
Modified Breastfeeding Attrition Prediction Tool: Prenatal and Postpartum Tests

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Abstract

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In earlier studies, the Breastfeeding Attrition Prediction Tool (BAPT) demonstrated predictive validity in the postpartum period. The purpose of this study was to compare the effectiveness of a modified version of the BAPT when given in the last trimester (BAPT1) and following delivery (BAPT2) in predicting breastfeeding attrition among 117 women who planned to breastfeed for at least 8 weeks. Subjects completed the BAPT during a prenatal breastfeeding class and again at delivery, and they received a phone call at 8 weeks to determine breastfeeding status. In this study, neither of the two administrations of the BAPT was predictive of breastfeeding status at 8 weeks. Findings here may differ because subjects in the current study were all committed enough to attend breastfeeding class and, thus, varied less on commitment than women in earlier studies. Significant associations were found with level of education and having a close relative who breastfed. To assist the perinatal educator in identifying women most at risk for early cessation of breastfeeding, the use of three questions regarding level of education, family support, and breastfeeding preparation is suggested.

Journal of Perinatal Education, 13(1), 1–8; breastfeeding, lactation, relative, education, ethnicity.

The benefits of breastfeeding for infant and mother are well documented (Dennis, 2002; Department of Health and Human Services [DHHS], 2000; Work Group on Breastfeeding, American Academy of Pediatrics, 1997). Initiation of breastfeeding in the hospital increased to 69.5% of mothers in 2001. The proportion of women breastfeeding to 6 months also increased, but less

Modified Breastfeeding Attrition Prediction Tool: Prenatal and Postpartum Tests

potential exists for reaching the *Healthy People 2010* goal to have 50% of new mothers maintaining breastfeeding to 6 months (Davis, Okuboye, & Ferguson, 2000; Ryan, Wenjun, & Acosta, 2002). To meet the *Healthy People 2010* goal of increasing the duration of breastfeeding, emphasis will need to be placed on identifying those women most likely to stop breastfeeding in the early postpartum period. A screening instrument is needed to help identify those at risk for early attrition, thus requiring a greater share of limited care provider resources in health-care settings.

The Breastfeeding Attrition Prediction Tool (BAPT), developed and tested by Janke (1992, 1994), has demonstrated potential for identifying women at risk for early breastfeeding attrition. In a study conducted with 201 women in Alaska, the instrument correctly predicted breastfeeding status of 73% of the subjects at 8 weeks postpartum. In a replication study (Dick et al., 2002) with a more heterogeneous group of 269 women at four sites in the southeastern region of the United States, the BAPT correctly predicted 78% of first-time breastfeeders who stopped breastfeeding before 8 weeks postpartum. In both of these studies, the BAPT was administered in the early postpartum period. Identification of women at risk in the postpartum period is helpful. However, with short stays in the hospital following childbirth, nurses must focus on teaching the new mother how to care for herself and her newborn. If a woman at risk for early breastfeeding attrition is not identified until this point, little time is available for intervention. Therefore, this study examined the effectiveness of a modified BAPT given in the last trimester and in the first two days postpartum in predicting cessation of breastfeeding prior to 8 weeks.

Method

Setting and Sample

Subjects for the study were contacted at a specialty women's hospital in the southeastern region of the United States. Permission to conduct the study was obtained from the institutional review boards of the university and the hospital. Lactation consultants at the hospital teach regularly scheduled classes for women who plan to breastfeed, and the hospital sent a letter about the study to all women who registered for the

classes. The study was explained prior to the beginning of the first class. Women choosing to participate signed a consent form and completed the BAPT before class started or at the break. They also agreed to fill out a demographic form and complete a second administration of the BAPT while hospitalized for the birth of their child, and to receive a phone call at 8 weeks.

Women included in the study were attending regularly scheduled prenatal breastfeeding classes, were in 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 for at least 8 weeks. The 8-week period was chosen to be consistent with both Janke's (1992) original study and the replication by Dick and colleagues (2002). The decision to include only those women planning to breastfeed for the first time was based on the finding by Dick and colleagues (2002) that the BAPT failed to predict breastfeeding status in women who had previously breastfed.

