The Effect of Progressive Muscle Relaxation Technique on the Fears Related to Pregnancy and Childbirth in Primigravida Mothers: A Randomized Clinical Trial

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Abstract

Background: Fear related to pregnancy and childbirth in mothers who experience the first pregnancy and the physical and hormonal changes can cause disturbances in their emotional, mental, and physical state and quality of life. As a complementary method, progressive muscle relaxation helps reduce this type of fear in mothers.

Aim: The present study was conducted with aim to investigate the effect of progressive muscle relaxation techniques on the fears related to pregnancy and childbirth in primigravida mothers.

Method: This randomized clinical trial study was carried out on 60 primigravida women referred to the selected health centers in Hamadan, Iran. The eligible mothers were randomly divided into control and intervention groups by the permuted block randomization method. The control group received routine pregnancy care. The intervention group received progressive muscle relaxation techniques during 30-minute sessions twice a week for four weeks in addition to routine care. Data collection tool was the Fears Related to Pregnancy and Childbirth scale before and after the intervention.

Results: The mean fear score before the intervention in the intervention and control groups was 114.27±8.71 and 109.66±12.36, respectively (*p*=0.101). After the intervention implementation, the mean score in the intervention and control groups was 70.33±7.12 and 108.93±13.53, respectively (*p*=0.000).

Implications for Practice: The progressive muscle relaxation technique can be used to reduce the fear related to pregnancy and childbirth in primigravida mothers.

Keywords: Childbirth, Fear, Primigravida Mothers, Progressive Muscle Relaxation

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Introduction

Pregnancy and childbirth are considered natural events in the life cycle of women. Although pregnancy is a natural function for women, it is also regarded as a stressful experience accompanied by extensive psychological and physical changes (1, 2). Among the significant psychological changes which occur during pregnancy, pregnancy and childbirth-related anxiety is the most common complications of pregnancy in women and its prevalence has increased in recent decades (3, 4). More than 80 percent of mothers who do not have high-risk pregnancies also experience anxiety associated with pregnancy and childbirth (5). Fear and anxiety are usually accompanied by symptoms of the autonomic system, such as headache, sweating, tachycardia, fatigue, restlessness, shortness of breath in the chest, and slight stomach upset. These symptoms are different in each woman (6). However, moderate anxiety is medically considered a concern, while the severe form of it could be debilitating and have a significant impact on the daily life of pregnant women (7).

Pregnancy and childbirth-related anxiety are more prevalent in primigravid women than in multiparous women because they do not have a complete and experienced idea of the pregnancy and childbirth process (8), which leads to an increase in demand for elective cesarean section (9). Most cesarean sections conducted in Iran are unnecessary and caused by various factors, such as high anxiety related to pregnancy and childbirth (9). The risk of postpartum depression and experience of pain and discomfort after delivery are higher in pregnant women with higher levels of fear related to pregnancy and childbirth (10). Studies have shown that pregnancy and childbirth-related fear and anxiety during pregnancy can cause physical and psychological complications (11, 12), such as high blood pressure, preeclampsia (13), and postpartum disorder (14). These complications can increase obstetric and gynecological interventions, especially early emergency cesarean, followed by low birth weight and preterm delivery (9). Matinnia et al. indicated that 71% of women with severe fear of pregnancy and delivery chose cesarean delivery, while 11% of women with mild fear selected vaginal delivery (3).

