

Prenatal breastfeeding intervention program to increase breastfeeding duration among low income women

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ABSTRACT

Extensive research confirms the nutritional, economic, biomedical, immunological, and psychological advantages of breast milk. Despite the clear benefits of breastfeeding to mother and infant, breastfeeding rates today continue to remain below the recommended levels in the United States, most notably among low-income mothers. One factor that plays a role in breastfeeding success and may be modifiable by nursing intervention is maternal self-efficacy. This study aimed to increase the breast-feeding duration through an intervention based on Dennis's Breastfeeding Self-Efficacy Theory. A quasi-Experimental design was used to test the effect of the intervention program on duration of breastfeeding. A convenience sample of 37 low-income women was recruited from two rural prenatal clinics in the Midwest. Data were collected using the Breastfeeding Self-Efficacy Scale (BSES) and a demographic profile. Women were contacted by telephone at two and six weeks postpartum to determine if they were still breastfeeding and to complete the BSES. The women who were assigned to a breast-feeding self-efficacy intervention showed significantly greater increases in breast-feeding duration and self-efficacy than did the women in the control group. The results of this study suggest that the one-hour of breastfeeding intervention program during the prenatal period may increase the duration of breastfeeding in low-income women who intend to breastfeed. This study supports the literature which found that prenatal education and postpartum support are important to the outcome of breastfeeding.

Keywords: Breastfeeding; Self-Efficacy; Intervention; Low Income

1. INTRODUCTION

Breastfeeding has long been recognized as the preferred method of feeding in the first year of life [1]. Extensive research confirms the nutritional, economic, biomedical, immunological, and psychological advantages of breast milk. Despite the clear benefits of breastfeeding to mother and infant, breastfeeding rates today continue to remain below the recommendation levels in the United States (US), most notably among low-income mothers. The decline of breastfeeding in the United States has been most marked among low-income women. It is reported that 38.9% of low-income women initiate breastfeeding in the hospital compared to 66.1% of women from middle- and high-income groups [2]. In addition; rates of exclusive breastfeeding are even lower in low-income populations, minority/racial groups, and adolescents [3].

When women initiate breastfeeding, the majority of breastfed infants are weaned before they are three months of age. A number of variables have been associated with this early weaning. These variables are sometimes classified as modifiable or non-modifiable. The evidence has demonstrated the impact of non-modifiable factors, such as maternal age, parity, race/ethnicity, and economic status, on breastfeeding. Breastfeeding rates have been found to be higher among women who are Caucasian, older, with higher education, and not participating in the Women, Infants [4-9]. Modifiable factors such as maternal attitudes and self-efficacy demonstrate a positive relationship with continued breastfeeding and some evidence exists that these variables may be modifiable to impact the breastfeeding experience [10-16]. One factor that plays a role in breastfeeding duration and may be modifiable by nursing intervention is maternal self-efficacy [11,12,15]. Past studies suggest that maternal confidence in breastfeeding affects intended duration of breastfeeding and that both are predictor of breastfeeding success [12,15,17]. Specifically, woman with a higher perceived self-efficacy for breastfeeding tend to initiate breastfeeding and persist even through challenges, whereas a woman

with a lower perceived self-confidence may decide not even to initiate breastfeeding or wean prematurely due to lack of confidence or effective coping skills [17-20].

The importance of breastfeeding education in supporting breastfeeding has not been clearly demonstrated in past research. Some studies identified education as a factor related to breastfeeding success [21,22], while other studies have reported nonsignificant results of education's effect on breastfeeding success [23]. The majority of current research indicates that maternal breastfeeding confidence is positively associated with breastfeeding duration [12, 15,17]. The author suggests that maternal breastfeeding confidence plays a major role in helping mothers have a successful breastfeeding experience, leading to breastfeeding satisfaction and increase breastfeeding duration. Studies on prenatal support and education are often lacking in the provision of consistent information and technique demonstration and practice.

The nursing intervention that was used in this study is flexible enough to meet the mother needs. It includes prenatal preparation and used all four sources of information to enhance women's self-efficacy judgment. Considering women's early discharge from the hospital, the first two weeks after delivery are the time of professional unavailability, and many breastfeeding women are left without assistance. This intervention continued to follow the women up to six weeks postpartum to provide consistent, structured information, techniques demonstration, practice and caring supportive attitude. Education aimed to increase a women's self-efficacy will provide more theoretically sound and empirically verifiable information on self-efficacy effect on breastfeeding behavior.

The purpose of the this study is to test the efficacy of the Breastfeeding Self-Efficacy Intervention Program (BSEIP), which is based on Dennis's (1999) breastfeeding self-efficacy theory, to increase breastfeeding duration.