One hundred forty-one women met the criteria for inclusion in the study and completed the first administration of the BAPT (BAPT1). Of these, 121 (85%) completed the second BAPT (BAPT2) during hospitalization. Subject attrition was related to delivery at another hospital, premature delivery and/or sick baby, change at the time of birth to formula as a method of infant feeding, and women having no interest in continuing to participate in the study. One hundred seventeen of the 121 (96%) women completing the BAPT2 were reached by phone at 8 weeks postpartum.

Instrument

The BAPT is based on the Theory of Planned Behavior (Ajzen, 1991), which has three constructs: attitude, subjective norm, and control. According to the Theory of Planned Behavior, people are more likely to engage in a behavior if they believe that carrying out the behavior will achieve a desired outcome (attitude), if the behavior is considered to be worthwhile by others whom the individual wishes to please (subjective norm), and if the individual believes that the behavior will be easy to perform (control). The BAPT (Janke, 1995) includes four subscales: positive breastfeeding sentiment attitudinal scale (PBS), negative breastfeeding sentiment attitudinal scale (NBS), social and professional support scale (SPS), and breastfeeding control

scale (BFC). The original BAPT (Janke, 1994, 1995) had 49 items. Dick and colleagues (2002) used the original items in their replication study, but Cronbach alpha analysis indicated that reliability could be increased by dropping several items from the instrument. Following factor analysis, which supported this finding, one item was dropped from the NBS scale and six items were dropped from the PBS scale. Reliabilities were recomputed and Cronbach alpha scores for the modified scales were acceptable (Control .864; PBS .815; NBS .784; and SPS .831). The modified BAPT was able to correctly predict infant feeding type at the eighth week among 73% of the first-time mothers who had planned to breastfeed for at least 8 weeks. It also accurately predicted 78% of the women who stopped breastfeeding before the eighth week.

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The PBS subscale consists of positive words or phrases about breastfeeding such as “convenient” and “satisfied baby.” The woman is asked to rate these items on a 5-point Likert-type scale (anchors: *breast to formula*) to indicate how these items describe breastfeeding or formula feeding. She is then asked to rate the importance of the same items in her choice to breastfeed or bottle-feed on another 5-point Likert-type scale (anchors: *important to not important*). The items are multiplied (attitude with corresponding importance) and then summed to create a score for positive breastfeeding attitudes. The original PBS scale contained 18 items. Based on the results of the study by Dick and colleagues (2002), six items were dropped. The modified PBS scale consisted of 12 items, with scores ranging between 12 and 300. Higher scores indicated more positive attitudes toward breastfeeding.

The NBS scale is identical in structure and scoring to the PBS scale, but contains words and phrases with negative connotations such as “messy” and “hard to do in public.” As with the PBS scale, items found not help-

ful in predicting early breastfeeding attrition in the study by Dick and colleagues (2002) were dropped. In this study, the scale contained eight items. Scores could range from 8 to 200, with lower scores indicating more negative attitudes.

The SPS scale lists 10 categories of significant others, such as the baby’s father and the woman’s mother, sister, doctors, and friends. The woman is asked to rate on a 5-point Likert scale how these people think she should feed her baby (anchors: *breastfeed to formula feed*). Then, she is asked to rate how much she cares about that person’s opinion on another 5-point Likert scale (anchors: *important to not important*). Scores for the items on these two scales are multiplied and, then, summed to create the SPS score, with a possible range of 10–250. Higher scores indicate greater support for breastfeeding.

Finally, the BFC scale is a set of 12 items such as “I have the skills to breastfeed.” The woman is asked to indicate the extent of her agreement (anchors: *agree to disagree*) with these statements on a 5-point Likert scale. The control scale has a possible range of 12–60; higher scores indicate a stronger sense of control and ability to breastfeed.

Demographic data collected postdelivery included parity, sex, and weight of the baby, the type of delivery and anesthesia, the time when the first breastfeeding occurred, age, and marital status. In addition, information was collected related to ethnicity, level of education, and whether the woman had a close relative who had breastfed. The decision to include information about ethnicity, education, and relatives was based on earlier research that indicates these variables influence breastfeeding duration (Aikin, 1999; Buckner & Matsubara, 1993; Forste, Weiss, & Lippincott, 2001; Ryan et al., 2002).

