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# The effect of yoga on anxiety among pregnant women in second and third trimester of pregnancy

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## ABSTRACT

The purpose of this study was the effect of selected yoga exercises on anxiety in pregnant women in the second and third trimester. Therefore, 24 healthy, non-athlete, and volunteer pregnant women in the second and third trimester of pregnancy were divided into experimental and control groups. They participated in a pretest-posttest randomized-groups design. The anxiety level was assessed by Pregnancy Outcome Questionnaire (POQ) in pregnancy. The experimental group performed the selected yoga exercises for 8 weeks. Data analysis using 2(group) \* 2(trimester) \* 2(test) ANOVA with repeated measures of test factor indicated the significant main effect of test and interaction of test and group ( $p < .001$ ). Other effects were not significant. In general, it can be concluded that yoga exercises regardless of trimesters of pregnancy has a positive impact on women's anxiety.

**Keywords:** anxiety, pregnancy, yoga

## INTRODUCTION

Some researchers believe that severe anxiety during pregnancy hurts the Mother-infant relationship and reduces the mother's ability to play the maternal role [1]. Physical experiences and studies show that maternal prenatal stress is associated with increased risks of abortion in itself, premature delivery, fetal disability, fetal growth retardation and asymmetric growth of the baby. Besides high stress in pregnancy increases the stress hormones, which can cause increased blood pressure and birth weight loss [2,3]. It is normal for a pregnant woman to be emotionally unstable, anxious about her baby and her own health and concerned about the changes that will happen in her life since the birth of her child. Understanding of responsibilities and heavy maternal duties, contradictory feelings of vitality on one side and feelings of fear and anxiety on the other side creates instability mode in a pregnant woman. A relatively large group of women have a great fear of pregnancy and delivery and are constantly in fear to imagine a hard and abnormal labor or their baby will be dead due to birth defects or other diseases. The woman's mood during pregnancy may change because of being interested in a particular gender, dominant culture of pregnancy and fetus sex, no interest in becoming pregnant and having kids [4].

Pregnancy can be stressful enough to prompt a mental illness. Women respond to stressors of pregnancy using variety of methods from the psychological perspective [5]. In general pregnant women are faced with anxiety, sleep disorder, night time sleep from the 12<sup>th</sup> week of pregnancy until the first two months after delivery that these errors in sleeping patterns is due to anxiety or cause anxiety. Stressful events prior to delivery not only affect the children's mental health in childhood but also they are also associated with the mental health problems in adulthood and this shows the issue significance and its profound effect on whole life [6].

Yoga during pregnancy helps women to focus on the delivery process and be prepared to tolerate the pain and change the stress and anxiety into energy. Yoga during pregnancy raises the birth weight, reduces the early delivery,

intra uterine growth delay, and high blood pressure caused by it. Yoga is an excellent way to stay fit during pregnancy, because almost every yoga postures can easily meet the needs of pregnant women [7].

In yoga therapy, yoga movements, breathing control, relaxation, meditation, and diet are used to get rid of Muscular and emotional stress, increasing concentration, raising blood oxygen levels, and to assist the body in its recovery [8]. Yoga techniques can be used to meet the needs of people with any physical abilities and age above 5 years old. Even if some people fail to do some needed physical postures, they are still able to benefit of its respiratory and meditative techniques. Yoga helps with flexibility and muscle strength and teaches pregnant women to listen to their bodies, to reduce stress and to soothe the mind. Yoga helps to improve the physical condition, strengthens the back muscles, and strengthens the lower abdominal and pelvic muscles and facilitates the labor and delivery and will help to create a perfect balance of physical and mental health [7].

There are few studies of benefits of yoga on various mental and physical aspects in pregnant women who are faced with numerous problems. Many researchers in these studies have used scales such as Spilberger State-Trait Anxiety Inventory [9-14] and Perceived Stress Scale (PSS) [3,12] while these scales have not been made to assess pregnancy concerns, so it is felt that there is a need for extensive scientific studies on the effect of yoga on mental disorders for the most vulnerable period of a woman's life that is pregnancy using special pregnancy questionnaire by physical education specialists. Considering the importance of early treatment of mental illness prior to the childbirth and yoga is effective in healing and treatment of many psychiatric disorders, the question in this study was if the 8 weeks of yoga practices had an effect on psychological anxiety among pregnant women in the second and third trimesters.

