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The effect of stress inoculation training on anxiety and quality of sleep of pregnant women in third trimester

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Abstract

Introduction: The aim of the present study was to examine the effects of Stress Inoculation Training (SIT) on anxiety and quality of sleep of pregnant women in third trimester.

Materials and Methods: This clinical trial conducted in a pre-test and post-test design with a control group. In this study 40 pregnant women were selected by cluster sampling from those referred to Nabi-e-Akram and Me'raj health centers of Bushehr city in the winter of 2013, who were at 31 or 32 weeks of pregnancy, and fulfilled the required research criteria. Then they were randomly allocated to one of the experimental or control groups. After the pre-test, the experimental group was subjected to 7 sessions of SIT training. Data were collected using Beck Anxiety Inventory (BAI) and Pittsburgh Quality of Sleep Questionnaire (PSQI). Data were analyzed by t-test, covariance analysis and SPSS 16 software.

Results: The results showed a significant decrease in the post-test mean scores of anxiety and sleep disorder in the experimental group compared to the pre-test and control group (P=0.01). The findings support the effectiveness of SIT in relieving anxiety and sleep disorder in pregnancy.

Conclusion: It seems that the use of psychological interventions such as stress inoculation training can reduce distress and improve women's health during pregnancy.

Keywords: Anxiety, Pregnancy, Quality of sleep, Stress

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Introduction

Although the process of becoming a mother is considered to be one of the significantly joyful and evolutionary events in every woman's life and also for her family (1), but it is accompanied by a new set of emotional and mental stressors and dramatic physiological changes (2). Some researchers believe pregnancy to be a position-related crisis saying "pregnancy which mostly ignites considerable happiness in the parents can cause anxiety in some women" (3). Different studies show different rates of anxiety in pregnancy; some studies indicate the emergence of anxiety in the first three months and some indicate it in the second three months of pregnancy (4, 5).

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Lee and his colleagues reported that anxiety develops throughout pregnancy especially as they go through labor and it gradually in increases (3). Pregnancy anxiety can cause several different outcomes including serious nausea and severe vomiting, fatigue (2), pregnancy poisoning, low birth weight of the baby, fetal distress, still birth, the death of the newborn and some kinds of abnormalities in the newborn such as cleft palate, pyloric stenosis (6 - 8). According to O'Connor & colleagues, pregnancy anxiety increases early childhood behavioral problems (9). Pregnant mothers' anxiety affects them as well and causes negative perception towards labor and birth, unnecessary fears about the birth of the child and motherhood, and self-medication with alcohol or limitation of activity in them (10). Due to Corticotropin Releasing Hormone, anxiety can cause preterm birth childbirth and the baby is born earlier than expected (11). One of the other factors that may happen is the mother's hypertension which can end

in abortion (12). Some researchers believe that maternal anxiety during pregnancy can damage the relationship between the child and the mother and decreases mother's ability of fulfilling the motherhood role (3,13).

Sleep disturbances is another one of the problems of pregnancy which has often been reported by pregnant women (14,15). Studies show that pregnant women, in comparison with their non-pregnant counterparts, experience more sleep disturbances during pregnancy (16). As they go through the 12th week of pregnancy, till 2 months after labor (17) pregnant women suffer shorter sleeping hours, frequent insomnia, having problem getting to sleep (18), or difficulty starting to sleep, losing the deep stages especially stages 3, 4, on which the quality of sleep depends (19), and feeling sleepy during the day, too much frequent snoring, and sleep disorders due to sleep apnea (20).

Pregnancy is accompanied with hormone, anatomic and mechanical changes which in turn cause the shift in sleep patterns and the quality of it (21,22). Estrogen and progesterone hormone changes and an increase in the plasma level of cortisol, effect natural sleep during pregnancy (23). Physical problem such as frequent urination during pregnancy, upset stomach, fetal movement, increased uterus size (Uterine contractions), low back pain (24), and some affective factors such as fear of taking care of the baby and acceptance of the new role as mother can cause difficulty in sleeping during pregnancy (23). Such sleep pattern disorders can be due to anxiety or be the cause of it (25,26).

Sleep difficulties in pregnancy cause increased hypertension, probable preterm labor, low weight of the newborn, prolonged labor, depression and anxiety during and after pregnancy (27), and it also seems to be suggesting the post labor depression (28,29). Excessive sleep difficulty increases the potential of weak mother-child relationship whose excessive case can lead to neglect of the child (30,31). Some studies indicate a relationship between these disorders and medical conditions such as Insulin resistance and Glucose intolerance and type 2 Diabetes (32- 35).