At the 8-week follow-up phone call, each woman was asked whether she was still breastfeeding and, if so, whether the baby was receiving breast milk only or breastfeeding was being supplemented with formula. If not breastfeeding, the woman was asked how long she breastfed and why she decided to stop. Because support has been identified as an important factor in continued breastfeeding (Aikin, 1999; Dennis, 2002; Dennis, Hodnett, Gallop, & Chalmers, 2002; DHHS, 2000; Humenick, Hill, & Wilhelm, 1997), all women were asked about any help they had received with

Modified Breastfeeding Attrition Prediction Tool: Prenatal and Postpartum Tests

breastfeeding both in the hospital and at home, and how they had obtained answers to any questions they had about breastfeeding.

Results

Demographics

The subjects were predominantly non-Hispanic White ($n = 92$; 79%). Twenty-one (18%) were African-American and four (3%) were Asian or Hispanic. Most subjects were married (90%), and all were at least 21 years old, with 57 (49%) in the 27- to 30-year-old age range. Most women ($n = 93$; 80%) had vaginal deliveries. Education levels were 32% with less than a college degree, 47% with a college degree, and 30% with graduate work.

At 8 weeks, 90 (75%) of the women were still breastfeeding. Among these women, 61 (67%) were giving only breast milk and 30 (33%) were supplementing with formula. Of the 29 (25%) women who stopped breastfeeding before 8 weeks, 13 (43%) stopped breastfeeding by 2 weeks. This finding is consistent with other studies (Dick et al., 2002; Ertem, Votto, & Leventhal, 2001).

Reliability and Validity of the BAPT

Internal consistencies of the subscales were tested at the prenatal and postpartum administrations of the BAPT using Cronbach's alpha (see Table 1). At the prenatal administration, the reliability coefficient for the

Table 1 Internal Consistency Reliability: Prenatal and Postpartum Administration of the Modified Breastfeeding Attrition Prediction Tool (BAPT; $n = 114$, 3 incomplete)*

Scale	Prenatal (BAPT1)	Postpartum (BAPT2)
Positive Breastfeeding Sentiment (PBS)	.845	.840
Negative Breastfeeding Sentiment (NBS)	.673	.831
Social and Professional Support (SPS)	.753	.815
Breastfeeding Control (BFC)	.868	.878

*Modified from Janke, J. R. (1995). *Scoring guidelines for the revised Breastfeeding Attrition Prediction Tool (BAPT)*. Unpublished manuscript, University of Alaska, Anchorage.

NBS scale was problematic (0.67). The other scales ranged from 0.75 to 0.87. At the postpartum administration, all scales had acceptable reliability coefficients exceeding 0.80.

Paired t tests were conducted to identify changes in the scores on the BAPT scales between the prenatal and postpartum administrations (see Table 2). No significant changes occurred in the means on either of the attitude subscales. However, significant differences existed on the control and support subscales. Women reported a greater sense of control and had higher support (SPS) scores in the postpartum period.

A stepwise discriminant function analysis was performed to determine the ability of the modified BAPT to predict early breastfeeding attrition when administered in the last trimester of pregnancy and in the hospital. None of the four subscales was a significant predictor at either administration. The stepwise function accounted for less than 4% of the variance (Wilks's lambda = .956; $p > .05$) in the prenatal administration and 3% of the variance (Wilks's lambda = .97; $p > .05$) in the postpartum administration. The BAPT predicted 58.5% of women who ceased breastfeeding by 8 weeks when administered in the prenatal

Table 2 Paired t test Comparisons of Responses to the Modified BAPT at Prenatal and Postpartum Administrations*

Scale	Mean (SD)	t score	p
Positive Breastfeeding Sentiment (PBS)			
• Prenatal	203.6 (42.3)	-.650	.58
• Postpartum	206.2 (42.2)		
Negative Breastfeeding Sentiment (NBS)			
• Prenatal	73.1 (22.7)	1.65	.10
• Postpartum	69.4 (26.9)		
Social and Professional Support (SPS)			
• Prenatal	101.1 (42.6)	-4.09	<.01
• Postpartum	117.0 (46.3)		
Breastfeeding Control (BFC)			
• Prenatal	46.5 (7.4)	-5.32	<.01
• Postpartum	50.7 (6.4)		

*Modified from Janke, J. R. (1995). *Scoring guidelines for the revised Breastfeeding Attrition Prediction Tool (BAPT)*. Unpublished manuscript, University of Alaska, Anchorage.