It is necessary to adopt an approach to reduce this fear. The progressive muscle relaxation technique is the most effective strategy for managing pregnancy-related fear (15, 16). This technique is one of the components of cognitive-behavioral therapy to reduce tension and anxiety through muscle relaxation (13). The technique is used as one of the non-pharmacological methods and complementary treatment with aim to create awareness of muscle tension and relaxation (16). Progressive relaxation is defined by the contractile movements of the muscles, beginning with the head, face, and neck muscles in a regular manner, and then involves the middle and extremities of the body. In this method, the individual causes an increase in the blood flow and enhances the circulatory function of the organs by performing contractile movements and returning them voluntarily to a relaxed and expanded condition (13). Progressive muscle relaxation is a systematic therapy for anxiety, insomnia, hypertension, and other problems caused by pregnancy and leads to deep relaxation (16-18). Furthermore, this technique can strengthen the pregnant women's feelings about the unborn infant and help the maternal adaptation, especially in those who experience their first pregnancy and motherhood. In this way, the positive adaptation, which is significantly related to the physical and mental health of the pregnant woman, leads to a better emotional attachment between the mother and fetus (15).
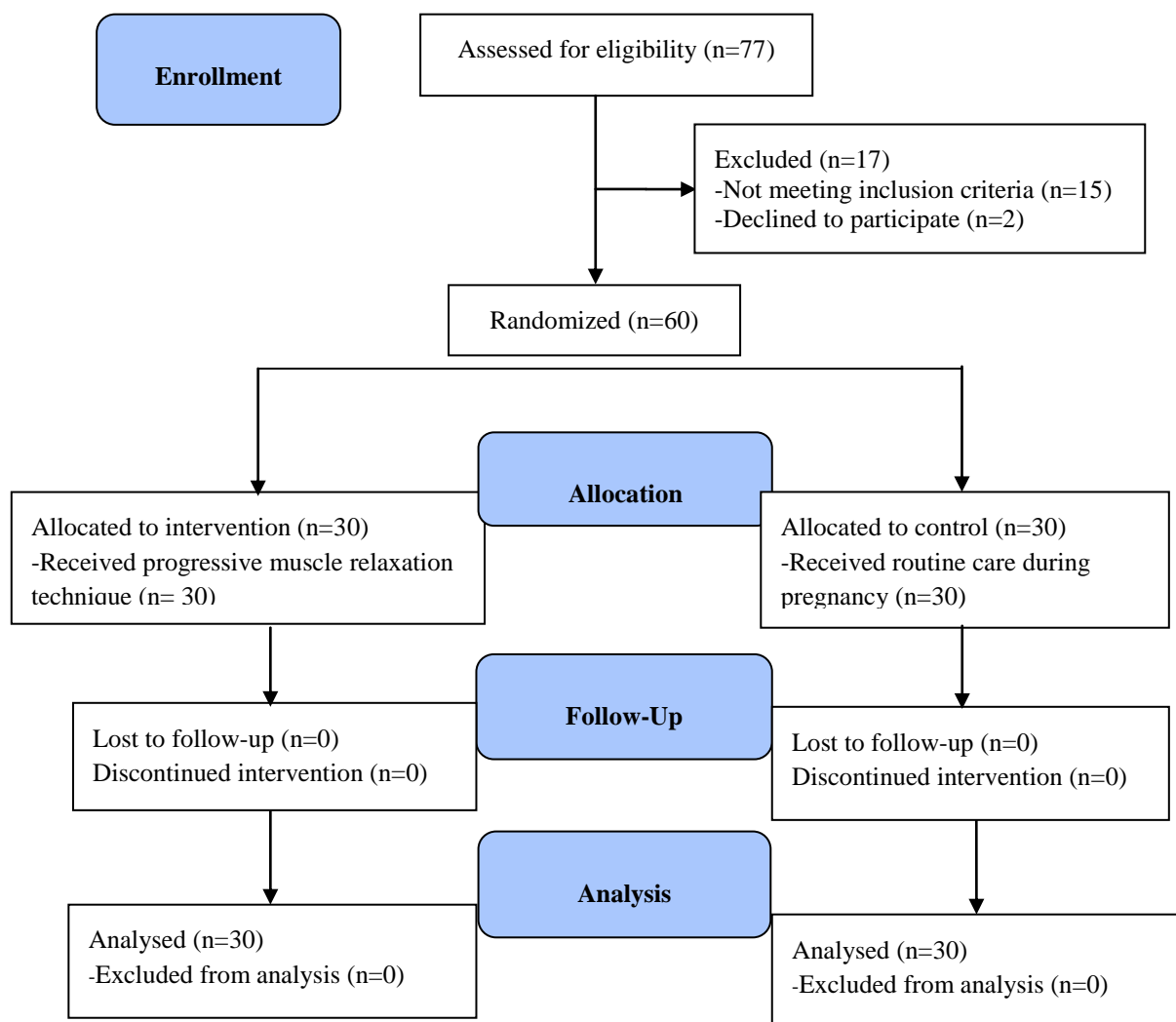
Several studies reported the beneficial role of the progressive muscle relaxation technique for anxiety, stress, and postpartum problems (16, 17), gestational fatigue (1), general health of pregnant women (15), postpartum depression (10), and fear of childbirth (8). In a study, Nasiri et al. reported the impact of progressive muscle relaxation on reducing depression, stress, and anxiety in pregnant women (19). However, no study has examined the effect of this technique on the level of the fears related to pregnancy and childbirth in primigravida mothers. Given the advantages of the progressive muscle relaxation technique as an easy, low cost and non-invasive method as well as the sensitive role of midwives and nurses in promoting the health of pregnant mothers, the present study was conducted with aim to evaluate the effect of progressive muscle relaxation technique on the fears related to pregnancy and childbirth in primigravida mothers.

