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Effect of the combination of Benson's relaxation technique and brief psychoeducational intervention on multidimensional pain and negative psychological symptoms of pregnant women: A randomized controlled trial

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Abstract:

BACKGROUND: Pregnancy is associated with negative psychological symptoms (NPS) and multidimensional pain. Therefore, the present study was conducted to determine the effect of the combination of Benson's relaxation technique (BRT) and brief psychoeducational intervention (BPI) on multidimensional pain and NPS of pregnant women.

MATERIALS AND METHODS: The present randomized clinical trial was conducted on pregnant women referred to Imam Reza and Motazedi Hospitals in Kermanshah, Iran. In this regard, 60 pregnant women were randomly allocated to intervention ($n = 30$) and control ($n = 30$) groups. The groups attended BRT and BPI educational sessions for 4 weeks, but the control group received no intervention. Subsequently, both groups completed Depression Anxiety Stress Scale-21 and multidimensional pain inventory.

RESULTS: The mean NPS (stress, anxiety, and depression) was significantly decreased in the intervention group ($P < 0.001$), while no statistically significant differences were observed in the control group ($P > 0.05$). The independent t -test revealed a significant difference between the mean scores of intervention and control groups ($P < 0.001$). The mean multidimensional pain was significantly decreased in mothers after the completion of educational sessions ($P < 0.001$), and the independent t -test results indicated a significant difference between the scores of the intervention and control groups ($P < 0.001$).

CONCLUSION: The results of this study suggested that the combination of BRT and BPI can lead to a reduction in the NPS and multidimensional pain in the pregnant women. This intervention is recommended to be considered as part of a healthcare program in pregnant mothers.

Keywords:

Pain, pregnant women, relaxation therapy

Introduction

The phenomenon of childbirth is a potentially stressful event for any mother so that women imagine that a new period of life has begun for them.^[1]

The importance of negative psychological symptoms (NPS, including stress, anxiety, and depression) during pregnancy is so much as evidence suggests that pregnant women at risk of catching these symptoms are more likely to develop premature delivery, giving

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low birth weight and fetal neurodevelopment disorders compared to other pregnant women.^[2]

Based on cognitive behavioral theory, chronic pain during pregnancy is considered to be a psychological, complex, and multidimensional phenomenon that each person experiences in a particular way, and factors such as dysfunction in daily activities, pain intensity, social support, control over life, and emotional distress will all form a different dimension of pain and will establish a multidimensional pain in the person. According to this view, the pain is not one-dimensional phenomenon and merely “pain intensity” but a cognitive behavior phenomenon affected by various dimensions.^[3,4]

Regarding the side effects of taking medications and some of the therapies, today’s emphasis is placed on the use of natural and uncomplicated methods. Some of the most important advantages of using nonpharmacological methods include no effect on the labor process and the absence of side effects on the mother and the fetus.^[5] Among the raised nonpharmacological methods, Benson’s relaxation technique (BRT) is a method influencing the health of pregnant mothers.^[6,7]

The BRT technique was first introduced by Herbert Benson.^[6] The BRT, with an emphasis on physical relaxation, can inhibit many physiological stressors.^[8] The BRT not only has a lot of advantages and easy way of handling but also has no side effects on individuals.^[9] This technique is considered as a relative state of relief from the physical and emotional effects of anxiety and stress.^[10] In addition to the BRT, which is well involved with psychosomatic dimensions to reduce stress during pregnancy, the use of the brief psychoeducational intervention (BPI) is also necessary along with this technique; the combination of BRT and BPI techniques is regarded to be a consideration of cognitive and knowledge dimensions on the one hand and taking into account the tools of knowledge practicing and also used in addition to considering the physical dimension to reduce the stress of cognitive dimensions in this regard. What is more evident in further studies is the one-dimensional emphasis on only one component of psychological symptoms, while the combination of interventions in this study covers both physical and psychological dimensions; and with the help of this advantage, more effectiveness can be achieved in fewer interventional sessions.^[9,10] Another feature of the combination of BRT and BPI intervention in the present study is that these two interventions have been summarized as far as possible so that they are known as a cost-effective method and can cover each other’s deficiencies and complement each other. Since each one of these two interventions can compensate for the shortcomings of each other and add strength to each