The following hypotheses will be tested:

1) Women who receive the Breastfeeding Self-Efficacy Intervention program (BSEIP) prenatally will report higher breastfeeding self-efficacy on the Breastfeeding Self-Efficacy Scale (BSES) at two and six weeks postpartum than women who do not receive the BSEIP prenatally.

2) Women who received BSEIP prenatally will breastfeed their infants significantly longer than women who do not receive the BSEIP prenatally.

2. METHOD

2.1. Design

The research design chosen for this study is a quasi-experimental with repeated measures to test the effect of a breastfeeding self-efficacy intervention program (BSEIP) on breastfeeding self-efficacy and duration. The design was selected to estimate a treatment effect by comparing

two groups of individuals, one group that receives the treatment (Experimental Group), and the second group does not receive the treatment (Control Group).

2.2. Setting and Participants

The target population consisted of pregnant women who had not previously breastfed a child longer than two weeks, and were between 28 and 38 weeks of pregnancy at the time of enrollment. The women received their prenatal care either at the Warren County Health Clinic (Clinic A) or at the Middletown Regional Hospital prenatal clinic (Clinic B). Both prenatal clinics are located in the same geographic area outside a large metropolitan area in the state of Ohio, and each serves predominately low-income, non-Hispanic White women (90% White, 5% African American, 3% Hispanic, and 2% others). The majority of women served by these clinics are low-income: 75% are eligible for Medicaid. Currently, there is no breastfeeding intervention program available at either of the two clinics.

2.3. Data Collection

Demographic data was collected using a tool developed for this study by the investigator. Subjects were asked to give information on income, education, number of children, marital status, race, employment, intention to breastfeed, and pregnancy history.

Breastfeeding Self-Efficacy was measured using the Breastfeeding Self-Efficacy Scale (BSES) [18]. The BSES is a 33-item self-report instrument that assesses breastfeeding self-efficacy expectancies in new mothers [18]. The initial Cronbach's Alpha coefficient for BSES was .96 with 73% of all corrected items total correlations ranging from 0.30 to 0.70. The BSES scores predicted which women would still be breastfeeding at six weeks postpartum ($f = 9.89$, $P < 0.001$). All items are preceded by the phrase "I can always" and anchored with a 5-point likert scale, where 1 = not at all confident and 5 = very confident. Items are summed to produce an overall score ranging from 33 to 165, with higher scores indicating higher levels of breastfeeding self-efficacy [18-20].

Breastfeeding duration was measured as the number of days from the first to last breastfeeding through the final data collection on the 42nd day. Because the six week postpartum follow-up call took place within two weeks of this time, duration of breastfeeding could be reported from 0 to more than 42 days. For the purposes of this study, the maximum breastfeeding duration was cut off at 42 days. In order to assess breastfeeding status, a specific script was designed to collect data during the follow-up telephone calls. Mothers were asked if they were still breastfeeding and depending on their answers, specific questions were asked.

2.4. Procedure

This study was approved by the University of Cincinnati Institutional Review Board. Women who agreed to participate were asked to sign the consent form, complete the demographic prenatal form and complete the BSES. The researcher maintained contact with all participants at their respective institution as their due dates drew near. All participants were contacted at two weeks following the birth of their infant by telephone or in person to determine breastfeeding status and to complete the BSES. If the mothers were still breastfeeding at two weeks postpartum, they were contacted again by telephone or in person at six weeks postpartum to determine if they were still breastfeeding, and, if not, when they stopped breastfeeding.

Subjects assigned to the Experimental Group were asked to meet the researcher two hours prior to their next prenatal appointment (after recruitment) to take part in the prenatal breastfeeding class. The BSEIP occurred during several time periods: the prenatal class and at two follow-up telephone calls—at one week and at two weeks postpartum. The nursing actions for the BSEIP included: education, assessment, encouragement/support, referral, physical assistance, and availability (by telephone or in person). Participants in the Experimental Group watched a 15-minute video about breastfeeding during the prenatal class, discussed normal physiological changes that occur during the postpartum period, and received explanations of how to evaluate milk supply and interpret infant cues.

Subjects were sent home with a written copy of the BSEIP that discussed the four steps of breastfeeding: positioning, offering the breast, effective sucking, and breaking suction. Research has demonstrated that these behaviors are important to the success and duration of breast-

feeding [9,22].

