

## Original Paper

# Effect of Progressive Muscle Relaxation Training on Postpartum Blues in High-risk Pregnant Women



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## ABSTRACT

**Introduction:** Postpartum blues is one of the complications that can affect the health of the mother and how she communicates with the baby, and as a result, her physical and mental health. Therefore, its prevention can influence the mental health of the family.

**Objective:** This study aimed to determine the effect of Progressive Muscle Relaxation (PMR) therapy on the postpartum blues of high-risk pregnant women.

**Materials and Methods:** This randomized clinical trial was conducted on 150 women with high-risk pregnancy referred to health centers in Shahreza City, Isfahan Province, Iran. They were selected by multi-stage sampling technique and randomly assigned into two groups of PMR (n=75) and control (n=75). The control group received only routine pregnancy care, while the PMR group, in addition to routine pregnancy care, received PMR education (Jacobson Method). The severity of postpartum blues was assessed by Zung's Self-rating Depression Scale on days 1, 3, and 10 after delivery. For analyzing data, we used the Chi-squared test, t-test, and the Mann-Whitney U test.

**Results:** Both groups had no significant difference with each other in terms of demographic and obstetric factors. No significant difference was observed between the control and PMR groups in the severity of postpartum blues on the first day; however, the difference was significant on days 3 and 10 (P<0.05).

**Conclusion:** Progressive muscle relaxation therapy can be useful in reducing the severity of postpartum blues in women with a high-risk pregnancy.

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## Highlights

- Postpartum blues can set the condition for the development of postpartum depression.
- Postpartum blues can provide unfortunate conditions for emergence and disintegration of family relationships.
- Postpartum blues can reduce emotional attachment between mother and baby.
- Weak mother-child emotional attachment will reduce the mother's confidence and compliance with the motherhood role.

## Plain Language Summary

Relaxation therapy includes a series of nerve and muscle exercises that helps the mother to pass pregnancy and various stages of labor with fewer complications. One of the essential effects of using relaxation techniques is to increase the attachment of the mother to the infant, which assist the mother in coping with psychological stress. Progressive Muscle Relaxation (PMR) method of Jacobson (1934) is one of the relaxation techniques which belongs to the active relaxation category and mind-muscle connection techniques. In these techniques, by tensing and then releasing the muscle, attention is paid to the muscles of the various parts of the body and then to their relaxation. In this method, the mind learns to focus on multiple parts of the body, and through this focus, experiences peace and detachment from outside, and thereby achieving calmness. The muscles can be tensed and released in separate (e.g. first the muscle of first phalanx of index finger, then the muscle of its second phalanx, and so on), in group (eg, muscles of leg and thigh together), or in half of the body (all muscles of the right side and then left side, or all muscles of upper half and then lower half of the body). These exercises can improve the outcome of pregnancy in high-risk pregnancies and deliveries.

## Introduction

Undoubtedly, pregnancy and childbirth are the highest artistic endower of creation and one of the manifestations of divine power. Pregnancy and delivery can have a profound effect on women's emotions, behaviors, and thoughts [1]. During pregnancy and childbirth, considerable changes occur in women that make them very sensitive to psychological stimuli and sometimes create psychological problems in them [2]. According to the World Health Organization, mood disorders will be the second leading cause of disability worldwide by 2020 [3]. In the postpartum period, the most common types of mood disorders are sadness, depression, and psychosis which can harm the physical and mental health and, consequently, the women's quality of life [4]. The most common mood disorder in the postpartum period is called "postpartum baby blues" with an incidence rate of (50-80%) varying from country to country [2, 5, 6]. For example, in South Africa, its incidence ranges from (59-81%), in Saudi Arabia (21-50%), in Gabon (55%), and in Japan (17%) [2, 6]. This disorder is mild and self-limiting and often subsides

after 2 to 3 days, but sometimes, it lasts for up to 10 days [7]. Symptoms of this disorder are fear, irritability, sleeplessness, concentration problems, headache, and hallucinations [8].

Some researchers attribute it to the feeling of mother-child detachment. Along with feeling insecure and inadequate in performing a new role as a mother, this disorder can reduce the mother's self-confidence [9]. Also, the deterioration of the relationship between mother and infant increases the risk of psychological, behavioral, and educational problems in the children of these mothers [8]. Postpartum blues may predispose women to postpartum depression, family disintegration, reduced emotional attachment, and low compliance with motherhood role [10-12]. Different nursing and midwifery practices have been proposed to minimize symptoms and prevent postpartum blues. Some of these practices are guided imagery, relaxation therapy, music therapy, and massage therapy [13].