Table 3 Prenatal (BAPT1) Comparison of Predicted and Actual Feeding Status at 8 Weeks ($N = 117$)

Predicted Feeding Method	Actual Feeding Method at 8 Weeks	
	Breastfeeding n (%)	Bottle-Feeding n (%)
Breastfeeding	53 (60%)	13 (45%)
Bottle-Feeding	36 (40%)	16 (55%)

Note: Wilks's lambda = .956, $p > .05$. Overall correct classification = 58.5%.

Table 4 Postpartum (BAPT2) Comparison of Predicted and Actual Feeding Status at 8 Weeks ($n = 105$)

Predicted Feeding Method	Actual Feeding Method at 8 Weeks	
	Breastfeeding n (%)	Bottle-Feeding n (%)
Breastfeeding	53 (60%)	15 (52%)
Bottle-Feeding	36 (40%)	14 (48%)

Note: Wilks's lambda = .97; $p > .05$. Overall correct classification = 56.5%.

period (see Table 3) and 56.5% when administered in the postpartum period (see Table 4).

Ethnicity and Breastfeeding

In this sample, no association existed between ethnicity and breastfeeding status at 8 weeks. Because inadequate numbers of Hispanic, Asian, and other groups were available, comparisons were made between the African-American and White women only. Fifteen (71.4%) of the African-American women and 70 (76%) of the White women were still breastfeeding at 8 weeks. This figure differs from other studies, which have reported lower rates of breastfeeding among non-White women (Dennis, 2002; Forste et al., 2001).

Education and Breastfeeding

Of the 115 women reporting their level of education, six (5%) reported a high-school diploma or less, 21 (18%) reported some college, 10 (9%) reported having earned an associate degree, 47 (41%) had a baccalaureate degree, and 31 (27%) had either completed coursework toward or earned a graduate degree.

A significant association existed between educational level and breastfeeding status at 8 weeks. The higher the level of education, the more likely the women were to be still breastfeeding (see Table 5). In the group of women with some college work or less, 62% were still breastfeeding; in the group holding a college degree, 79% were still breastfeeding; and in the group with the highest level of education, 87% were still breastfeeding.

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Relative Who Breastfed and Breastfeeding

The women were asked to indicate if they had a close relative who breastfed. Ninety-one women (79%) said "yes." A second question asked them to indicate who the relative was. Options included mother, mother-in-law, sister, sister-in-law, or other. Forty (44%) reported knowing "several people" who had breastfed an infant, and 14 (15%) said their mothers had breastfed. Other relatives identified included cousins and grandmothers. Several women entered "friend" under the category of "other."

Table 5 Breastfeeding at 8 Weeks and Ethnicity, Education, and Relatives Who Breastfed

Variable	Breastfeeding Status		χ^2	p
	Breast-feeding n (%)	Bottle-Feeding n (%)		
Ethnicity				
• African-American	15 (71%)	6 (29%)	0.856	.90
• White	70 (76%)	22 (24%)		
Education				
• Less than College	23 (62%)	14 (38%)	5.835	.05
• College Degree	37 (79%)	10 (21%)		
• Graduate Work	26 (87%)	4 (13%)		
Relative/Friend				
• Yes	73 (82%)	16 (18%)	9.494	.002
• No	13 (52%)	12 (48%)		

A significant association was found between having a close relative who had breastfed an infant and breastfeeding status at 8 weeks (see Table 5). Eighty-two percent ($n = 73$) of the women who were still breastfeeding had a close relative who breastfed, while only 52% ($n = 13$) of those who were no longer breastfeeding had a close relative who breastfed ($\chi^2 = 9.49$; $p < .01$).

Discussion

Two previous studies in which the BAPT was administered in the postpartum period were able to predict women at risk for early breastfeeding attrition (Dick et al., 2002; Janke, 1994). In this study, the BAPT was not an effective predictor of early attrition at either the prenatal or postpartal administrations.

Changes in attitudes about breastfeeding between the last trimester and the early postpartum period were not significant, indicating that, in this group, attitudes were stable by the third trimester. This is consistent with findings from Losch, Dungy, Russell, and Dusdieker (1995) that women tend to make the decision early in their pregnancies about how they will feed their infant.

