussion of the results, the implications of limitations, implications for nursing practice, and theoretical implications. Recommendations for future research are also presented.

<u>Discussion</u>

The findings from this study revealed that responses to the BAPT did not change much between the prenatal and postpartum period for positive breastfeeding sentiment and negative breastfeeding sentiment. Although the mean for Positive Breastfeeding Sentiment (PBS) was slightly higher in the postpartum period (PBS I = 297; PBS II = 303) the mean for Negative Breastfeeding Sentiment (NBS) remained unchanged (NBS I = 79.6; NBS II = 79.7). Women had slightly more positive attitudes toward the advantages of breastfeeding and the disadvantages of formula feeding after delivery of the baby than they did during pregnancy. However, their beliefs about the disadvantages of breastfeeding and the advantages of formula feeding did not change from pregnancy to postpartum. Thus,

attitudes were strongly positive and weakly negative, and appeared to be set by the third trimester.

Women perceived an adequate amount of social and professional support (SPS) during pregnancy and after delivery. Yet, unlike the stability found in the PBS and NBS scores, the SPS scores changed more between the prenatal and postpartum periods. At both periods there was a wide range of social support. Nevertheless, social and professional support for breastfeeding was perceived to be higher after delivery of the baby, and after the initiation of the breastfeeding experience. This change was not statistically significant, but this may have been due to the small sample size. This change could have resulted from the increased amount of attention that typically occurs after the birth of a baby, especially since it was the woman's first baby.

Unlike the PBS, NBS, and SPS, responses to the BFC scale differed between the BAPT 1 and BAPT 2, and these differences were statistically significant. BFC increased at the BAPT 2, which meant that perceived behavioral control was found to be greater during the postpartum period. Women felt that they had a greater sense of control over their ability to breastfeed after delivery of the baby, rather than during pregnancy, and after several positive breastfeeding experiences.

The results suggested that the BFC scale was relatively effective in predicting early attrition when the BAPT was given prenatally and postnatally. Although the small sample size precluded the prediction equation from being statistically significant, the study's preliminary data indicated the trend may have been in the direction of the BFC scale having greater predictive ability during the postpartum period.

The study found that five of the 23 women quit breastfeeding prior to eight weeks

postpartum. Yet, three of the five women who quit did not fit the characteristics of

women who were described in the literature as being prone to early breastfeeding attrition.

These three women were Caucasian, in their late 20s to early 30s, well educated, married,

initiated the first feeding within the first hour of birth, had multiple relatives who

breastfed, and received assistance with breastfeeding during the postpartum

hospital stay and at home after discharge. These findings contradicted findings from

previous studies that showed women with increased maternal age (Feinstein et al., 1986;

Hawkins, Nichols, & Tanner, 1987; Quarles, 1994; Ryan, Rush, Krieger, & Lewandowski,

1991), higher levels of education (Feinstein et al.; Hawkins, Nichols, & Tanner; Janke,

1988; Quandt, 1985; Quarles; Ryan, Rush, Krieger, & Lewandowski), married status

(Feinstein et al.; Hawkins, Nichols, & Tanner), white ethnicity (Kurinij, Shiono, &

Rhoads, 1988; Ryan, Rush, Krieger, & Lewandowski), and early onset of first

breastfeeding (Buxton et al., 1991; Coreil & Murphy, 1988; Janke, 1988) had a greater

likelihood of breastfeeding longer than their counterparts. Only one of the women who

quit breastfeeding early matched the profile of being prone to early attrition. This woman

was young, single, black, had a high school education, breastfed by the fourth hour of

birth, had no relatives who breastfed, and received no assistance with breastfeeding once

she was at home. Thus, more predictive information was needed than available from

demographic information. With this study, use of the BFC scale at both times correctly

identified 80% of those who stopped before eight weeks.

Results of the larger study may be more conclusive in predicting women who are prone to early breastfeeding attrition. Findings from the larger study may also reveal whether there are significant differences in responses to the BAPT between the prenatal and postpartum periods. If the BAPT is found to be just as effective during the third trimester of pregnancy, as it is during the immediate postpartum period, ideally more time might be allowed for prenatal breastfeeding education, support, encouragement, and reinforcement to take place. Focusing on the advantages, disadvantages, benefits, and techniques of breastfeeding may help build the woman's motivation and confidence to breastfeed. All of these factors may contribute to prolonging breastfeeding duration and preventing early attrition.

Implications of Limitations

This study was not without its limitations. One limitation was the small sample size. Reliability and predictive validity of the BAPT were unable to be determined because of the small sample size. Whether or not the BAPT was as effective in the prenatal period as it has been found to be in the postpartum period was also undetermined because of the small sample size. Over-representation of private patients, and under-representation of women from prenatal clinic settings was another limitation of the study. Furthermore, women who attended the breastfeeding classes may have been more committed to breastfeeding and therefore were more willing to participate in the study. Women who were unsure about breastfeeding may have chosen not to participate in the study for fear that they would quit too soon. Another limitation was that some women may have felt obligated to say they were still breastfeeding at the 8 week follow-up, when indeed they

really were not. False positive responses, such as this, could have skewed the results. However, the research design could not control for this confounding variable.