other’s effectiveness, they can have a higher unique level and greater effectiveness than interventions alone with less time and fewer sessions.^[11] Regarding the interactions between physical and psychological health on each other, and given the high vulnerability of pregnant women and their direct impact on the outcome of labor (newborns), and considering that limited research is available on the effect of combination of BRT and BPI on pain and NPS, the current study was designed to evaluate the effect of the combination of BRT and BPI methods on multidimensional pain and NPS.

Materials and Methods

Study design and participants

The method of this study was experimental, and research design was randomized clinical trial. The study was performed in 2018 on 60 pregnant women referred to Imam Reza and Motazedi Hospitals in Kermanshah, Iran. In this regard, the pregnant women selected by convenience sampling method were randomly allocated to intervention and control groups. The intervention group attended in BRT and BPI educational sessions for 4 weeks, but the control group received no intervention. After the end of the four sessions of intervention, a posttest was taken from both groups to compare the effectiveness of this intervention; the results of the pretest and posttest were then compared in both groups. No blinding was used in this study.

Pocock Formula and Gigi Table were used to estimate the sample size.^[12] Finally, 30 samples were estimated for each group (intervention and control) using pilot study and taking 0.01 for the Type I error (α) and 0.05 for the Type II error (β) and considering 30% attrition rate.

In Figure 1 (Pocock Formula), S_1 represents the standard deviation before the intervention, S_2 shows the standard deviation after intervention, μ_1 is the mean value before intervention, and μ_2 is the mean value after intervention. To reduce the level of Type 1 and 2 errors, each of these errors was considered at the lowest possible level ($\alpha = 0.01, \beta = 0.05$).

Inclusion criteria were informed consent for the participation in the study, healthy pregnancy and lack of

$$n = \frac{S_1^2 + S_2^2}{(\mu_2 - \mu_1)^2} f(\alpha, \beta)$$

Figure 1: Sample size calculation formula

difficulty, ability to read and write, singleton pregnancy, absence of chronic diseases (such as diabetes), living with a spouse, no history of infertility experience, no history of psychological illness, no participation in similar educational programs, and gestational age more than 20 weeks. Exclusion criteria were any serious problems or complications during pregnancy, lack of attendance in educational sessions (more than one session), and mother’s reluctance to continue attending educational sessions.

Data collection process

In the first stage, 91 pregnant women were examined for having the inclusion criteria, and 72 pregnant women met the desired criteria. Subsequently, each eligible participant in the study was randomly assigned to either the intervention or the control group. In this regard, a list was prepared of qualified participants. Then, a random number table was used to randomize each participant in one of the two intervention ($n = 30$) and control ($n = 30$) groups. The individuals who received the odd number were assigned in the intervention group and the other persons with even number in the control group. During the intervention and follow-up, six individuals were excluded from each group (due to their unwillingness to continue studying and absenteeism in more than one intervention session), and finally, the analysis of data was performed on 30 of each group [Figure 2].

The educational sessions were held in four official sessions over four consecutive 90-min sessions. The

summary of the content of each session is available in Table 1. In addition to the four official educational sessions, a checklist was also given to pregnant women for noting daytime exercises at home, and they were asked to do these exercises once a day. At the beginning of each session, after receiving the checklist, the educational materials of the last week were reviewed and the raised questions were answered. To improve participant adherence, investigators and participants increased open communication and trust each other. Participants could contact the researchers by telephone or telegram to keep communication. We provided compensation or rewards in several forms, including oral incentives and providing transportation fee.

Study instruments

The tools used in this study consisted of three sections.