Significant changes occurred between prenatal and postpartal administrations in scores on both the Social and Professional Support scale and the Breastfeeding Control scale. The increase in the support scale might be attributable to more awareness of what others thought about feeding once the baby was born. For example, mothers may not have discussed infant feeding with the baby's doctor until after delivery. The increase in scores on the control scale may be attributable to the actual experience of breastfeeding rather than the perception of what it might be like. Given these changes, the BAPT could be expected to be a more effective indicator in the postpartum period. This was not the case.

These results can be examined from several perspectives. The earlier samples may have contained women who were less committed to breastfeeding and more willing to express negative sentiments about breastfeeding. All subjects in this study were emotionally invested in plans to breastfeed and had voluntarily taken the step to attend prenatal classes on the topic. In the earlier studies by Janke (1994) and Dick and colleagues

(2002), women were recruited after delivery, and no information was collected about attendance at prenatal breastfeeding classes.

All the subjects in this study were recruited during the first of two breastfeeding classes taught by lactation consultants employed by the hospital where the women planned to deliver. Additionally, the same lactation consultants who taught the classes also provided assistance with breastfeeding on the postpartum unit. Standards of nursing practice at this hospital require demonstrated competency in breastfeeding education of all nurses on intrapartum and postpartum units. The preceding factors may have reduced the variability in the sample and, thus, limited the effectiveness of the BAPT in predicting breastfeeding status at 8 weeks. The BAPT, therefore, may not be useful as a predictor with mothers who voluntarily attend prenatal breastfeeding classes or in settings where breastfeeding classes are taught by perinatal educators who also see mothers postpartally, and where demonstrated competency in breastfeeding education assures consistency in what women are taught.

In the meantime, perinatal educators continue to face the challenge of identifying which new breastfeeding mothers may need the most support. Women having difficulty in the hospital with breastfeeding and those who ask numerous questions are easily identified as needing additional support and education. However, women at high risk for early attrition may be missed if they are not having initial difficulty with breastfeeding or asking questions. Therefore, we examined additional factors that might be helpful in identifying women more likely to stop breastfeeding early.

A study using a large national database (Forste et al., 2001) found that African-American women are less likely to breastfeed even after controlling for education. Dennis (2002) reported similar findings in a review of breastfeeding literature from 1990 to 2000. The findings of earlier studies were inconsistent with the current findings of no difference between African-American and White women in breastfeeding status at 8 weeks. African-American women in the current study had already made the decision to breastfeed and made the additional commitment to attend breastfeeding classes. It is possible that such commitment eliminates the effect of ethnicity on breastfeeding attrition.

Conclusion

Two variables were significant predictors of attrition in this study. Women with less than a college education were less likely to be breastfeeding at 8 weeks than those with baccalaureate education. Additionally, women with a baccalaureate education were less likely to be breastfeeding than those with a graduate education. This finding is consistent with the direction of outcomes reported by Ryan and colleagues (2002). Differences in rates of continued breastfeeding may be a matter of education or related to economic status, the need to return to work, type of employment, or other factors. Whatever the underlying cause, educational level appears to be useful in determining needs for intervention to reduce early cessation of breastfeeding.

A clear relationship was found between having a relative and/or close friend who had breastfed and breastfeeding status at 8 weeks. This finding is consistent with studies that identify the importance of support from family members (Humenick, Hill, Thompson, & Hart, 1998; Humenick et al., 1997; Myerink & Marquis, 2002) and the effectiveness of programs using peer counselors (Dennis et al., 2002). Thus, it would be helpful to know if new mothers have such a person and whether the mother views this person (or these people) as supportive. If possible, it may be helpful to involve these supportive persons in educational sessions. Women who lack this form of informal support may need greater access to professional help with problem-solving skills in order to avoid difficult times with breastfeeding.

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Perinatal educators may want to consider the use of the following three questions to assess risk for early breastfeeding attrition:

1. What is the highest level of school you have attended?

Perinatal educators continue to face the challenge of identifying which new breastfeeding mothers may need the most support.

2. Do you have a close relative or friend who has breastfed a baby and to whom you feel comfortable talking?
3. Did you attend breastfeeding classes?

Based on the results of this study that a higher level of education and knowing someone who has breastfed were found to be significant and that commitment to breastfeeding appears to be higher in those who attended classes, asking about these factors could serve as a rapid means of screening for potential early breastfeeding attrition. These questions could be used at any time in the pregnancy to identify women in need of increased intervention.

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Modified Breastfeeding Attrition Prediction Tool: Prenatal and Postpartum Tests

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