

# Evaluating the Effectiveness of Using a Progressive Muscle Relaxation Technique on the Self-Efficacy of Breastfeeding in Mothers With Preterm Infants

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## ABSTRACT

**Background:** Breast milk is a God-given gift that conveys a mother's love and compassion and that is made according to the needs and age of the child. Mothers who are interested in the welfare of their newborns tend to breastfeed their children. Training programs have been shown to improve breastfeeding self-efficacy in terms of both duration and amount.

**Purpose:** The aim of this study was to evaluate the effect of using the progressive muscle relaxation (PMR) technique on the self-efficacy of breastfeeding in mothers with preterm infants.

**Methods:** A clinical trial approach was used. Sixty mothers with preterm infants were randomly assigned to either the intervention or control group. The clinical trial ran for a period of 2 months for both groups. At 24–72 hours postpartum, the researcher used the Jacobson method to provide 30–45 minutes of individual training to the intervention group participants on PMR. Under the Jacobson method, mothers contract the 16 groups of muscles until they experience the feeling of pressure and then relax these muscles. The tools used in this study were the standard questionnaire of Dennis breastfeeding self-efficacy, which was completed by the participants at baseline, at the end of the fourth week, and during the eighth week. Data were analyzed using SPSS software.

**Results:** No significant difference was observed between the intervention and control groups in terms of demographic variables ( $p > .05$ ). Independent  $t$  tests found no significant difference between the two groups ( $p = .45$ ) in terms of mean score of maternal breastfeeding self-efficacy at pretest and significantly higher scores for the intervention group than the control group at both 4 ( $p = .001$ ) and 8 ( $p < .001$ ) weeks posttest. Furthermore, the analysis of variance test showed significant differences in the mean score of breastfeeding self-efficacy for the intervention group between pretest and the first posttest and between the first posttest and the second posttest, respectively ( $p < .001$ ).

**Conclusions/Implications for Practice:** Considering the effect of relaxation training on the breastfeeding self-efficacy of mothers with preterm infants, training and performing these exercises as an effective and low-cost method to improve the health of mothers, particularly mothers of preterm

infants, are recommended. The PMR technique facilitates the self-efficacy of breastfeeding in mothers with preterm infants and should be considered as an effective strategy to improve nursing care and the provision of better support services for mothers who breastfeed their infants.

## KEY WORDS:

breastfeeding self-efficacy, relaxation, postpartum period, preterm infant.

## Introduction

Children's health is an issue that is critical to the viability and future sustainability of societies and nations. Low-birth-weight and premature infants experience more physical, emotional, and psychological problems than normal infants (De Rouck & Leys, 2009).

In general, parents of premature infants experience more stress than parents of term infants. Furthermore, the premature-infant-related stress and anxiety are typically greater in mothers than fathers (Carter, Mulder, & Darlow, 2007).

Approximately, 28%–70% of mothers with premature infants perceive a high degree of mental stress (Younger, Kendall, & Pickler, 1997). High levels of stress change the interactions between a mother and her infant as well as impair her relationship with the medical team (Trombini, Surcinelli, Piccioni, Alessandroni, & Faldella, 2008). Perceived tension has been associated with decreased maternal loving and responsible behaviors, whereas maternal stress

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has been associated with disordered parental behaviors (Zelkowitz, Papageorgiou, Bardin, & Wang, 2009). Therefore, the parents of premature infants need more support than the parents of term infants (Maguire, Bruil, Wit, & Walther, 2007). Chuang et al. (2012) found that relaxation training programs improve the stress response of preterm women.

Most mothers are highly dedicated to performing their maternal duties well. If her child is taken away from her, a mother naturally feels confusion, worry, and anxiety, which impact the health of both mother and infant (Griffin, 2006).

Breastfeeding is a natural part of motherhood. Successful breastfeeding depends on various physiological and psychological factors in the mothers (Blyth et al., 2002). Breast milk is a God-given gift that conveys a mother's love and compassion and that is made according to the needs and age of the child (Varaie, Mehrdad, & Bahrani, 2009). Mothers who are interested in the welfare of their newborns tend to breastfeed their children. Breastfeeding supplies the nutritional needs of infants and improves infant health as well as their physical and emotional development (Noel-Weiss, Bassett, & Cragg, 2006). International studies have shown that insufficient milk and worry about providing sufficient milk volumes are the most common reason for discontinuing breastfeeding, with maternal factors playing an effective role in reducing milk production (Netshandama, 2002).