Methods

This randomized clinical trial study with two intervention and control groups was conducted in the most prominent obstetrics and gynecology hospital in Hamadan from late November 2019 to February

2020. After selecting primigravida mothers referring to the selected comprehensive health centers, they were invited to train and implement the relaxation technique. The sample size was estimated as 25 subjects per group based on a previous study (20) and considering a test power of 90% and a confidence coefficient of 95%. However, considering a dropout rate of 20%, the final sample size was determined as 30 participants per group.

The study population included primigravida mothers referring to the comprehensive health centers. Sampling was done in a multistage strategy. The first stage was in clusters; 1) Hamadan City was divided into four districts (North, South, East, and West). 2) Two centers were randomly selected from each district, eight comprehensive health centers in total. 3) Since the rate of visits of pregnant women was similar in all centers, sampling was done with an equal proportion from each center and in convenience sampling. Therefore, 77 women identified with a pregnancy profile, of which 62 were eligible. Finally, two individuals declined to participate in the study and a total of 60 women were analyzed (Figure1).

Enrollment

Assessed for eligibility (n=77)

Excluded (n=17)
-Not meeting inclusion criteria (n=15)
-Declined to participate (n=2)

Randomized (n=60)

Allocation

Allocated to intervention (n=30)
-Received progressive muscle relaxation technique (n= 30)

Allocated to control (n=30)
-Received routine care during pregnancy (n=30)

Follow-Up

Lost to follow-up (n=0)
Discontinued intervention (n=0)

Lost to follow-up (n=0)
Discontinued intervention (n=0)

Analysis

Analysed (n=30)
-Excluded from analysis (n=0)

Analysed (n=30)
-Excluded from analysis (n=0)

Figure 1. CONSORT Flow diagram of the study process

The permuted block randomization method was used to randomly divide the participants into intervention and control groups. The random assignment list was in a computer-generated sequence to prevent bias. The allocator has hidden the block size from the executor and used randomly varying block sizes of two, four, and six (21), until the participants' details had been logged, encryption concealed allocation.

The inclusion criteria were age of 18 to 30 years, singleton pregnancy, gestational age 29 to 32 weeks, living in Hamadan city, ability to read and write, ability to do exercises for 20 minutes daily, no history of congenital and genetic disorders in the pregnant woman and husband, absence of disease and pregnancy disorders, no history or concurrent use of yoga, psychotherapy, Pilates, meditation, etc., no history of taking stimulants and psychoactive drugs, sedatives, and anti-anxiety drugs and absence of mental problems. Pregnant mothers with medical problems and pregnancy disorders (severe, acute, or chronic diseases that harm pregnancy) with possibility of premature birth, confirmation of malformation or abnormality in the fetus, movement disorder, or cognitive impairment of the mother during data collection, absence from classes (more than one session), disturbing events such as the death of loved ones, family problems, and migration were excluded from the study.