Implications for Nursing Practice

Due to the preliminary nature of the study, there are no direct implications for practice, however, there is potential information. It appears that attitudes toward breastfeeding are set before the third trimester. Efforts to intervene in changing attitudes may need to be made much earlier in pregnancy. However, if these results are supported in the final study, changes in the support and control scales indicate potential areas for intervention to influence breastfeeding duration.

Determining the effectiveness of the BAPT when administered during the last trimester of pregnancy, compared with administration during the immediate postpartum period, may allow more time for nurses to intervene to prevent early breastfeeding attrition. Nurses can listen, respond to questions and concerns, and guide women to a variety of sources to gain additional information about breastfeeding. Interventions must be developed and implemented to support women who desire to breastfeed so infants can benefit from the physical, nutritional, and psychological properties of breast milk for at least the recommended period of four to six months of life.

Theoretical Implications

The PBS and NBS appear to be fixed by the third trimester. A woman develops positive or negative attitudes toward breastfeeding early in pregnancy, and these attitudes change very little throughout the pregnancy, or even during the immediate postpartum period. In order to influence behavior, the TPB emphasizes looking at attitude, social and

professional support, and perceived behavioral control. If a woman's behavior is going to be influenced in a positive manner, and her attitudes have already been set early in pregnancy, the focus needs to be on her support system and her control over her ability to breastfeed. The BAPT revealed that these two factors change late in pregnancy and immediately after delivery. The TPB was beneficial in predicting early attrition when the focus was on the two aspects that changed in the latter part of pregnancy. Efforts to influence attitude need to occur early in pregnancy. Yet, if nurses are going to intervene later in pregnancy, they need to focus on increasing the woman's support system, and increasing her sense of control over her ability to breastfeed. Although attitude, subjective norm, and perceived behavioral control changed at different times from the prenatal to postpartum periods, the TPB was supported.

Implications for Future Research

Replication of this study, using a larger sample and using women from prenatal clinic settings, may enhance the representativeness of the study. Future replication of this study could also focus on administering the BAPT to women who plan to breastfeed but who choose not to attend the prenatal breastfeeding classes. The BAPT could be administered during the prenatal doctor's visit. Although many studies have focused on identifying characteristics and variables that influence breastfeeding attrition, further research is needed to test clinical intervention strategies that would prolong breastfeeding duration. Using a tool to identify variables that lead to early attrition is one step, but the next step needs to be developing and testing nursing interventions that will prolong breastfeeding duration. Breastfeeding studies, such as this one, can provide the basis for the

development and testing of educational strategies with the goal of increasing breastfeeding

duration to the recommended 4-6 months of life.

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Appendix A

Recruitment Letter

Dear Breast-feeding Class Member:

You are coming to these classes because you plan to breast-feed your baby. We are registered nurses and faculty members of the School of Nursing at The University of North Carolina at Greensboro who are doing a study titled "Use of the Breast-feeding Attrition Prediction Tool (BAPT) During Pregnancy". We are looking at things that may influence how long a woman breast-feeds her baby. Results of this study will be used to develop actions that nurses can take to help breast-feeding mothers.

If you are in the last three months of your pregnancy, are at least 18 years old, will be breast-feeding for the first time, plan to be feeding the baby breast-milk for at least 8 weeks, and wish to take part in this study, you will be asked to complete a questionnaire today. At the time you deliver you will be asked to fill out the same questionnaire and agree to a follow-up phone call when your baby is eight weeks old. The questions are about how you, and people you know, feel about breast-feeding. When you fill out the questionnaire at the hospital, you will be asked to answer some questions about your delivery, yourself, and your baby. We will also check your phone number so that we can call you in eight weeks. When we call you, we will ask you a few questions about how you have been feeding your baby since birth. It will take between 10 and 15 minutes to complete the questionnaire and the phone call will take less than 5 minutes.

Filling out the questionnaire and the attached sheet today represents your consent to participate. If you decide to participate in this study, you may change your mind and stop at any time. The care that you and your baby receive will not be affected by your decision to take part in or not to take part in this study. All your answers will be kept confidential and your name will never appear in any reports or publication of this study or its results. To thank you for taking part in this study, you will receive a "Baby's First Year" calendar when we visit you in the hospital.

If you have questions about the study, now or at a later time, you can call either of the researchers. We can be reached at:

Marilyn L. Evans, PhD, RN	Margaret J. Dick, PhD, RN
119 Moore Building, UNCG	321 Moore Building, UNCG
(910) 334-5010 Ext. 531	(910) 334-5010 Ext. 555

You may keep this letter so that you can reach us if you have any questions about the study.

Thank you and best wishes.

Appendix B

Breastfeeding Attrition Prediction Tool

DO THE FOLLOWING ITEMS BEST DESCRIBE BREAST OR FORMULA FEEDING?