2.5. Breastfeeding Self-Efficacy Intervention Program (BSEIP)

The intervention program for this study was based on the four major sources of information that provide information for cognitive processing in the development of a self-efficacy judgment, namely, performance accomplishments; vicarious experiences; verbal persuasion; and physiological responses. Nursing intervention developed to manipulate these sources of information to enhance self-efficacy judgments of women who intended to breastfeed and to promote successful breastfeeding (see **Tables 1 and 2**).

3. RESULTS

3.1. Sample

A convenience sample of 37 women from two prenatal clinics was recruited to take part in this study. Because of the organization of each clinic, it was decided that randomization within clinics to Control and Experimental Groups could not be done without contamination across Groups. Therefore, women recruited from Clinic A served in the Control Group, while women recruited from Clinic B served in the Experimental Group. Seventeen women attending Clinic A (Control Group) and 19 women attending Clinic B (Experimental Group) agreed to participate in this study. Informed Consent was obtained from all women by the principal investigator. Two women in the Experimental Group did not complete the postpartum data collection, two women in the Control Group did not complete any data collection postpartum. Therefore, complete data was obtained on 15 women in the Control Group and 17 women in the Experimental Group.

Table 1. Study procedure summary.

Experimental Group	Both Groups (Experimental and Control)
Subjects were asked to meet the researcher two hours prior to the next prenatal appointment, and will receive a prenatal breastfeeding class	Prenatal period: <ul style="list-style-type: none"> • Participants recruited for the study, by the investigator and the research assistant, at the prenatal clinic waiting area during the time that they were waiting to see the physician for routine third trimester prenatal care. • At that time, the investigator or the research assistant provided an overview of the study. • Subject who agreed to participate: 1) signed the consent form, 2) completed the demographic prenatal form and 3) Completed a breastfeeding self-efficacy scale.
Postpartum At one and two weeks: telephone contact with the Experimental Group subjects in the first and second weeks after delivery, involved extensive evaluation of the mother-infant breastfeeding situation. Also, mother’s description of positioning, pain, infant cues of hunger, and her general level of anxiety was evaluated by the researcher	Postpartum: Two and six weeks: all participants were contacted at two and six weeks following the birth of their babies by telephone to determine breastfeeding status and to complete the BSES.

Table 2. BSEIP content, source of self-efficacy information.

BSEIP Content	Source of Self-Efficacy Information
<p>Performance Accomplishment: Social cognitive theory (Dennis, 1999) is concerned with the acquisition of cognitive and behavioral skills as well as with knowledge of what leads to what. Mastery of a task conveys new efficacy information, thus raising ones efficacy appraisal (Bandura).</p>	<p>Holding and positioning infant for breast-feeding, qualities and appearance of breast-milk, how to pump and store milk. Specific techniques practiced (using a doll) were: 1) positioning 2) offering the breast 3) evaluating effective sucking breaking suction Avoiding embarrassment, breast-feeding discreetly, practice will take place using a doll. After delivery the researcher continued to discuss and assess problems with mechanics of breastfeeding through telephone consultations at two weeks post- delivery.</p>
<p>Vicarious experience: Modeled success by similar others raises self-efficacy while modeled failures lower self-efficacy (Bandura, 1986).</p>	<p>Assessment of previous experience or knowledge about breastfeeding (role models) will provide information upon which the learning sessions will build. Many women who are preparing for breastfeeding seek vicarious experience through books or videos about breastfeeding, or they hear other women recount their experience. This experience were provided to the mothers in the prenatal class by the researcher demonstrating the mechanics with a doll, and with a video</p>
<p>Verbal persuasion: involves realistic feedback on performance of the behavior. Women may be verbally persuaded by lactation consultant or educator whose attempts to infuse women with confidence in their abilities to breastfeed have been shown to significantly prolong breastfeeding duration (Dennis, 1999)</p>	<p>In the prenatal class this was occurred while women practice the mechanics of breastfeeding. Researcher discussed the benefits and the barriers of the breastfeeding. The researcher was also provided verbal feedback through telephone consultations. Advice to breast-feed based upon health promotion of mother, infant, and family economics charts illustrating nutritional qualities of breast-milk as compared to formula will be used; convenience of breast-feeding, handouts were given. Throughout the intervention, participants were encouraged to breastfeed "early and often" and to avoid the use of formula supplementation in order to facilitate establishment of breast milk.</p>
<p>Physiological status: involves women's' interpretations of physical signs of arousal. This area for breastfeeding mothers is important because increased anxiety has a direct effect on milk ejection reflex and can decrease milk supply. Situations that involve pain, anxiety and stress inhibit the hormone oxytocin and may lead to poor letdown reflex and the insufficient milk syndrome</p>	<p>The researcher was provided the mother with information prenatally regarding normal physiological changes in breastfeeding women, how to interpret infant cues and signals. Because the intervention session will be provided in the prenatal period, anticipatory guidance and informational handouts will assist the mother in knowing what to expect.</p>

