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## Research Article

# Comparative Effect of Attachment and Relaxation Training on Perception of Fetal Movement and Mother's Anxiety in Primiparous Women: A Randomized Controlled Study

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## Abstract

Educational methods can be effective in reduction of mother's anxiety and improvement of fetal movements. The present study aimed to investigate the effect of attachment and relaxation training on fetal movements. This randomized controlled clinical trial by using the table of random numbers was conducted on 126 primigravida women who had referred to Hafez and Shoushtari hospitals affiliated to Shiraz University of Medical Sciences in 2012. The participants were randomly divided into relaxation, attachment and control groups, each containing 42 subjects. The interventions of maternal-fetal attachment training and relaxation took part in four 60-90 min classes held once a week and each meeting was held with 14 mothers in both intervention. Spielberger's anxiety scale and Cranley's attachment scale were completed before and after the intervention were analyzed using descriptive and inferential statistics. Results showed the mean age of the participants was 23.9 years. No significant difference was found among the 3 groups regarding the mean score of anxiety (0.58) and mean number of fetal movements (0.52) before the intervention. However, the mean and standard deviation of anxiety score was reduced after the intervention in the two intervention groups compared to the control group ( $p = 0.036$ ). So, the mean number of fetal movements was increased after the intervention in the two intervention groups compared to the control group ( $p < 0.001$ ). In conclusion, attachment and relaxation training was increased their mother's perception of fetal movements which are effective in fetal health but in the relaxation group the difference was not statistically significant. Therefore, they can be used as a routine prenatal educational program.

**Key words:** Attachment, relaxation, anxiety, fetal movement

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**Data Availability:** All relevant data are within the paper and its supporting information files.

## INTRODUCTION

Although becoming a mother is among the pleasurable phenomena of women's life bringing about parent's happiness, it is accompanied by tensions and worries due to its accompanying physical and psychological changes (Harris *et al.*, 1996). The women are not sufficiently supported by the family members or the medical staff, their fears are increased and eventually lead to depression and anxiety (WHO., 2008). High levels of anxiety and stress increase the probability of preterm birth, low birth weight, miscarriage and infantile disorders (Harris *et al.*, 1996).

In general, anxiety disorders are highly common during pregnancy and play a major role in quality of life. Evidence has shown that a 30% increase in anxiety disorders during pregnancy might have negative effects on the fetus (Toosi *et al.*, 2014; Karmaliani *et al.*, 2009; Glover, 2014; Alder *et al.*, 2007; Punamaki *et al.*, 2006). Now a days, various methods are used for decreasing anxiety. Studies have shown that anxiety reducing interventions, such as yoga, progressive muscle relaxation and massage could help improve the pregnancy outcomes (Fink *et al.*, 2010; Narendran *et al.*, 2005; Field *et al.*, 2012). The results of a previous study indicated that fetal response to mother's relaxation included reduction of heart rate and increase of heart rate variability, just similar to the time the mother was sleeping. In addition, mothers reported more fetal movements after relaxation training (Saisto *et al.*, 2006).

A previous study showed that maternal-fetal interactional activities, including talking to the fetus, touching the fetus and paying attention to the fetal movements, improved attachment (Nishikawa and Sakakibara, 2013). In fact, behaviors such as counting the number of fetal movements stimulate the mother's emotions and her interaction with the fetus. Fetal movements and heart rate are directly related to gestational age and maturation of the nervous system (Maeda *et al.*, 2006). In another study, relaxation improved maternal and fetal heart rate variability and fetal movements ( $p = 0.01$ ) (DiPietro *et al.*, 2008).

Number of fetal movements has been long considered as an indicator of fetal health. Thus, counting the number of fetal movements is an indirect criterion for evaluation of the performance of central nervous system and fetal health. Fetal movements can have positive effects on attachment before birth, because the fetus will be more tangible for the mother after movement. The mothers with higher levels of attachment feel the fetal movements more (Cunningham *et al.*, 2001; Mikhail *et al.*, 1991).