Considering the unpleasant effects of anxiety and sleep difficulties on the health of the mother and the fetus, and respecting the unknown side-effects of sedatives on the fetus, and also there is empirical data asserting the effectiveness of teaching stress management and relaxation methods on decreasing mental stress symptoms (36-38), it is suggested that teaching stress inoculation can improve quality of sleep and decrease pregnancy anxiety in pregnant women.

"Training stress inoculation" technique is one of the most common forms of cognitive-behavior therapy modes developed by Meichenbaum, one of the founders of cognitive-behavior therapy (39). Training stress inoculation, like physical illness inoculation helps individuals get ready for the difficult experiences that happened in the past and may also happen in the future. Individuals are taught to predict these situations and practice ways in which dealing with these difficult situations in future, and the stress resulted from that, will be of control to them. Meichenbaum stresses cognitive factors in stress inoculation, one of which one can be the way people justify stressors in their daily lives for themselves (40).

According to this theoretical framework, this study was conducted to determine the effectiveness of training stress inoculation on anxiety and quality of sleep of pregnant women based on an educational plan.

Materials and Methods

This study is a clinical trial, recorded in the Clinical trials website under the code IRCT2014031716093N1. The study included an experiment and a control group with pretest and posttest. The statistical population included all the pregnant women who came for pregnancy care services to the sanitation institutes and centers in Bushehr city during the winter of 1391. In the experimental studies, at least 15 people are chosen for each sample group (41). In choosing the members of such groups, one must consider the dropout of the group members, therefore using the cluster sampling method from among 11 Sanitation Centers in Bushehr city, Nabi-e-Akram and Me'raj Sanitation Centers were selected, 40 people of all the pregnant women coming to these two centers, those early in the third trimester of pregnancy and who had filled out the demographic questionnaire qualifying to them to enter the study, were selected and then they were divided into control and experiment groups using simple random sampling. Some of the conditions to enter the study were; being able and eager to take part in the training program, being in the 31st or 32nd week of pregnancy, not taking part in similar pregnancy educational classes, not having had stress inducing or traumatic events in the recent 3 months in the family, having a satisfactory marital life, good economical situation, not having a physical illness causing sleep disorder and anxiety, not having a psychiatric record, having studied two years in college or more, and the age range was between 23 and 33.

It is notable to mention that the criteria mentioned for the participants of the study existed in their medical records and to make sure about their validity, the personnel of the hospital and the Sanitation Centers were asked to confirm the information in these medical records and hence they were controlled and checked. Also in case the participant chose to quit the study or if pregnancy shifted to a dangerous state (danger of having an abortion, bleeding, preeclampsia), preterm labor (before the 38th week of pregnancy), they would be excluded from the study. Four people of the experiment group in this study were discarded because of preterm labor, danger of abortion and moving.

After the participants of the experiment and control groups were finally admitted to the study, they were asked to go to their chosen Sanitation Center. Before the experiment was conducted, the participants' agreement for taking part in the study was met and they were taught how the experiment would go. The Beck Anxiety Index (BAI) and Pittsburgh Quality of sleep Index (PSQI) were filled out by the participants and also they were told of the secrecy of the information they provide for the study. The experiment group practiced 7 sessions of SIT training using Donald Meichenbaum's (42) inoculation training, every once in a week in sessions of 60 to 90 minutes. The time span for conducting the training sessions were early Bahman through late Esfand of 1391, and the place was one of the rooms of the Sanitation Center that had good physical spatial quality, with no noise or traffic of the staff or other clients. After the educational intervention was done, both the control and experiment group were re-evaluated through Beck Anxiety Index (BAI) and Pittsburgh Quality of sleep Index (PSQI) and acknowledging the participants, the sessions ended.

The variables of the study were evaluated through the following instruments:

Research Instruments

A) Beck Anxiety Index (BAI): the Beck Anxiety Index was developed by Beck and colleagues in 1990. This index has been designed to measure anxiety and consists of 21 items for each of which four choices can be selected, ranging from not at all (0), mildly (1), moderately (2), severely (3); The BAI has a maximum score of 63 (43). Osman and colleagues study confirm the validity of Beck Anxiety Index (44). Kaviani and Musavi's study reported a reliability of 83% and validity of 72% and internal consistency of 92% (45).