At first, permission was obtained from the university and selected centers. To use this technique correctly, the researcher participated in the relevant training workshop and obtained the certificate of qualification for administering training and this technique. After visiting the selected centers, the researcher, while introducing herself, explained the objectives of the research, the method of conducting the study, and the duration of the training to the mothers and invited them to attend an obstetrics and gynecology hospital if they wish to participate in training and intervention sessions. All participants were informed of the confidentiality of the data and participation in the study was voluntary without any physical or financial risk. Then, written informed consent was obtained from all participants.

Training and implementation of progressive muscle relaxation techniques were organized in groups of 7 and 8 members by the researcher. The educational content was in the form of lectures, presentations of pamphlets, and educational videos. The intervention for each group was carried out in 30-minute sessions twice a week for four weeks. The details of the training program are presented in Table 1. At the end of the training sessions, the pregnant mother practiced the technique a few minutes; so that the researcher could make sure that she performed it correctly. So they would not have any problems related to the technique in the next session. The first minutes of each session were assigned to raise mothers' questions about the educational content of the previous session.

Table 1. The contents of training program' sessions

Session 1	Introduction of physiological and psychological changes in pregnancy to mothers
Session 2	Introduction of muscles involved in progressive muscle relaxation technique and the necessity usage of this technique
Session 3	Training of progressive muscle relaxation technique
Session 4	Performing progressive muscle relaxation technique
Session 5	Deep breathing training
Sessions 6, 7, 8	Practical exercise deep breathing with the progressive muscle relaxation technique

In the practical sessions after explaining the procedures, pregnant women were asked to take out their watches, bracelets, and other types of jewelry and then lay down in a supine position in a grouped form. The participants who felt vertigo performed these training procedures on a comfortable chair. Pregnant women lay down on mattresses in the hospital's gymnasium with appropriate light and heat, without annoying stimuli. The Jacobson method was used for progressive muscle relaxation (22). In this way, the muscles of each part of the body were carefully identified and divided, and the mother was taught to contract the body in every part as much as possible and then loosen them. Each group of muscles was contracted for 5 seconds and relaxed for 15 seconds. The mothers were asked to do this technique twice a day, in the morning and the afternoon, at home. The control group received no interventions except routine care. At the end of the intervention, they received a pamphlet and an instructional video on how to conduct the progressive muscle relaxation technique.

The primary outcome of this study was the level of fears related to pregnancy and childbirth in primigravida mothers. Demographic and Clinical Questionnaire and Fears Related to Pregnancy and Childbirth scale were used for data collection.

Demographic and Clinical Questionnaire which included information such as mother's age, gestational age, education, occupation, and have a plan for pregnancy.

Fears Related to Pregnancy and Childbirth scale which was developed in 2001 for the first time (23). In Iran, the new version of Fears Related to Pregnancy and Childbirth scale was designed by Matinnia et al. (2015), which consisted of 30 questions on a 6-point Likert scale (never to always). The dimensions of the questionnaire include general fear (4 questions), fear of the baby's health and life (5 questions), fear of childbirth (16 questions), fear of parenthood and postpartum life (4 questions), and fear of the infant's gender (1 question). The higher score denotes more fears related to pregnancy and childbirth in pregnant women. The qualitative face and content validity of this questionnaire has been examined. In quantitative content validity, the content validity index (CVI) was obtained at 0.84. Construct validity was confirmed by factor analysis on 342 participants. Also, its reliability has been reported using Cronbach's alpha (0.84) (3).