Demographic profile form

This form included questions about age, gender, marital status, current gestational age, number of pregnancies, number of deliveries and maternal educational level.

Depression Anxiety Stress Scale-21

This scale was developed by Lovibond and Lovibond to investigate the NPS.^[13] This scale consists of a short form with 21 items and a collection of three subscales of self-assessment designed to measure negative psychological states of depression, anxiety, and stress. Each of its three subscales consists of 7 items that are scored in a four-point Likert scale; the range of responses

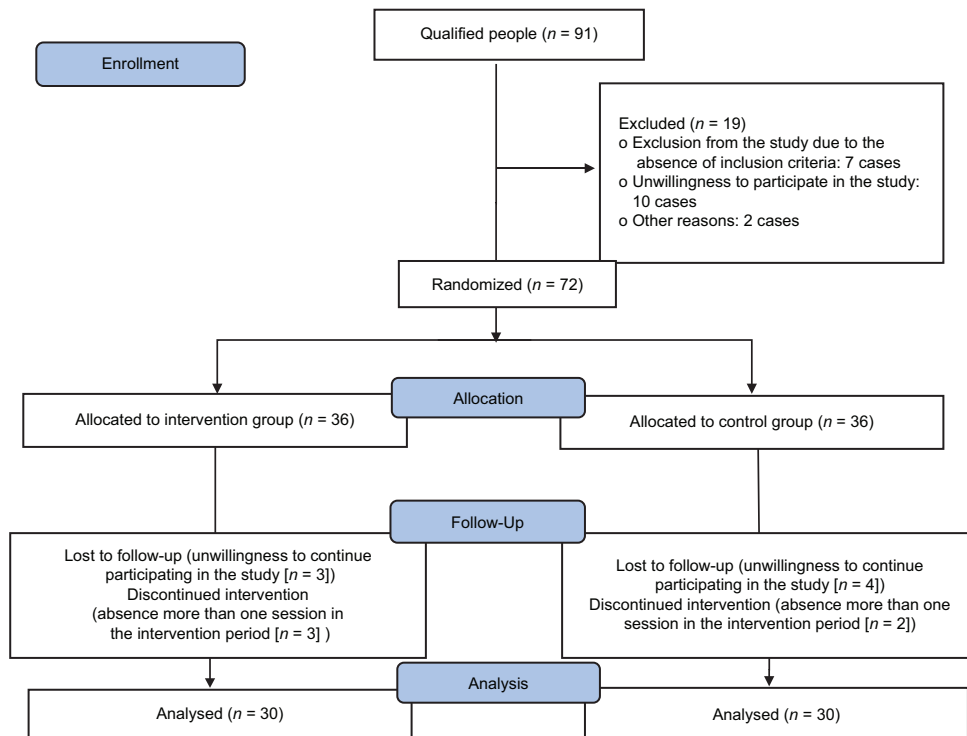


Figure 2: Consort flow diagram of study

Table 1: Outline of educational sessions

Educational sessions	Descriptions
First	Emphasizing the changes in anatomy, physiology, and hormones in pregnancy, the effect of pregnancy alterations on body and mind in pregnant women, learning stress-coping strategies, ways to better adapt to changes in pregnancy such as proper nutrition, individual health, physical and psychological health, knowing types of methods capable of improving the process of adaptation to changes in pregnancy, including relaxation and its effects on the pregnancy Learning and practicing relaxation: positioning in a relaxed environment, mental arrangements, deep muscle relaxation from the sole to the upper muscle, at last gently leave relaxation
Second	Focusing on cognitive dimension to overcome stress, embryo development in different months of pregnancy, the effect of nutrition and healthcare of pregnancy on maternal and fetal health, the effect of relaxation on the reduction of anxiety in pregnancy, and its impact on maternal and fetal physical and psychological health Practicing relaxation: directed concentration on a specific word, muscle relaxation, rhythmic and deep breathing
Third	An explanation of the signs and symptoms in pregnancy and how to treat them, the effect of relaxation on improving maternal sleep and nutrition, and in the attachment of mother to fetus and its effect on fetal growth Practicing relaxation: decreasing stress with physical and psychological release of externally stressors, tightening movements and backward movement to relax and expand
Fourth	An explanation of how to do relaxation in the delivery process, and the need for relaxation in postpartum recovery and lactation and reduce postpartum depression Practicing relaxation: relaxation initiated from the muscles of the head, face, and neck regularly and continued in the middle and end members of the body, including the contraction of the muscles of the back, buttocks, thighs, legs, and toes