The role of proper nutritional strategies in promoting the health of premature infants should not be overlooked (Work Group on Breastfeeding, 1997). The American Academy of Pediatrics recommends breast milk as the best source of nutrition for all infants. Furthermore, all infants, including premature and sick babies, should be fed on breast milk exclusively for up to 6 months and for up to 24 months in combination with other foods (Martin, Fanaroff, & Walsh, 2010). Breast milk is the best food for infants, and feeding with breast milk is an important and effective measure to maintain and sustain the health of infants (Noel-Weiss et al., 2006). Not producing sufficient quantities of milk and prematurely ending breastfeeding are problems that are commonly encountered in postpartum mothers of premature infants.

Keith, Weaver, and Vogel (2012) found that listening to music increases the quantity and quality (i.e., increased fat content) of milk in mothers of preterm infants. Maternal self-esteem and breastfeeding self-efficacy are among the many factors that are known to affect breastfeeding (Cernadas, Noceda, Barrera, Martinez, & Garsd, 2003; Gijsbers, Mesters, Knottnerus, & Van Schayck, 2006). Breastfeeding self-efficacy has been shown to predict maternal breastfeeding behavior and to indicate maternal confidence and ability to breastfeed (Lowe, 1993). According to Bandura's theory (proposed in 1986), self-efficacy is influenced by the following four main information sources (Dai & Dennis, 2003; Dennis, 1999):

1. Functional outcomes (e.g., previous breastfeeding experience)
2. Proxy or surrogate experiences (e.g., observing other lactating women)
3. Verbal persuasion (e.g., encouragement from effective people such as friends, family, and previous consultations)
4. Physiological responses (e.g., fatigue, stress, anxiety, and sleep disorders)

Relaxation has been shown to effectively improve perceived levels of stress (Chuang et al., 2012). Moreover, relaxation techniques in many situations, including pain, birth, anxiety, and insomnia, have been shown to be effective in assisting subjects to control their emotions and behavior (Martin et al., 2010). Furthermore, in light of the importance of maternal self-efficacy in the breastfeeding process, using effective strategies and techniques to improve this self-efficacy should be a priority.

In Iran, the effect of relaxation on the self-efficacy of caregivers of patients with multiple sclerosis has been evaluated (Masoudi et al., 2011). However, no study has evaluated the effect of relaxation on the breastfeeding self-efficacy of mothers with premature infants. Therefore, this study was designed to assess the breastfeeding self-efficacy of this population and to study the effectiveness of a progressive muscle relaxation (PMR) technique on breastfeeding self-efficacy.

## Methods

A clinical trial with a control group was used. The research community consisted of mothers of preterm infants of a gestational age between 32 and 36 weeks who were hospitalized at one of the educational, research, and treatment centers of Ghaem, Imam Reza (AS), and Omolbanin (SA), Mashhad. Each group was composed of 33 patients, which took into account a maximum rate of attrition of 30%. "Comparison means" were adopted, as the main variables that were examined in this study were all quantitative. The recommended sample size, standard deviation, and mean were adopted from a similar study on sleep quality, as no prior study had addressed the specific issue taken up in this article. A pilot study was conducted on 15 mothers.

Of the 66 enrolled patients, 60 participated in the study through all three data collection points. Sampling was randomly conducted in two time blocks of 2 months each, and a toss of a coin determined which group would be recruited first. Thus, the intervention group was recruited first, followed by the control group. The Dennis breastfeeding self-efficacy standard questionnaire, a demographic information form, and a relaxation self-report checklist were used as the research tools. A Persian version of the Dennis breastfeeding self-efficacy standard questionnaire that had been used in multiple studies was used in this study. The content validity method was used to assess the validity of each of the tools, with reliability calculated using the

test–retest method. Thus, a pilot study was conducted in which 10 participants completed the questionnaire in two periods of 2 weeks. The correlation coefficient between the results of these two periods was measured, and the reliability of the questionnaires was confirmed ( $r = .78$ ). Inclusion criteria included having at least an elementary education, being between 18 and 39 years old, perceiving poor sleep quality with a score of 5 or higher on the Pittsburgh Sleep Quality Index, not taking any sleeping medications, having no abuse of regulated substances, and having a premature infant with a gestational age of 32–36 weeks.

In the intervention group, the researcher gave each participant a one-to-one PMR training session (30–45 minutes) in accordance with the Jacobson method in the break room. This session was composed of the following sections: (a) The participant was taught the muscle groups and the process of technique implementation, and (b) the participant was asked to perform the procedure in a quiet room with soft light while either seated or in a supine position. Furthermore, the participant was asked to wear comfortable clothing and to remove watches and bracelets if possible while performing the procedure.

PMR is a routine that alternately contracts and relaxes the practitioner's muscles for 5 and 10 seconds, respectively. PMR or active relaxation is a technique that was developed by Edmund Jacobson. The progressive constriction and then relaxation of specific groups of muscles have been shown to elicit feelings of comfort (Conrad & Roth, 2007).