In the current study, the opinions of 10 faculty members and experts in the field of instrument development was used to assess the qualitative content validity of the questionnaire (24). It's reliability was examined using the internal consistency measurement, and the Cronbach's alpha was calculated (α=0.82).

Written informed consent was obtained from all the participants after the researcher explained the objectives and method of conducting the research. The self-report questionnaires were distributed among them. The data was collected in both groups before and after the intervention. Completing the questionnaires took about 10 minutes. For randomization, a blind researcher scored the questionnaires. Also, the participants were asked to contact the researchers if they had any questions.

Data were analyzed by SPSS software (version 21). Pearson's chi-square test, independent t-test, dependent t-test, and ANCOVA were used to compare the studied groups. $p< 0.05$ was considered statistically significant.

Ethical Consideration

The research protocol was approved by the Ethics Committee of Hamadan University of Medical Sciences, Hamadan, Iran (ethical code: IR.UMSHA.REC.1398.616) and registered in the Iranian Registry of Clinical Trials (code: IRCT20120215009014N317).

Results

There were no statistically significant differences between the two groups in the terms of demographic characteristics (p>0.05) (Table 2). The mean age of mothers in the intervention and control groups was 26.87±3.66 year and 26.63±3.51 year, respectively (p=0.57). Also, the mean gestational age in the intervention and control groups was 30.39±1.13 weeks and 30.43±1.13 weeks, respectively (p=0.91). All mothers were married. Other demographic and clinical characteristics are presented in Table 2.

Table 2. Demographic characteristics of participants in the control and intervention groups

Variables	Control (n=30) N (%)	Intervention (n=30) N (%)	Pearson's chi-square test Statistic	Pearson's chi-square test P-Value
Occupation				
Professional employee	1 (3.33)	1 (3.33)	2.833	0.418
Non-professional employee	6 (20)	11 (36.7)		
Self-employment	6 (20)	7 (23.33)		
housewife	17 (56.67)	11 (36.67)		
Education Level				
High school/Diploma	6 (20)	6 (20)	6.095	0.192
Associate	9 (30)	5 (16.67)		
Bachelor	10 (33.33)	18 (60)		
Master	5 (16.67)	1 (3.33)		
Plan of pregnancy				
Planned	22 (73.3)	15 (50)	3.462	0.177
Unplanned but welcome	6 (20)	11 (36.7)		
Unplanned	2 (6.7)	4 (13.3)		

At the beginning of the program, the mean fear score in the intervention and control groups was 114.27±8.71 and 109.66±12.36, respectively (*p*=0.101). There were no significant differences in fear scores and its different dimensions in the two groups (*p*=0.101). After the intervention implementation, the average score in the intervention and control groups was 70.33±7.12 and 108.93±13.53, respectively (*p*=0.000). Following the implementation of the relaxation technique, the mean score of fear in all dimensions (Table 3) and in general in the intervention group decreased compared to before the intervention, in such a way that it was statistically lower than the control group (Table 4).

Table 3. The mean scores of fear related to pregnancy and childbirth and its dimensions in the intervention and control groups

Dimension	Time	Intervention Mean ± SD*	Control Mean ± SD*	*p*-value	Statistical Test	ANCOVA
General fear	Pre-intervention	15.86±2.22	15.4±2.69	0.464	401[**]	
	Post-intervention	11.20±1.67	15.13±3.39	<0.001	-5.7[***]	*p*<0.001
Fear of baby's health and life	Pre-intervention	22.57±2.54	21.73±2.67	0.133	350[**]	
	Post-intervention	15.47 ±2.21	21.53±2.88	<0.001	55.5[**]	*p*<0.001
Fear of childbirth	Pre-intervention	57.53±5.85	54.87±7.73	0.137	1.507[***]	
	Post-intervention	31.10±5.08	54.7±8.35	<0.001	11[**]	*p*<0.001
Fear of parenthood after childbirth	Pre-intervention	15.50±2.81	15.4±3.59	0.905	442[**]	
	Post-intervention	11.20±2.14	15.2±3.13	<0.001	-5.82[***]	*p*<0.001
Fear of baby's sex	Pre-intervention	2.8±1.49	2.27±1.23	0.152	356[**]	
	Post-intervention	1.37±0.81	2.3±1.24	0.001	241.5[**]	*p*<0.001