B) Pittsburgh Quality of Sleep Index (PSQI): This index is an international standard instrument and has been validated in several studies. This index is used to measure the quality and patterns of sleep in the older adult during the past month (46); it has seven domains: subjective quality of sleep, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. The overall scores of the index range between 0 and 21 and a sum of "6"or greater indicates a "poor" sleeper (47). Studies indicate that PSQI has proved right in pregnancy related researches (26).

Studies inside our country have reported validity and reliability of this index (48-50). HoseinAbadi and colleagues investigated and confirmed the validity of this index and reliability was reported 88% (38). Also in Soleimani and colleagues' study the reliability of the index was re-measured and they reported 84% (51). Aghajani and Ghoraishi's study, reported Cronbach's alpha 89% and in Aghajanlu and colleagues' study Cronbach's alpha was 86% (52,53). A researcher-made questionnaire was used In order to get the demographic information of the participants to find a consistent sample consisting of such items as age, pregnancy age, eagerness to take part in the training program, education, economic status, marital satisfaction and lacking any physical or mental ailment. The data of the study were analyzed using inferential and descriptive statistics including independent t test and ANCOVA using SPSS 16 software.

Results

In terms of demographic features the mean of the experiment group's age was 28.8 the mean of the control group's age was 28.56. Also of all the 16 people in the experiment group 4 had studied two years in college (25%), 8 were BA (50%), 3 were MA (18.7%) and one had a doctorate (6.2%) and in the control group 6 had studied two years in college (37.5%), 8 were BA (50%), 2 were MA (12.5%). 2.56% of the mothers in the experiment group were in the 31st week of pregnancy and 43.7% of them were in the 32nd week of their pregnancy. In the control group, 62.5% of the mothers were in the 31st week of pregnancy and 37.5% of them were in the 32nd week of their pregnancy.

It is notable to mention that all the participants of the two groups (16 control and 16 experiment participants) reported marital and economical status satisfaction.

The descriptive scales mean of the anxiety scores in the experiment group in the pretest stage of the study was 16.43 and this mean was 10.25 in the control group. In the posttest stage, the mean of anxiety in the experiment group is 3.56 but in the control group this scale is 9.3 (Table 1).

Table 1. Descriptive measures of anxiety scale

Groups	Variables	Number	Mean	SD
Experiment	Pertest	16	16/43	5/97
	Posttest	16	3/56	2/39
Control	Pertest	16	10/25	3/83
	Posttest	16	9/3	4/07

The descriptive scales mean of quality of sleep in the experiment group in pretest stage is 12.37 and in the control group it's 12.93. In the posttest stage of the experiment the mean of quality of sleep of the experiment group is 8.18 but for the control group this is 13.25 (Table 2).

Table 2. Descriptive measures of quality of sleep scale

Groups	Variables	Number	Mean	SD
Experiment	Pertest	16	12/37	1/78
	Posttest	16	8/18	1/68
Control	Pertest	16	12/93	1/98
	Posttest	16	13/25	2/90

The covariance analysis results show a significant difference between the adjusted mean of anxiety in the experiment and control groups. The group effects with the score (12.120) and the level of significance is (P<0.01) therefore with the confidence level of 99% we can say that the Stress Inoculation Training has a significant influence on reducing anxiety in the experiment group (Table 3).

Table3. Analysis of covariance effect of stress inoculation training on anxiety quality of sleep

Variables	Scale	df	Mean square	F	Significant level	Volume effect
Anxiety	Pertest	1	0/015	0/052	0/01	0/52
	Groups	1	3/624	12/120	0/01	
Sleep	Pertest	1	0/077	0/013	0/01	0/54
quality	Groups	1	201/481	34/500	0/01	

Table 3 also shows a significant difference between the adjusted mean of quality of sleep in the two groups. The effects of the groups with the score (34.5) is significant (P<0.01).

Therefore with 99% of confidence we can say that Stress Inoculation Training has significant influence on improving quality of sleep of the experiment group.

The independent t test results show that (t=5.39) (P<0.01, d=30) and with the confidence level of 99% we can say that there is a significant difference between anxiety scale in the experiment group mothers (SD=2.39, M=3.56) and the control group (SD=4.07, M=9.93) (Table 4).

Also the independent t test indicate that (t=6.02, P<0.01, d=30) is significant. Therefore 99% of confidence we can say there is a significant difference between sleeping quality of the mothers in experiment group (SD=1.68, M=8.18) and the control group (SD=2.90, M13.25) (Table 4).