### MATERIALS AND METHODS

The participants were 24 volunteer healthy non-athlete pregnant women aged 23-33 yr. in the second and third trimester of pregnancy that divided to experimental and control groups. The experimental group with age mean ( $\pm$ SD) 29.42 $\pm$ 3.4 yr. consisted of a group of 7 pregnant women in their second trimester and one 5-person group of pregnant women in their third trimester and the control group with age mean ( $\pm$ SD) 27 $\pm$ 3.7 yr. consisted of a group of 6 pregnant women in their second trimester and one 6-person group of pregnant women in their third trimester. All the participants were in good health and those who were suffering from any diseases that would prevent them from doing the exercises were not participated in the study. The participants filled out the consent form. Based on the minutes P - 26 - 07/06/2011 Council Committee of the 0026 Code of Ethics in Medicine was awarded to this project.

They participated in a pretest-posttest randomized-groups design. At first anxiety level was measured by Pregnancy Outcome Questionnaire (POQ). POQ was developed and used by Theut, Pederson, Zaslow, and Rabinovich in 1988 [15]. They confirmed its reliability through Cronbach's alpha coefficient of  $\alpha = \%80$ . This questionnaire is consisted of 15 items with responses ranked on a 4-point Likert scale with response options (1) never (2) sometimes (3) most often (4) always and scoring for the items of 1, 6, 11, 13, 14 and 15 is reversal. The minimum score is 15 and the maximum is 60 points. More points represent the more anxiety. Control and experimental group filled out the questionnaire twice in pre and post test in the gynecologist office and in the training hall, respectively.

Twelve volunteer pregnant women were selected for the experimental group and 12 women who refused to perform yoga were selected as control group. In the next step, the experimental group was involved in yoga selected exercises which included Asana, Panoramas, visualization, meditation, and muscle relaxation [3]. Yoga was followed up two days a week for 60 minutes with a special trainer. The subjects were asked to do both the inhalation and exhalation correctly together during all yoga postures. After that the breathing exercises (Prayanama) such as Nadi Shudan and Shitali were performed for 10-15 minutes. Meditation, delivery visualization and muscle relaxation was performed for 15 minutes. It was attempted to consider a new practice of meditation and delivery visualization every session. The exercises were begun by light moves in the first sessions and the load was added gradually. New exercises were intended each session to avoid the monotony of the class and make the pregnant mothers interested in pursuing the class. The post test from both experimental and control groups were performed using POQ after 8 weeks.

After descriptive statistics to determine the characteristics of the sample, Kolmogorov-Smirnov (K-S) test was used to determine the data normality. Data was analyzed by 2(group) \* 2(trimester) \* 2(test) ANOVA with repeated measures of test factor with significance level  $p < .05$ . The t tests with a Bonferroni correction were used to pairwise comparisons.

RESULTS AND DISCUSSION

Figure 1 shows the mean of subgroups' anxiety (experimental in 2<sup>nd</sup> trimester, experimental in 3<sup>rd</sup> trimester, control in 2<sup>nd</sup> trimester, and control in 3<sup>rd</sup> trimester) in pretest and posttest. According this figure a reduction of anxiety was seen in experimental groups.

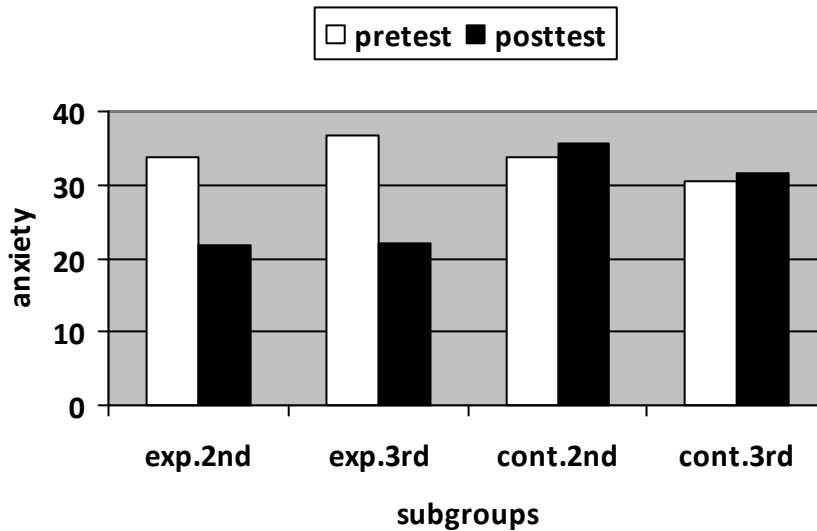


Figure 1. The mean of experimental and control groups' anxiety in pretest and posttest.

Based on results of K-S test, data distribution was normal ( $p > .05$ ). Table 2 shows the results of 2(group) \* 2(trimester) \* 2(test) ANOVA with repeated measures of test factor. According to this results the main effect of test ( $F_{(1,18)} = 14.627$ ,  $p = .001$ ) and the interaction of testing and group ( $F_{(1,18)} = 23.574$ ,  $p = .0001$ ) were significant and other effects were not significant.