varies from “never” to “always.” The lowest score is 21 and the highest score on this scale is 84, and earning a higher score is indicative of a higher NPS. The short form of Depression Anxiety Stress Scale-21 was validated by Sahebi *et al.* for the Iranian population. This scale was examined through internal consistency, factor analysis, and criterion validity by simultaneous implementation of Beck Depression Inventory, Zung Self-Rating Anxiety Scale, and Perceived Stress tests. The internal consistency of this scale was calculated using Cronbach’s alpha, and the depression scale was 0.77, the anxiety scale was 0.79, and the stress scale was 0.78.^[14]

Multidimensional pain inventory

Kerns *et al.* designed multidimensional pain inventory based on cognitive behavioral theory of pain, whose reliability and validity have been confirmed.^[15] The questionnaire consists of three independent sections. The first part, used in this study, has 20 items whose questions assess the issues such as daily activity dysfunction, pain intensity, social support, control over life, and emotional distress. How to respond to any of the questionnaire questions varies from 0 to 6 in a Likert scale. To score this questionnaire, the questions were summed and then divided by number of questions; the higher scores of the questionnaire exhibited more pain. Validity and reliability of this questionnaire have been approved in Iran. Ten experts in this field have been used to confirm the validity of the questionnaire. To investigate the reliability, the Cronbach’s alpha coefficient of the questionnaire varies from 0.77 to 0.92 and has a desirable reliability.^[16]

Ethical considerations

The present study was approved by the Ethics Committee of Kermanshah University of Medical Sciences,

Kermanshah, Iran (approval code: KUMS.REC.1397.499). To collect the data, the aim of the study was explained to the participants, and their written informed consents were gained. The participants were assured that their information would be kept confidential.

Statistical analysis

Statistical analysis was done by SPSS software (version 13.0; SPSS Inc., Chicago, IL, USA) using descriptive statistics including frequency distribution tables, mean and standard deviation, and analytical statistics methods, including Chi-square test and independent *t*-test, to verify the homogeneity of the two groups after random allocation of the groups. Paired *t*-test was used to compare the mean quantitative trait before and after the intervention in each of both intervention and control groups. Independent *t*-test was applied to compare the mean quantitative trait in the two control and intervention groups before and after the intervention (to compare the changes between the groups).

Kolmogorov–Smirnov test displayed the normal distribution of data. Due to the normal distribution of attained data, parametric methods were used for analysis. The significance level for all tests was <0.05.

Results

The mean age was 28.18 ± 3.38 in the intervention group and 28.63 ± 3.14 in the control group, and there was no significant difference between the two groups according to independent *t*-test (*P* > 0.05). On the other hand, two groups of intervention and control showed no significant difference in comparison of demographic variables [Table 2] (*P* > 0.05).

Table 3 shows the mean NPS (stress, anxiety, and depression) in both intervention and control groups. As shown in Table 3, the paired *t*-test result revealed a significant statistical difference in the intervention group before and after intervention ($P < 0.001$). Thus, in the intervention group, the mean stress, anxiety and depression scores, and total score were decreased significantly ($P < 0.001$). However, the control group did not show any significant statistical differences ($P > 0.05$). On the other hand, independent *t*-test indicated a significant difference between the mean scores of intervention and control groups ($P < 0.001$).