Prenatal education can also play a significant role in reducing diseases and mental disorders during pregnancy and after delivery [14]. The prevalence of women with high-risk pregnancy in Iran who need special care

is about (70%) [15]. In these women, the likelihood of catching psychosis, anxiety, depression, mental disorders, isolation, sleep and nutritional disorders, phobias, and loneliness are more pronounced during pregnancy and postpartum [16]. Moreover, the children of women with high-risk pregnancy are more likely to develop behavioral and mood disorders [17].

One of the methods that can reduce mental health problems is muscle relaxation. It includes a series of nerve and muscle exercises that helps the mother to tolerate pregnancy and various stages of labor with the fewest complications [12]. Jacobson introduced Progressive Muscle Relaxation (PMR) in 1934. It is a type of active relaxation and mind-muscle connection technique. In the mind-muscle connection technique, by tensing the muscle and then relaxing it, attention is paid to the muscles of the various parts of the body and then to their relaxation. In this method, the mind learns to focus on multiple parts of the body, and through this focus, it is detached from all outside things, and accordingly, experiences relieve and peace [18-20]. These exercises can improve the outcome of pregnancy in high-risk pregnancies and deliveries [21, 22].

Besides, muscle exercises reduce the stimulating effects of the sympathetic nervous system and by balancing the sympathetic and parasympathetic systems, reduce the respiratory breaths and heartbeats, and create a sense of safety and comfort [23]. Furthermore, this method can be used as a suitable strategy for mental relaxation and increasing maternal relationship and attachment [24, 25]. Considering the high prevalence of postpartum blues and its undesirable effects, this study aimed to determine the impact of PMR on postpartum blues in women with a high-risk pregnancy.

## Materials and Methods

This randomized clinical trial was conducted in health centers located in Shahreza City, Isfahan Province, Iran, from September 2013 to March 2014. The sample size was determined 150 considering 0.5 effect size, (84%) test power, (95%) confidence interval, type 1 error of 1.96, sample ratio in study groups of 1, and the difference in mean health score of study groups as 0.9 according to a similar study [4]. The samples were selected using a multi-stage sampling technique. To do this, first, the health centers of Shahreza were divided into two districts of North and South and based on the number of health centers ( $n=5$ ), the statistics of samples in each stage and the percentage of required sample in each stage were determined.

First, the researcher referred to 5 selected health centers every day (except holidays) and completed the demographic and pregnancy questionnaires for 200 women with a high-risk pregnancy at their 32-35 weeks of gestation (based on their health record). Of them, the women who were interested in participating in the study and met the inclusion criteria (ability to read and write, no history of mental disease based on the medical records, gestational age of 32 to 35 weeks based on the first day of the last menstrual period or ultrasound date (<20 weeks), and without doing muscle relaxation therapy before or during the study) were selected and randomly assigned (using random number table) into the Progressive Muscle Relaxation (PMR) and control groups (each 75 women). Six samples from the PMR group and 3 from the control group left the study (due to not answering calls, changing the place of residence, and preterm delivery). They were replaced with new samples using random number table. All participants signed a written informed consent form before entering the study.

Considering that at the third trimester of pregnancy, the anxiety level increases and psychological changes are more, and this period is close to the time of delivery, it seems that the effect of muscle relaxation exercises on the severity of postpartum blues can be higher at this trimester [7]. So the intervention was provided to the PMR group in this period. The participants in the PMR group were divided into six groups of 10-14 people each receiving PMR therapy (four 90-min sessions) separately based on Jacobson's approach. They were trained to focus on different parts of their body. By this kind of focus, they became detached from the outside, and hence, experienced the peace of mind and achieved relaxation. By tensing and relaxing muscles, this method draws the attention of the mind from the outside to the inside of the body [22, 23]. The trained and licensed researcher was responsible for teaching PMR and supervising the intervention. For performing PMR exercises by samples, the permission was obtained from their therapists or the physicians in health centers.