1. Convenient
2. Painful
3. Best for Mom
4. Fewer allergies
5. Healthy for baby
6. Other people can help feed
7. Hard to do in public
8. Nutritious
9. Sagging breasts
10. Easy
11. Fussy baby
12. Mom and baby bonding
13. Hard to return to work or school
14. Satisfied baby
15 Overweight baby
16. Low cost
17. Easy to tell how much baby gets
18. Restful for Mom
19. Time consuming
20. Father and baby bonding
21. Healthy for Mom
22. Best for baby
23. Personally satisfying
24. Messy
25. Ties Mom down
26. Baby sleeps well
27. Enjoyable

HOW IMPORTANT WERE EACH OF THE FOLLOWING IN YOUR CHOICE TO
BREASTFEED OR FORMULA FEED? (IMPORTANT/NOT IMPORTANT)

1. Convenient
2. Painful
3. Best for Mom
4. Fewer allergies
5. Healthy for baby
6. Other people can help feed
7. Hard to do in public
8. Nutritious
9. Sagging breasts
10. Easy
11. Fussy baby
12. Mom and baby bonding
13. Hard to return to work or school
14. Satisfied baby
15. Overweight baby
16. Low cost
17. Easy to tell how much baby gets
18. Restful for Mom
19. Time consuming
20. Father and baby bonding
21. Healthy for Mom
22. Best for baby
23. Personally satisfying
24. Messy
25. Ties Mom down
26. Baby sleeps well
27. Enjoyable

HOW DO THE FOLLOWING PEOPLE THINK YOU SHOULD FEED YOUR BABY?
If not applicable, blacken the NA box. (BREAST FEED/FORMULA FEED)

1. Baby's father
2. Your mother
3. Your mother-in-law
4. Your sister
5. Your closest friend
6. Your doctor or midwife
7. Baby's doctor
8. People at work
9. Other relatives
10. Other important people in your life

HOW MUCH DO YOU CARE ABOUT PEOPLE'S OPINION ON HOW YOU
SHOULD FEED YOUR BABY? (CARE A GREAT DEAL/DON'T CARE AT ALL)

1. Baby's father
2. Your mother
3. Your mother-in-law
4. Your sister
5. Your closest friend
6. Your doctor or midwife
7. Baby's doctor
8. People at work
9. Other relatives
10. Other important people in your life

HOW MUCH DO YOU AGREE OR DISAGREE WITH THE FOLLOWING
STATEMENTS? (AGREE/DISAGREE)

1. I have the skills to breastfeed
2. I am physically able to breastfeed
3. I know how to breastfeed
4. I feel ready to breastfeed
5. I am determined to breastfeed
6. I can overcome any breastfeeding problems that occur
7. I feel in control over my breastfeeding
8. I am confident that I can breastfeed
9. I know that I will have enough milk for the baby
10. Breastfeeding is easy to learn
11. I have someone who will help me breastfeed, if needed
12. There is nothing that will stop me from breastfeeding

PLEASE DARKEN THE CIRCLE THAT CORRESPONDS TO YOUR ANSWER FOR
THE FOLLOWING QUESTIONS.

1. What did you have? (boy/girl)

2. How soon after birth did you first breastfeed your infant? (within first hour/by the
second hour/by the third hour/by the fourth hour/after four hours)

3. How much did your baby weigh? (less than 5 lbs/5lbs to 5-15 oz/6lbs to 6-15 oz/7lbs to
7-15 oz/8lbs to 8-15 oz/9lbs to 9-15 oz/10lbs or larger)

4. What type of birth did you have? (Vaginal birth/Cesarean birth)

5. What type of anesthesia did you have? (local/epidural/spinal/general/none)

6. To how many children have you given birth - including this infant? (one/two/three/four/five/more than five)

7. Has any close relative of yours breastfed a baby? (yes/no)

8. If yes, who? (mother/mother-in-law/sister/sister-in-law/other - please specify)

9. What is your ethnic background? (African-American/Asian/Hispanic/Native American/White/Other - please specify)

10. What is the highest educational level completed? (grade school/some high school/high school/some college/associate degree/baccalaureate degree/graduate education)

11. Marital status (single/married/separated-divorced/widowed)

12. What is your age? (18 to 20/21 to 23/24 to 26/27 to 30/31 to 33/34 to 36/37 to 40/41 to 43/44 or more)

Appendix C

Eight Week Follow-Up Phone Call Sheet

Number of weeks gestation at first BAPT (31/32/33/34/35/36/37/38/39/40)

1. Are you still breastfeeding? (yes/no)

2. Is baby getting breast-milk only or are you supplementing? (NA/breast only/

supplementing)

3. If not breastfeeding, how long did you breastfeed? (1 week/2 weeks/3 weeks/4 weeks/5

weeks/6 weeks/7 weeks)

4. Can you tell me why you stopped?

5. While you were in the hospital, did someone help you with breastfeeding? (yes/no)

6. If yes, can you tell me who helped you in the hospital?

7. Did you receive assistance with breast-feeding after you went home? (yes/no)

8. If yes, can you tell me who helped you at home?

9. If you had questions about breast-feeding your baby, how did you get them answered?