The 16-fold expansion and contraction routine was performed for the participants by the researcher using the Jacobson method in a period that lasted between 30 and 45 minutes. After confirming that the participants were sufficiently proficient in performing the PMR routine, the participants were given an audio CD of the PMR training routine, a written guide for performing the routine, and a self-report checklist with the researcher's telephone number. The participants were requested to perform the routine at least once each day and to record the date and time of each performance on the checklist. Finally, the participants returned to the centers during the fourth and eighth postpartum weeks to complete the breastfeeding self-efficacy questionnaire.

In addition to receiving the usual care, the control group was trained on relaxation breathing techniques, which they were asked to perform "as needed" during the first 8 weeks postpartum. After all of the data had been collected from both groups, the breastfeeding self-efficacy of the two groups was compared. Data were analyzed using paired  $t$  test, chi-square analysis of variance, and Mann–Whitney  $U$  tests on SPSS Software Version 17.

## Results

The mean age of participants was  $28.2 \pm 6.7$  years in the intervention group and  $27.8 \pm 5.5$  years in the control group. Premature rupture of membranes was the primary cause of preterm labor for 53.3% and 56.7% of the

intervention and control groups, respectively. Eighty percent of the intervention group and 66.7% of the control group underwent a cesarean section.  $t$ , chi-square, and Mann–Whitney  $U$  tests showed that the two groups were statistically equivalent in terms of age, cause of preterm delivery, mode of delivery, level of education, occupation, and income level. Table 1 shows the demographic characteristics of the participants by group.

An independent  $t$  test found no significant difference between the mean score of self-efficacy for the two groups at pretest ( $p = .45$ ). However, the mean scores of self-efficacy at the first pretest (fourth postpartum week;  $p = .001$ ) and second pretest (eighth postpartum week;  $p < .001$ ) were significantly higher in the intervention group than in the control group. Furthermore, the analysis of variance test found that mean self-efficacy scores for the intervention group differed significantly over time ( $p < .001$ ), whereas mean self-efficacy scores for the control group did not differ significantly over time ( $p = .16$ ). Table 2 shows a comparison of maternal breastfeeding self-efficacy scores across the three data collection points.

## Discussion

This study found the relaxing training program to effectively improve the breastfeeding self-efficacy of mothers with premature infants ( $p < .001$ ) and to increase the mean score

**TABLE 1.**  
**Comparison of Demographic Characteristics of the Mothers by Group**

Variable	Intervention Group ( $n = 30$ )		Control Group ( $n = 30$ )		$p$
Age ( $M$ and $SD$ )	28.2	6.7	27.8	5.5	.85*
Reason for preterm delivery					
PROM	16	53.3	17	56.7	.66**
Preeclampsia	8	26.7	7	23.3	
Bit	3	10.0	5	16.7	
Beginning of pain	3	10.0		3.3	
Education level					
Elementary	7	23.3	6	20	.94***
Secondary	6	20.0	8	26.7	
High school	13	43.3	11	36.7	
College	4	13.3	5	16.7	
Delivery mode					
Vaginal	6	20.0	10	33.3	.24**
C/S	24	80.0	20	66.7	
Income level					
Poor	16	53.3	15	50	.94**
Good	10	33.3	11	36.7	
Excellent	4	13.3	4	13.3	

Note. Bit = trauma or injury; PROM = premature rupture of membranes.

**TABLE 2.**  
**Comparison of Maternal Breastfeeding Self-Efficacy Scores at Pretest, First Posttest, and Second Posttest**

Time	Intervention Group		Control Group		Independent <i>t</i> Test
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Breastfeeding self-efficacy					
Before intervention	47.01	8.85	45.62	6.82	<i>p</i> = .45
4 weeks after intervention	50.51	6.79	44.63	6.35	<i>p</i> = .001
8 weeks after intervention	57.62	6.22	47.41	7.91	<i>p</i> < .001
ANOVA tests with repeated measurement	<.001		.16		

Note. ANOVA = analysis of variance.

of breastfeeding self-efficacy of the mothers in the intervention group. For this group, the breastfeeding self-efficacy mean score was  $47.01 \pm 8.85$  at pretest,  $50.51 \pm 6.79$  at the first posttest (end of the fourth postpartum week), and  $57.62 \pm 6.22$  at the second posttest (eighth week postpartum). Conversely, the control group saw no significant change in this score over time, with mean scores reported as  $45.62 \pm 6.82$  at pretest,  $44.63 \pm 6.35$  at the first posttest, and  $47.41 \pm 7.91$  at the second posttest.