The PMR intervention program included first teaching the most essential and prevalent principles during pregnancy at the beginning of each session for 40 minutes. Then, the educational materials and exercises presented in the previous meeting were reviewed, the checklists of performing exercises at home were reviewed, and the questions were responded for 20 minutes. Finally, muscle relaxation exercises were performed based on Jacobsen's method, and the women's correct doings were supervised for 30 minutes. In this

program, educational materials comprised anatomical, physiological, and hormonal changes during pregnancy, effects of pregnancy on the body and mind of mother, strategies for more adaptation to pregnancy changes (proper nutrition, individual health, and mental health), familiarity with the development of embryos in different months of pregnancy, effects of relaxation therapy on physical and mental health of mother, improvement of sleep and its impact on the labor process, importance of relaxation during labor and postpartum recovery, and breastfeeding and reducing postpartum blues and depression. PMR teaching was conducted through lectures and practical presentations and by using educational CDs.

At the end of every session, to be ensured that future mothers perform PMR exercises at home, they were given a checklist of relaxation exercises for doing at home along with CDs and educational pamphlets about common pregnancy problems and PMR exercises. They were asked to perform PMR exercises at least twice a day for at least 15 minutes according to the instructions given in educational CD containing light music, and mark the checklist as “done” and “not done”. The pregnant women were recommended to do PMR therapy before bedtime to improve their quality of sleep. It is to be noted that in 2013 (the period of collecting study information), no preparation classes were held for pregnant women in health-treatment centers in Shahreza. So the control group did not receive any education during their pregnancy. They only received educational pamphlets on pregnancy (prepared by the researcher) along with routine pregnancy care. After delivery, the subjects received no intervention. On the 1<sup>st</sup>, 3<sup>rd</sup> and 10<sup>th</sup> days after delivery, the questionnaires were completed again by both groups again. To do this, the researcher referred to the department of midwifery at the hospital and to

the health centers on the mentioned days and distributed the study questionnaires and depression scale.

The data collection tools were a demographic and obstetric questionnaire and Zung’s self-rating depression scale for measuring postpartum blues. This scale has also been used in other studies on postpartum blues [4, 8, 26, 27]. It has 20 items rated on a 4-point rating scale (a little of the time, some of the time, good part of the time, most of the time). Its validity and reliability have been approved in different studies and countries, including Iran [4, 8, 26, 27]. Its total score ranges from 20 to 80 with a cut-off point of 47 for postpartum blues [4, 8]. Data analysis was conducted by performing Chi-squared test, Independent t-test, and paired t-test in SPSS v.17. The significance level was set at 0.05.

### Results

Since PMR intervention period during pregnancy lasted for 4 weeks, the women’s gestational age at the end of the intervention was 36-39 weeks. Both study groups were homogenous in terms of demographic and obstetric information (age, level of education, occupation, monthly income, housing status, duration of marriage, gestational age, risk factors for pregnancy, number of pregnancy, and satisfaction about the baby’s gender) according to the results of the Chi-squared test, Independent t-test, Mann-Whitney U test, and Fisher’s exact-test (Table 1). In terms of risk factors for high-risk pregnancy (age <18 years, age >35 years, number of pregnancies >5, history of preterm delivery, urinary tract infection, maternal weight <50kg before pregnancy, maternal height <150cm, poor weight gain during pregnancy, excessive weight gain during pregnancy, thyroid disease, anemia, hypertension, diabetes, preeclampsia symptoms, history of abortion, history of