The mean multidimensional pain was significantly decreased in mothers after the completion of educational sessions ($P < 0.001$) and the independent *t*-test results indicated a significant difference between the scores of the intervention and control groups ($P < 0.001$) [Table 4].

Discussion

The present study showed that BRT and BPI significantly reduced the NPS in pregnant women. This finding was consistent with studies by Heidari Gorji *et al.*^[10] and Otaghi *et al.*^[17] However, studies by Heidari Gorji *et al.* and Otaghi *et al.* only used the BRT as an independent

Table 2: Comparison of demographic variables in intervention and control groups

Variables	Groups		P
	Intervention (n=30)	Control (n=30)	
Age of mother	28.18±3.38	28.63±3.14	0.596*
Current gestational age (week)	25.24±0.91	25.32±0.83	0.724*
Frequency of pregnancy	2.04±1.75	2.17±1.64	0.768*
Frequency of deliveries	1.83±1.51	1.61±1.49	0.573*
Economic problems in providing treatment cost (frequency)			
Low	8 (0.27)	11 (0.37)	0.702**
Moderate	10 (0.33)	9 (0.3)	
High	12 (0.4)	10 (0.33)	
Educational level of mother			
≤High school	9 (0.3)	7 (0.23)	0.844**
Associate degree	10 (0.33)	11 (0.37)	
≥Bachelor's degree	11 (0.37)	12 (0.4)	

*The independent *t*-test was used. **The Chi-square test was used. Continuous data were expressed as mean±SD. Categorical data were expressed as frequencies (%). SD=Standard deviation

Table 3: The mean negative psychological symptoms in the pre- and post-test between intervention and control groups

Variables	Groups	Mean±SD		Paired <i>t</i> -test
		Before intervention	After intervention	
NPS				
Stress	Intervention	17.13±4.28	12.57±3.03	$P < 0.001$
	Control	16.61±4.43	16.47±4.19	$P = 0.608$
	Independent <i>t</i> -test	$P = 0.637$	$P < 0.001$	
Anxiety	Intervention	19.24±4.15	14.14±2.68	$P < 0.001$
	Control	19.37±3.97	19.31±3.89	$P = 0.738$
	Independent <i>t</i> -test	$P = 0.899$	$P < 0.001$	
Depression	Intervention	18.43±6.66	14.97±3.85	$P < 0.001$
	Control	18.11±3.26	18.17±3.25	$P = 0.725$
	Independent <i>t</i> -test	$P = 0.683$	$P = 0.001$	
Total	Intervention	54.81±10.38	41.67±7.09	$P < 0.001$
	Control	54.07±9.49	53.94±9.15	$P = 0.731$
	Independent <i>t</i> -test	$P = 0.766$	$P < 0.001$	

All data are presented as mean±SD. SD=Standard deviation, NPS=Negative psychological symptoms

Table 4: The mean multidimensional pain in the pre- and post-test between intervention and control groups

Variable	Groups	Mean±SD		Paired <i>t</i> -test
		Before intervention	After intervention	
Multidimensional pain	Intervention	4.18±1.07	2.14±1.23	$P = 0.0001$
	Control	4.17±1.12	3.96±1.19	$P = 0.485$
	Independent <i>t</i> -test	$P = 0.972$	$P = 0.0001$	

All data are presented as mean±SD. SD=Standard deviation

variable (intervention), and the cognitive aspect of patients was not covered by the BPI; it seems that the lack of emphasis on cognitive dimension using the BPI reduces the effectiveness of interventions because both in the study of Heidari Gorji *et al.* and in the study of Otaghi *et al.*, we observed that the individuals performed the BRT twice a day and for 1 month to achieve the desired result, while the number of interventional sessions was dropped dramatically in the present study with the combination of BRT and BPI. The origin of NPS consists of two physical and psychological components. What is more evident in further studies is the one-dimensional emphasis on only one component of psychological symptoms, while the combination of interventions in this study covers both physical and psychological dimensions; and with the help of this advantage, more effectiveness can be achieved in fewer interventional sessions. For further investigation, it is suggested that the integrated intervention in this study should be compared with other interventions that consider only one dimension.