Self-efficacy reflects the level of confidence that a person has in accomplishing a specific task. Bandura and his colleagues believe that the sense of self-efficacy forms in a person through meeting the challenges and learning the steps necessary to perform a task successfully (Dennis, 1999). The results of this study reflect this concept because the mean scores of maternal self-efficacy at the end of the eighth week were higher than the pretest scores for both groups.

According to Bandura's theory, self-efficacy is influenced by four main information sources, one of which is "physiological responses" such as anxiety, stress, and fatigue (Bastable, 2003; Dai & Dennis, 2003; Dennis, 1999). As the effect of relaxation on stress has been shown (Varaie et al., 2009), we may say that relaxation affects the physiological responses and improves the breastfeeding self-efficacy of mothers, which is also in line with Bandura's theory. On the other hand, in a clinical trial that Massoudi et al. performed in Shahrekord, Iran, entitled "Effect of a Progressive Muscle Relaxation Program on Quality of Life and on the Self-Efficacy of Caregivers of Multiple Sclerosis Patients," a significant increase was found in both the self-efficacy and quality of life of family caregivers of patients receiving relaxation after 3 months of intervention ( $p = .0001$ ), whereas no significant difference was observed in the control group (Massoudi et al., 2011). Massoudi et al.'s study is consistent with this study in terms of the positive effects of relaxation on self-efficacy.

Kim, Newton, Sachs, Glutting, and Glanz (2012), in a study entitled "Effects of Guided Relaxation and Imagery on Self-Efficacy," showed this intervention to effectively increase the self-efficacy of old individuals (Kim et al.,

2012). Furthermore, the same study showed that this intervention increased the breastfeeding self-efficacy in mothers.

McQueen, Dennis, Stremmer, and Norman (2011), in a pilot study entitled "An Intervention for Breastfeeding Self-Efficacy of Nulliparous Mothers," showed that breastfeeding self-efficacy, maternal confidence, and breastfeeding duration were statistically significantly higher in the mothers in the intervention group who had received the standard protocol based on self-efficacy than the control group. Moreover, Noel-Weiss et al. (2006), in their study entitled "Workshop of Developing Breastfeeding Before Pregnancy to Improve the Mothers' Breastfeeding Self-Efficacy," concluded that mother's breastfeeding self-efficacy is defined as the mothers' confidence to breastfeed, which is positively associated with breastfeeding.

On the other hand, Otsuka, Dennis, Tatsuoka, and Jimba (2008) argued that higher breastfeeding self-efficacy during the postpartum period may decrease the mothers' imagery of insufficient milk and early cessation of breastfeeding or using supplementary nutrition during breastfeeding. Zhu, Chan, Zhou, Ye, and He (2014), in a study entitled "Predictors of Breast-Feeding Self-Efficacy in Chinese Women," introduced the factors associated with increased breastfeeding self-efficacy in Chinese women such as social support perceived by mothers and receiving the attention of important people such as husband, mother, and friends toward infant's breastfeeding as well as previous experience of breastfeeding and training caused by attention to others' breastfeeding.

Aghdas, Talat, and Sepideh (2014), in a study entitled "Effect of Immediate and Continuing Skin-to-Skin Contact on Breastfeeding Self-Efficacy in Primiparous Women," revealed that early contact increases the breastfeeding self-efficacy of mothers and consequently extends the duration of exclusive breastfeeding. Wu, Hu, McCoy, and Efirid (2014) stated that interventions that increase breastfeeding self-efficacy have a significant impact on breastfeeding.

Krol, Kamboj, Curran, and Grossmann (2014), in a study entitled "Breastfeeding Experience Differentially

Impacts Recognition of Happiness and Anger in Mothers,” found that longer durations of exclusive breastfeeding were associated with faster recognition of happiness, providing evidence for a facilitation of processing positive facial expressions. In addition, they found that greater amounts of breastfed meals per day were associated with slower recognition of anger.

Yu et al. (2015), in a study entitled “Maternal Prenatal Attitudes and Postnatal Breastfeeding Behaviors in Rural Bangladesh,” found that maternal positive attitudes, self-efficacy, and knowledge about breastfeeding were positively associated with intent to breastfeed exclusively (all  $ps < 0.05$ ).

In light of the abovementioned studies, the protection and promotion of breastfeeding should be a critical public health priority due to the related physiological and psychological benefits to both mothers and children. Thus, interventions that significantly raise breastfeeding self-efficacy may be expected to increase the rates of successful breastfeeding, which will reduce the costs borne by families and society and improve general public health (Netshandama, 2002).

## Implications for Practice

Relaxation training is an effective education and skills-based intervention that mothers may use to improve breastfeeding self-efficacy. The PMR technique is easy to learn and perform and is one of the best complementary therapies due to the easy training regimen, low cost of learning and performing, lack of special equipment needs, and easy implementation by the practitioner.

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