Table 2. Results of 2(group) \* 2(trimester) \* 2(test) ANOVA with repeated measures of test factor

source \ Statistics	SS	df	MS	F	p
test	341.096	1	341.096	14.627	0.001
test*group	549.723	1	549.723	23.574	0.0001
test* trimester	7.566	1	7.566	0.324	0.576
test*group* trimester	2.076	1	2.076	0.089	0.769
error	419.750	18	23.319		
group	228.334	1	228.334	3.377	0.081
error	1352.325	20	67.616		

The results of paired t-test with Bonferroni correction to compare the pretest and post test of each group have been given in table 3. Difference of anxiety of experimental group in pretest and posttest was significant ( $p < .008$ ).

Table 3. Results of paired t test with Bonferroni correction

group \ Statistics	Mean difference	SD	t	df	p
experimental	12.800	9.378	4.316	9	0.002
control	-1.583	2.429	-2.258	11	0.045

The results of the independent t-test with Bonferroni correction to compare the two groups in pre and posttest have been shown in table 4. The results revealed that there was no significant between groups difference in anxiety of pretest ( $p > .008$ ) but the difference was significant in posttest ( $p < .008$ ).

Table 4. Results of Independent t test with Bonferroni correction

group	Statistics	Levine test		t	df	p
		F	p			
Control and experimental group	Pretest	4.463	0.054	1.113	21	0.278
	Posttest	2.496	0.129	1.084	21	0.0001

The results of this study suggest that selected yoga exercises have a significant impact on pregnant women's anxiety. This finding was consistent with majority of previous studies; for example Javanbakht, Hejazi Kenari, and Ghasemi in 2009 [16], Michalsena et al. in 2008 [12], Moin in 2010 [17], Shapiro et al. in 2007 [18], and Smith, Hancock, Mortimer, and Eckert in 2007 [19] which showed the influence of yoga on reduction of depression, anxiety, and stress and was consistent with Beddoe, Kennedy, Weiss, and Lee in 2009 [20], Field et al. in 2012 [21], Narendran, Nagarathna, Narendran, Gunasheela, and Nagendra in 2005 [22], Rakhshani, Maharana, Raghuram, Nagendra, and Venkatram in 2010 [23], Satyapriya, Nagendra, Nagarathna, and Padmalatha in 2009 [3], and Urech et al. in 2010 [24] that showed the effect of yoga on reduction of stress, anxiety, disorders associated with pregnancy and improving women's mental health indices. Due to abundant and undeniable effects of yoga on mental and physical health and its influence on reducing levels of anxiety, stress, and depression of pregnant women that is necessary for pregnant women and also admitting special conditions during pregnancy such as overweight due to pregnancy, specific changes in organ systems to accommodate the mother's body in this period, problems such as cravings, nausea and vomiting, fatigue, lack of energy, back pain, foot pain or changes that are caused in body appearance, if it is taken into consideration and if it is removed, makes her to go through a very quiet, happy and pleasant period away from stress and anxiety that has surrounded her. This study and studies presented above are parallel. Yoga is a great way to stay fit during pregnancy because yoga posture can easily meet the needs of pregnant women. Yoga teaches pregnant women to listen to their body and reduce stress and anxiety and to quiet the mind. There is no text available suggesting negative effect of yoga on physiological and psychological consequences [7].

Findings of the present study in relation to effectiveness of selected yoga exercises on anxiety in the second and third trimester of pregnancy showed no significant difference between these periods. This case shows that yoga has positive effects on anxiety in both periods and this effect was significant, but no significant difference was seen between levels of anxiety in the second and third trimester of pregnancy that was not consistent with results of Teixeira, Figueiredo, Conde, Pacheco, and Cost in 2009 [14], Skouteris, Wertheim, Rallis, Milgrom, and Paxton in 2009 [25]. The difference in studies may be due to the questionnaire used to measure the anxiety level of participants that have not been made to assess prenatal Concerns. Sample size of different studies (24 in the present study, 300 in Teixeira et al., and 207 in Skouteris et al study) can be noted of other possible causes of inconsistency that only deal with examining anxiety in different periods of pregnancy.

## CONCLUSION

According to the study results which showed that yoga is effective to reduce anxiety in pregnant women, regarding mobility restrictions on pregnant women and specific conditions of their physical and mental health problems, yoga classes are recommended to reduce anxiety during the second and third trimester as effective and convenient tool that require limited financial and spatial resources in health centers and places where women are under the supervision.

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