Furthermore, fetal movements can be an indicator of physiological growth and vital activities. Normally, the fetus

moves in 10% of its fetal life during 30-40 weeks of gestation. As the mother gets close to the end of pregnancy, the fetus is completed and its sleeping and waking hours are stabled. Therefore, it will move less but the fetal movements tend to increase in some time points, such as evenings which can be attributed to the fetus' complete wakefulness at these time points. In general, sufficient fetal movement is considered as one of the indexes of fetal health (Velazquez and Rayburn, 2002; O'Neill and Thorp, 2012). According to the studies conducted on the issue, in case fetal movements are absent for 12 h in spite of acceptable heart rate, the fetus has an inappropriate status and pregnancy should be terminated (Narendran *et al.*, 2005).

Due to these considerations, the pain and anxiety during labor has negative impact on the fetal-maternal attachment also due to the lack or absence of studies to study the effect of attachment and relaxation together on fetal movements. Besides, midwives can play an important role in this field. This study aims to investigate the effect of maternal-fetal attachment and relaxation training on number of fetal movements.

## MATERIALS AND METHODS

This randomized controlled clinical trial was approved by the Ethics Committee of Shiraz University of Medical Sciences, Shiraz, Iran. Based on a previous study (Vakilian *et al.*, 2007; Khoramrody, 2000) conducted on the issue, considering variance of 0.92, least mean difference of 0.6,  $\alpha = 5\%$  and power of 80% and using the following formula, 108-subject sample size was determined for the study:

$$n = \frac{2(z_{1-\alpha/2} + z_{1-\beta})^2 \delta^2}{d^2}$$

However, considering with the possibility of sample loss, 126 couples were selected through simple purposive sampling and were randomly divided into two intervention and a control groups using the table of random numbers (Fig. 1). The women who had referred to Hafez and Shoushtari hospitals affiliated to Shiraz University of Medical Sciences in 2012. To reduce exposure to the intervention and control groups, sampling was conducted in the intervention group and the control group a day.

The inclusion criteria of the study were being primigravida and 18-35 years old, singleton pregnancy, gestational age of 28-34 weeks, cephalic presentation, not suffering from anatomical and psychological problems, having