Table4. T-test for comparison of anxiety and quality of sleep in experimental and control groups

Scale	Groups	Posttest			df	T	Significant level
		Number	Mean	Standard deviation			
Anxiety	Experiment	16	3/56	2/39			
	Control	16	9/93	4/07	30	5/39	0/01
Sleep	Experiment	16	8/18	1/68			
quality	Control	16	13/25	2/90	30	6/02	0/01

Discussion

The findings of the present study show that Stress Inoculation Training influences pregnancy anxiety, in a way that unlike the control group, the experiment group's anxiety decreased dramatically in comparison with before the intervention and this could be due to the participants' different coping skills (relaxation, cognitive restructuring and …). In training the cognitive restructuring skill the patients were taught to learn to focus on the task rather than on themselves, because thoughts related to the task leads to positive evaluations and also using the identification of negative thoughts and cognitive restructuring, the patients realize the thoughts which bring about anxiety and they learned to express their emotions and issues and pour out their emotionally deformed responses. By encouraging the participants to develop relationships and social support and maintaining them, anxiety has been decreased. Also training relaxation has helped the clients to cope with their daily stress and anxiety (39).

This finding is in line with those of Ghamari; Hoseinzadeh and Shauhan and Hern's (quoted by Purhomayun) saying that Stress Inoculation Training as a cognitive-behaviorist approach can reduce anxiety (54-56). This finding also corresponds with Felixman and Bond whose study showed the influence of Stress Inoculation Training on reducing mental tension in working people (57). HoseiniNasab et .al, Davis and Chang, Wang and Chen showed and reported that non-medical interventions training in pregnancy can: reduce pregnancy anxiety and the trained women experienced much less anxiety in comparison with the control group, and the current study corresponds with these findings (58,59,38).

The findings of this study is in line with other such studies, Darreh Shuri Mohammadi, Basak Nezhad and Sarvghad showed in their studies that training stress management is a good approach for improving mental health and reducing status/trait anxiety and pregnancy anxiety (36). In his study, Karaamuzyan stated with 99% of confidence that

training cognitive-behaviorism stress management has a significant influence in reducing the anxiety of pregnant women (60).

It is also corresponding with Figarido, Kandeh, Lee et, al, MossalaNezhad et, al, ShahHoseini et, al, who assert the pregnancy anxiety and anxiety related disorders contaminant during pregnancy (3,5,61,62).

The findings of the present study show that training stress inoculation improves quality of sleep in pregnancy. According to this it can be concluded that sleep disturbance during pregnancy is due to the stress of this period of time. In fact we could say that some emotional factors such as stress and fear of taking care of the baby and acceptance of the new role and anxiety that influence normal sleeping patterns (23), with mental imagery and replacing positive thoughts, both in the training sessions and at home have been manage and controlled.

The findings of this study is confirming those findings of Moradkhani, Malekzadegan, Ashayeri, and Haghani's whose findings show that relaxation exercises can influence pregnant women's sleep disturbances in their late three months of pregnancy and reduces these disturbances (23). Several studies have also asserted sleep disturbances contaminant with pregnancy (14-18) and the findings of the present study are in line with them. Although subject, method and the application of the above studies are different on the surface, but these findings show that training psychological skills including Stress Inoculation Training can be used as a tool to improve quality of sleep and reducing pregnancy anxiety in pregnant women.

In the end, due to the lack of collaboration from the officials of the Sanitation Centers especially in terms of providing information from the participants' clinical records and also the limitation regarding the population of the study which accompanies the results of the study with some sort of caution and inference; it is necessary to add that if in the future studies posttest are conducted in different time spans, to make sure of the influence of the intervention, and also predicting some ways to get the collaboration of the officials of such Sanitation Centers, the results of such studies will be much more subject to certainty. In terms of the application of the findings it is of interest to say that Sanitation Centers, especially mental health and mental services institutes should put more stress on providing space for better mental services and more focus on Stress Inoculation Training programs for pregnant women; and along with that they should give out informative brochures and conduct educational programs regarding the supportive role of such interventions, provide more opportunity for pregnant women to benefit from these programs.

Conclusion

From the findings of the present study it is clear that training stress inoculation can considerably reduce sleep disturbance and pregnancy anxiety. Regulating educational programs and psychological interventions in terms of Stress Inoculation Training can reduce the damage and improve quality of sleep of and health of women during pregnancy.

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