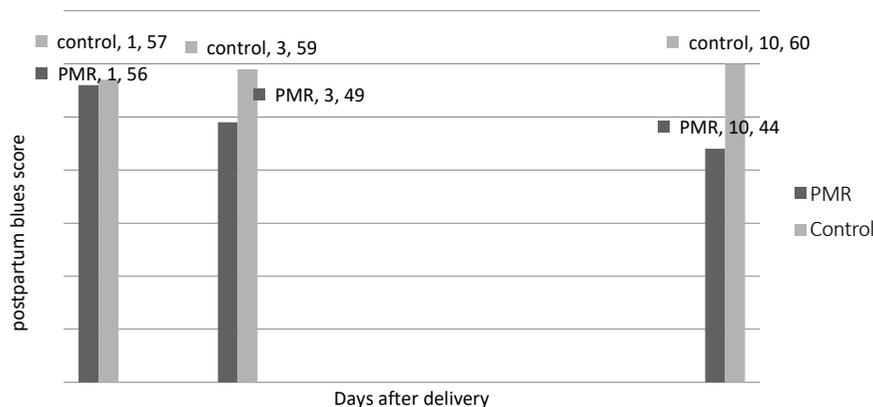


Figure 1. Postpartum blues scores after delivery

**Table 1.** Demographic and obstetric characteristics of the participants

Variables	Mean±SD		Sig.
	PMR (n=75)	Control (n=75)	
Age (y)	27.1±5.03	27.53±5.84	0.633*
Gestational age (wk)	32.38±0.45	32.39±0.47	0.986*
Number of pregnancies	2.17±0.811	2.26±0.84	0.647*
Duration of marriage (y)	5.78±4.26	5.97±4.49	0.794*
Monthly income (US Dollars)	<b>N (%)</b>	<b>N (%)</b>	
150	46(61.34)	59(78.7)	0.054*
150-200	28(27.33)	14(18.7)	
>200	1(1.33)	2(2.6)	
Education			
Secondary school	22(29.34)	24(32)	0.784**
High school	43(57.33)	41(54.66)	
Academic	10(13.33)	10(13.34)	
Occupation			
Housekeeper	68(90.66)	3(4)	0.345***
Employed	7(9.34)	72(96)	
Housing status owned	51(68)	37(49.34)	0.065****
Rented	13(17.34)	30(40)	
Belongs to the spouse's family	11(14.66)	8(10.66)	
Satisfaction with the baby's gender	59(78.66)	60(80)	0.886****

\*The Independent t-test; \*\*Mann-Whitney U test; \*\*\*Fisher's exact-test; \*\*\*\*The Chi-squared test

intrauterine fetal death, short intervals between pregnancies, unwanted pregnancy, insufficient income, history of abnormalities in previous embryos, multiple pregnancy, history of cesarean section, and history of infertility), both groups were also homogenous according to the results of the Chi-squared test and Fisher's exact-test. The most common risk factors in both group participants were the history of abortion (36%), history of Caesarian Section (CS) (29.3%), unwanted pregnancy (26%), urinary tract infection (21.3%), and thyroid disease (18.6%) (Table 2).

The Mean±SD newborn height in the PMR group was 52.1±3.64cm, and in the control group 48.6±3.43cm; the Mean±SD newborn weight was 3400±0.48g in the PMR group and 3200±0.56g in the control group; and their Mean±SD head circumference was 35.9±2.88cm

and 34.09±1.85cm in the PMR and control groups, respectively. These differences in all three indexes were significant (P=0.001). Concerning the type of delivery, the difference between the two groups was also significant (P<0.001). In the PMR group, (36%) had CS and (64%) normal delivery, while in the control group, (53.33%) had CS and (46.66%) normal delivery.

The mean score of postpartum blues on day 1 after delivery was 56.5 in the PMR group and 57.1 in the control group, and there was no statistically significant difference between them. On day 3, these mean scores were 49.7 and 59.4, in the control and PMR groups, respectively. And on day 10, the mean of reported scores were 44.2 and 60.3 in the control and PMR groups, respectively. Significant decrease in postpartum blues was observed in the PMR group on the 3rd and 10<sup>th</sup> days follow-

**Table 2.** Risk factors for high-risk pregnancy in study participants

Variables	N (%)		Sig.*
	PMR	Control	
History of abortion	27(36)	27(36)	0.99
History of cesarean section	20(26.66)	24(32)	0.475
Unwanted pregnancy	15(20)	24(32)	0.094
History of urinary tract infection	18(24)	14(18.66)	0.425
Thyroid disease	14(18.66)	14(18.66)	0.99
Maternal weight <50kg before pregnancy	10(13.33)	12(16)	0.644
Age >35 years	12(16)	12(16)	0.48
Excessive weight gain during pregnancy	11(14.66)	5(6.66)	0.113
Poor weight gain during pregnancy	5(6.66)	7(9.33)	0.547
Anemia	4(5.33)	5(6.66)	0.99
Short intervals between pregnancies	2(2.66)	6(8)	0.276
Hypertension	4(5.33)	2(2.66)	0.68
History of preterm delivery	3(4)	3(4)	0.99
History of infertility	4(5.33)	1(1.33)	0.367
Gestational diabetes	1(1.33)	3(4)	0.62
Age <18 years	2(2.66)	2(2.66)	0.99
Maternal height <150cm	0	3(4)	0.245
History of intrauterine fetal death	2(2.66)	1(1.33)	0.99
Preeclampsia symptoms	2(2.66)	0	0.497
Multiple pregnancy	1(1.33)	1(1.33)	0.99
History of abnormalities in previous embryos	0	1(1.33)	0.99

\* The Chi-squared test

ing delivery (Table 3). In the PMR group, the postpartum blues scores decreased significantly by 12.3 units from day 1 to day 10 (P=0.001) after giving birth, while in the control group, the scores significantly increased by 3.2 units (P=0.043) (Figure 1).