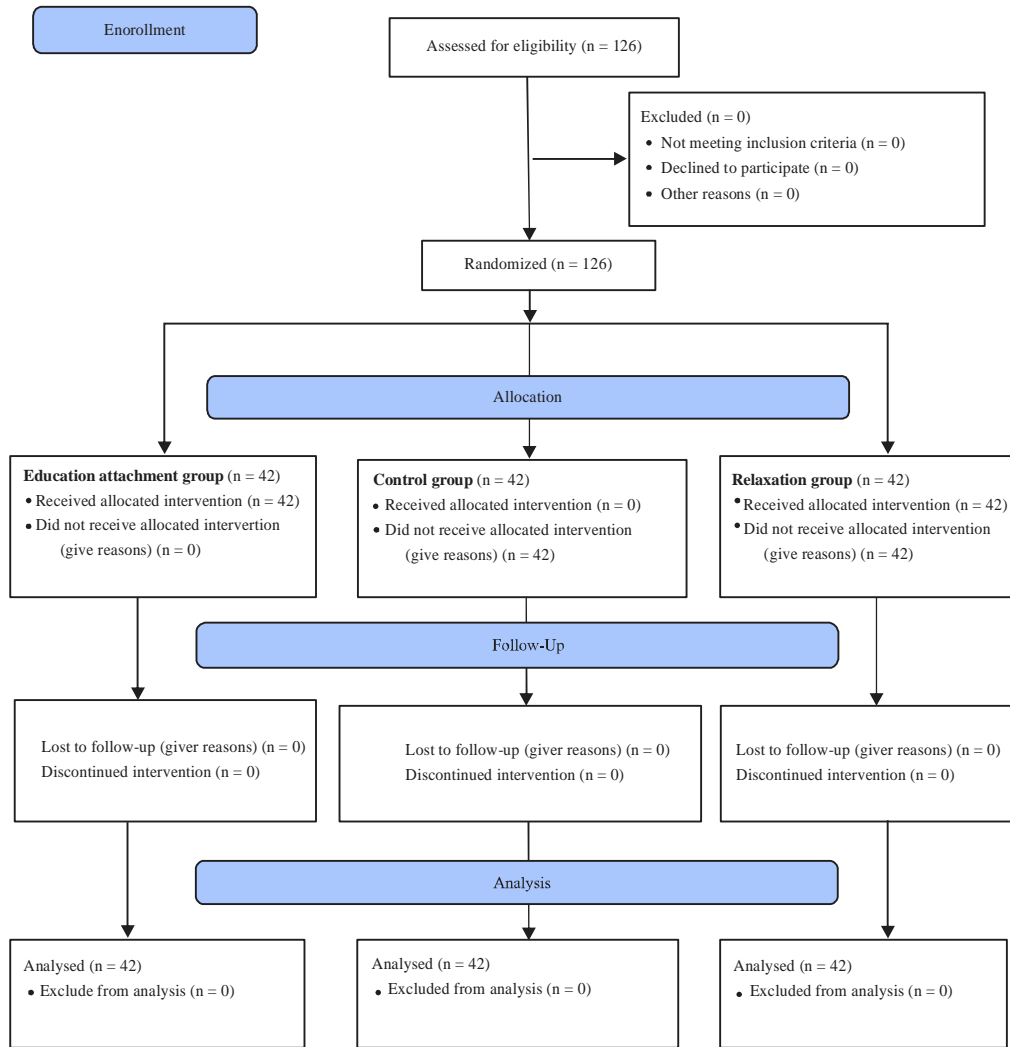


Fig. 1: Random sampling allocation division, follow up and analysis

low or average anxiety levels according to Spielberger's anxiety scale, not having the history of pregnancy hypertension, reduction of fetal movements, intrauterine growth restriction, polyhydramnios, not suffering from chronic diseases such as cardiovascular and pulmonary diseases, having at least middle school degree, being able to take part in the classes regularly, having received the pregnancy care during the previous months and not having the history of smoking or drug abuse.

Before the intervention, all the participants filled out demographic and pregnancy information form, Cranley's attachment scale, Spielberger's anxiety scale and written informed consents.

Spielberger state-trait is composed of two parts of state and trait anxiety status. Anxiety is score from 20-80. Spielberger test has been used in many research papers (Gedney *et al.*, 2004; Hur *et al.*, 2005). The reliability and

validity indexes measured in Aghamohammadi's study are the basis of the present study (Kalkhoran and Karimollahi, 2007).

Cranley (1981) questionnaire which was originally used by Cranley and its validity and reliability has been confirmed. This questionnaire evaluates maternal-fetal attachment behaviors in 5 dimensions and the minimum and maximum scores of the questionnaire were 24 and 72, respectively (Akbarzade *et al.*, 2014). The reliability and validity indexes measured in Khoramroudi's study are the basis of the present study (Khoramrodi, 2000).

The first maternal-fetal attachment educational interventions were executed in three 14-subject groups through 60-90 min classes held once a week. The materials included familiarity with the general concept of attachment, effects and the ways of attachment on maternal and fetal health finally, familiarity with the role of husband as a

supporter and teaching the attachment skills to fathers by pregnant women.

The second relaxation interventions were also conducted in three 14-subject groups. The intervention involved getting familiar with the general concept of anxiety, stress and their symptoms, the effect of stress on life and pregnancy, getting familiar with stressors during pregnancy, stress control methods, getting familiar with muscle relaxation techniques and the appropriate location for doing relaxation. Then the participants were trained regarding breathing exercises. The control group received the routine pregnancy care.

After the fourth session, attachment scales were completed by all the three study groups. All the participants were also required to fill out Sadovsky's form (daily fetal movement counts, 28 forms were completed by each subject). Then, the mean number of movements in a day was computed for every participant.

Then, the data were analyzed using one-way ANOVA, LSD, chi-square test and paired t-test and by SPSS software 16 versions.