3.2. Demographics Characteristics

The demographic characteristics of each Group are reported in **Table 3**. There were no statistically significant differences between the two groups. All of the women in the Control Group and 13 of the 18 (72%) women in the Experimental Group were non-Hispanic White. Although not statistically significant, more women in the Control Group than in the Experimental Group were primipara (80% versus 53.7%, respectively; $t(30) = -2.345$, $p = 0.026$); women in the Experimental Group tended to have higher incomes than women in the Control Group (see **Table 4**).

3.3. Hypotheses Testing

The mean BSES score was 108.33 (SD = 30.29) and 108.52 (SD = 28.27) for the Control and Experimental Group, respectively [$t(30) = -1.09$, $p = 0.95$].

Hypothesis 1: Independent t-tests revealed that women who received the intervention reported a significantly higher BSES score at Time 2 (two weeks postpartum) and Time 3 (6 weeks postpartum) than women who did

not receive the intervention; $t(30) = -2.33$ ($p = 0.026$) and $t(30) = -3.97$ ($p = 0.00$) at Time 2 and Time 3, respectively. **Table 4** provides the means, ranges, and standard deviations for BSES scores at Time 1, Time 2, and Time 3. As noted in **Table 4**, there was also a positive significant improvement in the BSES score of the women in the Experimental Group from Time 1 ($M = 108.3$) to Time 2 ($M = 135.9$) and Time 3 ($M = 143.7$).

Hypothesis 2: Breastfeeding duration was determined by follow up telephone calls at six week postpartum. When asked at the prenatal visit, all mothers (in both experimental and control groups) intended to at least initiate breastfeeding in the postpartum period; 64% of the women in the Experimental Group and 53% of women in the Control Group intended to breastfeed more than six weeks.

The analysis revealed a statistically difference between the Control and Experimental Group ($t(30) = -3.02$, $p = 0.003$) on number of days the women breastfed. Women in the Experimental Group demonstrated a significant increase in the breastfeeding duration than did women in the Control Group.

Table 3. Sociodemographic characteristics of subjects by Group.

Variable	Control N = 15 N (%)	Experimental N = 17 N (%)	Significance χ^2
Plan to Breastfeed	<six weeks	7 (46.7%)	0.513
	>six weeks	8 (53.3%)	
Level of Education	<high School	3 (20.0%)	0.522
	Some college	7 (46.7%)	
	Associated degree	4 (2.7%)	
	Bachelor degree	1 (6.7%)	
Race	0 (0%)	2 (11.8%)	0.497
	Non-Hispanic White	15 (100%)	
	Non-Hispanic Black	13 (76.5%)	
	Hispanic	2 (11.8%)	
Income	Asian	1 (5.9%)	0.093
	Less than 10,000	9 (60.0%)	
	Less than 20,000	2 (13.3%)	
	Less than 30,000	1 (6.7%)	
	Less Than 40,000	1 (6.7%)	
	More than 40,000	0 (0%)	
Work	missing	1 (6.7%)	0.497
	Full time	5 (33.3%)	
	Part time	1 (6.7%)	
	Not employed	8 (53.3%)	
Number of children	student	1 (6.7%)	t(30) = -2.345, p = 0.026
	No children	12 (80%)	
age	1 or more	3 (20%)	0.468 t(30) = -1.900 p = 0.067
	<20	2 (13.3%)	
	20 - 24	11 (73.5%)	
	25 - 29	1 (6.7%)	
	30 - 35	1 (6.7%)	
Pre-treatment BSES	Mean	22.26	t(30) = -109 p = 0.985
		107.2	
		108.5	

Table 4. Mean BSES score by Time and Group and mean breastfeeding duration by Group at Time 3.

Variable	Control (n = 15)	Experimental (n = 17)	P value
BSES Time 1	108.33	108.52	0.985
Range	33 - 143	71 - 155	
Std.	30.29	28.26	
BSES Time 2	107.20	135.9	0.026
Range	48 - 150	52 - 162	
Std.	27.88	31.06	
BSES Time 3	107.20	143.76	0.000
Range	41 - 163	45 - 164	
Std.	32.09	37.98	
Breastfeeding duration in days at 6 weeks	11.86	28.82	0.003
Range	0 - 42	10 - 42	
Std.	15.63	13.48	

4. RESULTS

The relationship between breastfeeding self-efficacy at Time 1 for the total sample was found to be positive and not significant ($r = -0.054$). There was, a significant relationship between breastfeeding self-efficacy and breastfeeding duration ($r = 0.531$, $p = 0.01$; and, $r = 0.370$, $p = 0.05$) at Time 2 and Time 3, respectively. Maternal breastfeeding self-efficacy during the prenatal period (BSES Time 1) was not related to breastfeeding duration in this

study. In contrast, however, breastfeeding self-efficacy at 2- and 6-weeks postpartum was significantly related to breastfeeding duration.