*Standard deviation; **Mann-Whitney U test; *** Independent t-test

Table 4. The mean scores of fear related to pregnancy and childbirth before and after the training in the control and intervention groups

Groups		Score of fear (Mean ± SD)		Analysis of changes	Paired t-test	
		Pre-intervention	Post-intervention		Statistic	*p*-value
Control		109.66±12.36	108.93±13.53	0.73 ± 1.91	2.102	0.044
Intervention		114.27±8.71	70.33±7.12	43.93 ± 6.42	37.411	<0.001
Independent t-test	Statistic	1.666	-13.820	35.290		
	p-value	0. 101	<0.001	<0.001	-	

Discussion

The purpose of the present study was to determine the effect of progressive muscle relaxation techniques on the fears related to pregnancy and childbirth in primigravida mothers referred to the comprehensive health centers, Hamadan, Iran. According to the results of this study, the mean scores of the fears related to pregnancy and childbirth did not differ between the two groups before the start of the intervention. This lack of difference increases the accuracy of the results and better examines the changes related to the effect of the intervention on the fear score. After the progressive muscle relaxation intervention, the mean scores of fears related to pregnancy and childbirth were statistically different between the experimental and control groups. So, the score of fear was significantly decreased in the experimental group compared with the control group. This result implies that training and implementing progressive muscle relaxation techniques reduced the fear of pregnancy and childbirth processes in primigravid mothers. In this regard, RahmaniBilondi et al. demonstrated that after seven weeks of progressive muscle relaxation training via SMS service to pregnant mothers, the

mean score of state/trait anxiety was markedly decreased in the experimental group compared with the control group, which is in line with the results of the present study (25). In the current study, the relaxation technique was performed in 8 sessions of 60 minutes twice a week for four weeks in person for the intervention group. The group and face-to-face training, as well as the high time and the number of progressive muscle relaxation sessions for primigravid women create an intimate and friendly atmosphere and possibly magnify the relaxation effects on pregnant women. Therefore, implementation of this technique with more time and number of sessions and in-person by women who experience the primigravid caused a significant reduction of anxiety.

A study by Boryri et al. indicated that face-to-face training is considered a factor for more relaxation effects when used for primigravid women (20). Some studies showed a positive effect of progressive muscle relaxation on obvious/trait anxiety in pregnant women (19) and suggested relaxation with more time and sessions to achieve deep relaxation in primigravid mothers (15, 20). The progressive muscle relaxation technique is considered a skill that becomes more effective when applied more time with more exercise sessions.

The findings of this study are approved by Boryri et al.' study, which examined the effect of the progressive muscle relaxation technique and guided imagery on fear of childbirth (20). The main point is that Boryri et al. only examined the overall level of childbirth-related fear, whereas, in the present study, in addition to the anxiety of childbirth, other dimensions of fears related to pregnancy and childbirth causing critical complications in the life of pregnant women were examined, especially primigravid mothers who, due to lack of experience about childbirth and pregnancy, could be exposed to more anxiety and fear about their infant's health, pregnancy, and delivery.

Tragea and colleagues showed that progressive muscle relaxation and breathing techniques could decrease stress in the second trimester of pregnancy (26). Their study was performed on pregnant women in the second trimester of pregnancy; however, in the present study, the primigravid women in the third trimester of pregnancy were examined. More psychological distress was experienced at this period and the anxiety of childbirth would increase at the end of pregnancy. Hence, the progressive muscle relaxation technique could be effective.