## RESULTS

The mean age of the study women was 23.9 years. In addition, the highest and lowest frequency was related to 26-30 (43.7%) and 31-34 years (1.6%) age groups, respectively (Table 1). The majority of the participants (31.2%) had diplomas while, the minority was related to the middle school degree (20.8%) (Table 2).

The anxiety level in the attachment group after training was declined to  $42.25 \pm 3.35$  and in relaxation group after intervention was declined to  $39.95 \pm 3.9$  and in control group was a slight decrease in the level of anxiety, suggested that the volume of anxiety was reduced in the intervention groups. So, significant difference was found among the 3 groups regarding the mean score of anxiety after the intervention (0.036) (Table 3). According to the results of ANOVA, the three groups were similar regarding the number of fetal movements before the intervention. However, the mean number of fetal movements was statistically significant in the three groups one month after the intervention ( $p = 0.001$ ). The mean number of fetal movements in the attachment group was  $12.28 \pm 1.41$  after intervention. The results of paired t-test indicated that attachment training increased the mother's perception of fetal movements. In the relaxation group, the mean number of fetal movements was  $11.28 \pm 1.29$  after the intervention. The results of paired t-test showed that although the number of fetal movements increased after the intervention, the difference was not statistically significant ( $p = 0.09$ ) (Table 4).

## DISCUSSION

The present study aimed to analyze the effect of maternal-fetal attachment and relaxation training on level of mother anxiety and number of fetal movements. In our study showed that attachment skills training increased the fetal movements. Training the mothers during pregnancy can enhance their sensitivity to the fetal movements. This was investigated by Saastad *et al.* (2008), who evaluated 1325 pregnant women's knowledge about fetal movements using a researcher-made questionnaire. After the intervention, 99% of the study women reported that they paid more attention to fetal movements during the day and had a good feeling towards these movements. Also, the results revealed a positive correlation between being primiparous and increase in the perception of fetal movements after the training (Saastad *et al.*, 2008). This implies that increasing the mother's knowledge through training during pregnancy enhances their sensitivity and positive attitude regarding the fetal movements. It might also be the reason for the mother's feeling of more fetal movements after attachment training. Also, in the present study maternal-fetal attachment training increased the mother's perception of fetal movements.

Research suggests that fetal movements strongly correlate with the degree of attachment behavior and indirectly fetal activity can also be the signs of the central nervous system (Saastad *et al.*, 2008; Laxton-Kane and Slade, 2002).

Also, studies have shown that training classes for further interaction between the mother and fetus (Lowdermilk *et al.*, 2007) or abdominal massage (Bellieni *et al.*, 2007) have a positive effect on the attachment and fetal movements.

Maternal-fetal attachment has an important role in the health of pregnant mother and her fetus and it is an important factor in formation of native identity; it has been mentioned as a vital factor for the emotional development of children (Saastad *et al.*, 2008). It seems that the emotional development of the fetus is also involved in fetal movements. Meada and colleagues found that interactive maternal-fetal activities including talking to the fetus, touching the fetus through the abdomen and attention to fetal movement promote the attachment (Maeda *et al.*, 2006).

Behaviors such as counting fetal movements, the mother engaged in activities that stimulate the fetus, fetal movement and heartbeat are among the factors that have a direct correlation with gestational age and maturity of the nervous system (Cunningham *et al.*, 2001). Fetal movement may have a positive effect on attachment before birth. Because after

Table 1: Frequency distribution of the pregnant women in the intervention groups and the control group based on age

Group age	Intervention							
	Relaxation		Attachment		Control		Total	
	%	No.	%	No.	%	No.	%	No.
18-20	38.9	7	7.1	3	19	8	14.2	18
21-25	26.2	11	52.4	22	42.9	18	40.5	51
26-30	57.1	24	35.7	15	38.1	16	43.7	55
31-34	0		4.8	2	0	0	1.6	2
Total	100	42	100	42	100	42	100	126

Table 2: Frequency distribution of the pregnant women in the intervention groups and the control group based on education Level

Groups	Relaxation		Attachment		Control		Total	
	%	No.	%	No.	%	No.	%	No.
Primary school	26.2	11	14.6	6	21.4	9	20.8	26
High school	19	8	17.1	7	35.7	15	24	30
Diploma	35.7	15	36.6	15	21.4	9	31.2	39
University	1.9	8	31.7	13	21.4	9	24	30
Total	100		100		100		100	126