The literature on breastfeeding provides strong support for the development of this intervention, and the results of this study were congruent with findings of earlier studies [13,15,17,22]. Encouraging early and frequent mother contact for breastfeeding [5], and support through telephone contact in the early postnatal period [15,18].

Both hypotheses in this study were supported. Mothers who received the intervention had higher BSES scores postpartum and breastfed for significantly longer than mothers who did not receive the intervention. These results support Dennis' (1999) BFSE Theory and provide empirical support for the manipulation of self-efficacy to affect breastfeeding behavior. The results examined from the Experimental Group supported the BFSE Theory in a number of ways. First, high self-efficacy scores predicted the continuation and maintenance of breastfeeding behavior regardless of obstacles [17,18]; in this case the obstacle was defined by the fact that all women received formula samples in the hospital and no women in the Experimental Group received lactation consultation. Second, the high breastfeeding duration rate demonstrated by the Experimental Group, as compared to the Control Group,

suggests that the intervention, including prenatal information and postpartum follow-up, enhanced breastfeeding self-efficacy and duration in a group of low-income women. Third, BFSE Theory states that the enactive attainment and verbal persuasion will enhance self-efficacy [18]. Verbal persuasion was evident in the actual practice of the breastfeeding and support from the researcher and research assistant. Results showed an increase of breastfeeding self-efficacy score from pre-test (before the treatment) to post-test (2 weeks postpartum).

The sample in this study was composed of mainly non-Hispanic White, low income women, a group that has a historically low rate of breastfeeding. The 6-week continuation rate was 43.81% for our sample, compared to the national 6-week continuation rate of 32.2 [2]. Of the 36 participants who enrolled in the study, one infant developed a medical condition and was unable to continue, three women were lost to follow-up at 2- or 6-weeks postpartum. The strong support provided to the women in both groups may have made them feel more committed to continuing participating in the study. Another factor that might have contributed to the continuation of breastfeeding in this sample was the women's prenatal intention to breastfeed.

The results of this study are consistent with the research which has documented the effects of follow up and support on breastfeeding outcomes and has found that nursing support during the first two weeks postpartum period can have the greatest positive effect on the breastfeeding outcome [17,23]. Fewer women Experimental Group were primiparous (43.7%) as compared to women in the Control Group (80%). This may have contributed to the higher BSES scores reported by the Experimental Group at Time 2 and 3.

5. CONCLUSIONS

The results of this study suggest that the BSEIP, which incorporated the four principle sources of information from the Breastfeeding Self-Efficacy Theory, contributed to an increase in the mothers' breastfeeding self-efficacy that was sustained over time, and increased breastfeeding duration. Breastfeeding mothers who received the intervention felt more confident in their ability to breastfeed than mothers who did not receive the intervention program. The intervention provided in this study was different from other interventions reported in the literature in that it used specific and consistent information on technique and physical practice of breastfeeding skills.

There was a positive relationship between self-efficacy and health behavior maintenance, as evidenced by high breastfeeding self-efficacy posttest scores and high breastfeeding continuation rate, which in turn supports the usefulness of breastfeeding self-efficacy as a manipulatable factor, which can be precisely measured in task and

action.

Findings suggest that a one-hour intervention during the prenatal period, including all the components to enhance mother's self-efficacy, and support from the researcher during the postpartum period, may make a difference in a sample of low income women who intend to breastfeed. This study supports literature findings that prenatal education and postpartum support are important to the outcome of breastfeeding.

6. LIMITATIONS

This study has a number of limitations. The use of a non-probability convenience sample did not reflect a diverse population, limiting the extent of generalizability of the findings to other breastfeeding mothers of different backgrounds. This study also used a small sample. It was difficult to recruit subjects to this study; most of the women in the two clinics did not intend to breastfeed and therefore, did not meet the inclusion criteria. The possibility of the response bias was considered as participants completed questionnaires related to their caregiving abilities in relation to infant breastfeeding. It was recognized that participants may tend to give favorable responses so that they will be perceived as competent mothers. The intervention in this study was done individually for each woman, a technique that is probably not feasible in a busy clinical setting for staff nurses.

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