## Discussion

In this study, the results showed a significant difference between two groups in the postpartum blues of pregnant women on days 3 and 10 after delivery compared

**Table 3.** Comparing scores of postpartum blues in both groups on days 1, 3, and 10 after delivery

Group	Mean±SD			Sig.
	Day 1	Day 3	Day 10	
PMR group	56.5±0.47	49.7±0.38	44±0.35	0.001**
Control group	57.1±0.56	59.4±0.67	60.3±0.78	0.043**
Sig.	0.876*	0.001*	0.001*	-

\*The independent t-test; \*\*Paired t-test

to day 1. On these days, there was a slight increase in the mean score of postpartum blues in the control group and a significant decrease in the mean score of postpartum blues in the PMR group. Thus, the study hypothesis is confirmed. These results indicate the effectiveness of PMR in women with a high-risk pregnancy. It is noteworthy to say that in this study, relaxation education was given to pregnant women in groups. Group education helps women to use one another's experiences (under the control of the researcher) and creates an intimate and friendly atmosphere, which increases the impact of PMR therapy. In Bastani et al. study, group education to pregnant women was considered as a factor for increasing confidence, improving the mental status, creating a familiar, friendly atmosphere among pregnant women that enhanced the effect of relaxation education [28]. Akbarzade et al. reported that relaxation education could reduce postpartum blues severity on the 1st and 10<sup>th</sup> day after delivery and improve the quality of life of pregnant mothers [4].

On the contrary, in our study, there was no significant difference between the control and intervention groups on the first day after delivery in terms of postpartum blues score. This discrepancy may be due to the difference in groups' age and the given relaxation education. In their study, all samples were first-time mothers with low-risk and uncomplicated pregnancy, while in our study, they were exposed to a high-risk pregnancy. In these women, the incidence of depression and mental disorders is higher [16]. Moreover, the type of relaxation used in our study was Jacobsen's PMR method (active relaxation), while in that research, it was Benson relaxation method (passive relaxation) [4].

These differences can result in different outcomes. Evidence suggests that the effects of various relaxation therapies are different. For example, Teixeira et al. found out that the impact of active relaxation (PMR) on reducing postpartum mood disorders was higher than that of passive relaxation [29]. Urech et al. reported that active relaxation techniques of PMR and guided imagery were effective in reducing mood disorders after delivery [30]. Notably, based on some studies such as Bastani et al. and Alder et al. simultaneous use of active and passive relaxation methods can be more productive [28, 31].

In our study, most samples (70%) had high school and academic education, and (90%) of them were housewives. These characteristics can increase the effectiveness of relaxation therapy in pregnant women. In the studies of Rahimi et al. Bastani et al. and Teixeira et al. these two factors were also useful, and housekeeper

pregnant mothers had more willing to participate in educational classes during pregnancy. Since the experiences of a few weeks before delivery have an impact on the current quality of life of mothers, the positive effects of relaxation therapy during pregnancy and childbirth will make the mother feel better. [25, 28, 29]

One of the limitations of this study was our uncertainty of mothers' performing relaxation exercises at home. However, the researcher had emphasized that the exercises should be done at least twice a day at home. The other limitation was related to the checklist of relaxation exercises that may not reflect the actual performance level of studied women. Not mentioning the history of mental illness or taking medications could have affected the results of this research, too. Further studies are recommended on investigating and comparing the effects of different types of relaxation therapy on postpartum depression and blues in women prone to mood disorders.

## Ethical Considerations

### Compliance with ethical guidelines

This study has permission of the Ethics Committee under registration number 116-2682 and was approved by the Research Ethics Committee of Shahid Beheshti University of Medical Sciences and registered by the Iranian Registry of Clinical Trials (Code: IRCT2013121015737N1).

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### Authors contributions

All authors contributed in preparing this article.

### Conflict of interest

The authors declared no conflict of interest.

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