The results of a study by Nasiri et al. in Iran conducted to determine the effect of progressive muscle relaxation and guided imagery on stress, anxiety, and depression of pregnant women referred to health centers showed a significant difference between the experimental and control groups in the mean scores of depression, anxiety, and stress after the intervention (19). In their study, two training sessions were held in person, while in the present study, all relaxation sessions were held in person in the form of questions and answers with the primigravid women. In addition to face-to-face meetings, the researchers followed-up to emphasize training at home. It seems that telephone follow-ups were fruitful in the continuity and effectiveness of the relaxation technique.

Increased anxiety about the infant's birth, the process of pregnancy, and the delivery type (9) can increase the rate of emergency or elective cesarean, especially in primigravid women who have no experience in this field. The results of Matinnia et al.' study in Iran showed that primigravid women who chose cesarean section experienced greater fear of pregnancy and childbirth compared to those choosing vaginal delivery (3). Therefore, in the present study also, primigravid women who were probably more afraid of pregnancy and childbirth were selected as the research population. However, Johnson et al. reported no difference in the score of childbirth-related anxiety between pregnant women who had a vaginal delivery and those who had a cesarean section. They reported that cultural differences were effective in the results of their study (27). Since the progressive muscle relaxation technique can have significant physiological and psychological benefits for pregnant women, it seems that trying to reduce fears related to pregnancy and childbirth using non-pharmacological and low-cost methods, such as progressive muscle relaxation in pregnancy, may have a positive effect on the consequences of pregnancy and childbirth and even the type of delivery. This technique balances the activity of the posterior and anterior hypothalamus and reduces the sympathetic system's function to prevent the adverse effects of stress and anxiety caused by pregnancy. Moreover, this technique exerts anti-pressure activity in muscle contraction and increases relaxation in the body and consequences in the mind (28).

Abdollahi et al. indicated that relaxation training programs reduced state/trait stress and fear in women during pregnancy (5). It is assumed that complementary therapies, such as progressive muscle relaxation, influence the pituitary-adrenal axis of the hypothalamus, preventing the overproduction of

cortisol and improving mood, and resulting in a relaxing response. The complementary therapies act as neuroendocrine mediators in neural circuits which are responsible for regulating mood and emotion (29). The decrease in fear and anxiety during pregnancy and childbirth can help to ensure the physical and mental health of pregnant women and fetus and lead to a decline in various maternal and fetal complications during pregnancy.

The limitations of the present study include individual differences and mood of participants during response to the intervention and its effect, the impact of environmental and cultural factors on the women's perception about the effect of relaxation technique on improving physiological symptoms, and the degree of learning and the absence of mental conflict on the efficacy of relaxation technique. Therefore, it is suggested that in future studies, the effect of this intervention on the other signs and symptoms of primigravid mothers be examined with a larger sample size and be compared with other relaxation techniques for reducing fear and tension in these mothers. It is emphasized that the knowledge obtained from this study can help improve the health of pregnant women. Furthermore, designing this randomized controlled trial with a pre-test and post-test was the strength of this study.

In general, employing the progressive muscle relaxation technique was effective on the scores of fear and its dimensions and decreased favorably after the implementation of training. This technique can be used as complementary care and a low-risk and low-cost method for pregnant mothers afraid of pregnancy and childbirth. Therefore, it is necessary to plan this kind of care, minimizing the mental burden of mothers and their health improvement, which requires the support of managers in the health care system.

Implications for practice

The progressive muscle relaxation technique is easily accessible and fully effective for primigravida mothers and should be taught to them by nursing and midwifery staff. Therefore, it is necessary to hold an in-service training class about this supplementary care method for nurses and midwives and emphasize the importance and necessity of implementing this kind of care.

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Conflicts of interest

The authors declared that they have no competing interests.

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Authors' Contributions

AAk, MS and MB designed the study and reviewed the study materials. MS prepared the ethics submission. ANG, FZM and MS collected the data. LT analyzed the data. AAk, AAz and MS taught relaxation techniques. MB oversaw all aspects of the study's implementation. All authors read and revised the draft and approved the final manuscript.

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