Table 3: Comparison of mean and standard deviation of anxiety in the three groups before and after the Intervention

Group intervention	Control Mean ±SD	Relaxation Mean ±SD	Attachment Mean ±SD	PV paired t-test
Before	3.33 ±42.25	3.77 ±42.42	3.37 ±43.01	0.58
After	3.6 ±42.01	3.9 ±39.95	3.35 ±41.25	0.036
PV	0.57	0.001	0.001	

Table 4: Comparison of the mean number of fetal movements in the three groups before and after the Intervention

Group intervention	Control Mean ±SD	Relaxation Mean ±SD	Attachment Mean ±SD	PV paired t-test
Before	1.22 ±10.78	1.38 ±10.80	1.41 ±11.09	0.52
After	1.25 ±10.88	1.29 ±11.28	1.62 ±11.28	0.001
PV	0.7	0.09	0.02	

feeling the fetal movement by the mother, it seems more real. Mothers who have higher levels of attachment feel the baby's movements more (Velazquez and Rayburn, 2002).

Also, Kim's research showed that the interventions aiming at increasing maternal sensitivity to the infant's activities can strengthen the relationship between the mother and fetus (Kim and Cho, 2004). In a study of maternal-fetal attachment and fetal movement is obtained association (Mikhail *et al.*, 1991).

In our study, the mean and standard deviation of the number of fetal movements before the group relaxation was  $10.80 \pm 1.38$  and after the intervention it was  $11.28 \pm 1.29$ . The results of paired t-test ( $p = 0.09$ ) showed that despite an increase in fetal movement after the intervention, this increase was not statistically significant.

One other study assessed the effect of relaxation in the 32nd week of gestation in 100 pregnant women. Fetal movements were recorded using fast ultrasound during and after relaxation. Then, the intervention group underwent positive imagery relaxation and the fetal movements were recorded. The results revealed a significant difference in fetal

movements compared to before the relaxation ( $p = 0.0001$ ); such a way that the fetus' motor movements decreased during relaxation but increased later (DiPietro *et al.*, 2008). In that study, fetal movements were recorded through ultrasound while, in the present study, fetal movements were recorded based on the mother's perception. This might be the reason for the difference between these two studies. In this study, relaxation training had no effects on the number of fetal movements. Thus, further studies are recommended to use ultrasound in order to investigate fetal movements.

Also study of Bastani *et al.* (2005) on nulliparous women with moderate to severe anxiety revealed that anxiety, low birth weight and cesarean delivery were decreased in pregnant women, who used relaxation techniques compared with the control group.

Yuan *et al.* (2004) evaluated the effect of relaxation on the relationship between the mother and fetus during pregnancy and mental health. Seventy pregnant women with a mean gestational age of 18 weeks were randomly divided into two groups and educational relaxation program continued for 90 min, twice a week for 3 months. After three months of

intervention, maternal-fetal attachment score in the study group ( $p = 0.01$ ) increased and the level of anxiety ( $p = 0.08$ ) decreased (Ji and Han, 2010). The relaxation caused a reduction in the activity of sympathetic nervous system and the level of stress hormones and cortisol; this can be a reason for reduction of the level of anxiety by relaxation (Teixeira *et al.*, 2005; Benson *et al.*, 1975).

The strengths of the study was to compare two methods of attachment relaxation that fewer studies have investigated. One of the limitations of the present study was some participant's lack of interest in cooperation. Of course, by expressing the importance of the issue and involving the women in discussions, It was attempted to be taken mothers consent to participate into the plan. Another limitation was the small sample size is a limitation of this study. It is necessary future studies in this area be done in larger sample size, the results can be extended to the entire community.

### CONCLUSION

The findings of the current study showed that attachment and relaxation training can increase the mother's perception of fetal movements which is of great importance in fetal health but in the relaxation group the difference was not statistically significant. Therefore, it can be considered as a routine prenatal educational program.

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