The BRT and BPI are considered as treatments for the NPS, which offer self-control coping skills to people for attenuating anxiety, stress, and depression. On the other hand, the contribution of BRT and BPI can also lead to quality of life, as Mowla *et al.*, in a study on mothers with a child suffering from chronic disease, showed that the combination of BRT and BPI can effectively lead to improve the quality of life of mothers.^[11] The emphasis on cognitive dimension in this study can help individuals to recognize that despite the automation of many of the body responses; they can change many of the NPSs in a positive direction and thus can control and reduce their stress in difficult circumstances.^[18]

The intervention used in this study seems to lead to changes in the NPS by reducing muscle tension and impact on cognitive and psychological dimensions. Therefore, the person's relationship with his or her inner experiences changes and makes the person to deal with the anxiety responses.

Since any NPS experience with physical and psychological symptoms is directly associated with physical symptoms and the relaxation training, in turn, produces somatic impacts that counteract the arousal effects (lowered heart rate, increased peripheral blood flow, and neuromuscular stability), the applied intervention has been effective in reducing stress and anxiety in the intervention group. Thus, the individuals in the intervention group have managed to some extent control and reduce their stress levels through the training they received.

The mechanism of BRT in reducing the NPS is based on the regulation of hypothalamus, the inhibition of

sympathetic activity, and the reduction of adrenaline secretion.^[9] On the other hand, it seems that in the present study, the BPI with an impact on cognitive dimension has significantly augmented to the effectiveness of BRT.

The other finding of the present study showed that BRT and BPI reduce multidimensional pain in pregnant women. In this regard, Solehati *et al.* argued that the use of BRT can attenuate the pain intensity in women after cesarean section. However, Solehati *et al.* considered the pain only limited to "Pain Intensity" and did not investigate the pain as a multidimensional phenomenon; on the other hand, they applied the BRT alone without the use of BPI that appears to be less efficient.^[19] Roditi *et al.* underlined that the use of cognitive dimension of psychological interventions can be helpful in managing the patient pain, as they believe that these interventions can apply the principles of psychology to make compatibility changes in the patients. In these interventions, the main goal is to learn coping skills with stress so that the individual can identify current maladaptive coping strategies and change them effectively to reduce the stress level.^[20] Despite the emphasis on the cognitive dimension, most studies have separately used the BRT and cognitive interventions.^[19,20] It seems that the BRT and BPI could help the pregnant women to reduce their unpleasant sensations toward their symptoms, get relief from severe psychological stress, and get hopeful about future. Such changes then have led them toward a better psychological adaptation and decreased their multidimensional pain.

One of the limitations of this study was fatigue of pregnant women during intervention sessions. In this regard, we tried to use more rest time. Another limitation of this study was the lack of blinding that should be considered in the future study designs. On the other hand, in this study, we did not compare the intervention to another intervention; it is recommended to use a factorial design for future studies to compare the current intervention with other interventions in complementary medicine (aromatherapy, reflexology, guided imagery, etc.). To use BRT and BPI for a larger sample, it is recommended to use large group teaching methods including teleconferencing, computer-/web-based learning, and e-learning.

Conclusion

Overall, the present study showed that the combination of BRT and BPI intervention can alleviate the NPSs (anxiety, stress, and depression) and the multidimensional pain in the pregnant women. Thus, the NPS and multidimensional pain can be controlled in these patients by focusing on two cognitive and somatic dimensions in the pregnant women. It is suggested to conduct in-service

educational programs for health advisers and treatment staff, including nurses, and consider combination of BRT and BPI intervention as part of a healthcare program in pregnant mothers.

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Conflicts of interest

There are no conflicts of interest.

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