

# The Effects of Fetal Movements Counting on Maternal-Fetal Attachment: A Randomised Controlled Trial

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## ABSTRACT

**Introduction:** With the decrease in fetal activity, the risk of adverse pregnancy outcomes increases and timely reporting by mother may decrease the risk of fetal death. There are conflicting reports about the impact of fetal movement counting on maternal-fetal attachment and this study is trying to address this issue.

**Aim:** The aim of this study was to determine the effects of fetal movements counting on maternal-fetal attachment.

**Materials and Methods:** In a randomised controlled trial from October 2012 to December 2013, 250 nulliparous women referred to Health Centers to receive the prenatal care. The Ultrasound screening was performed in 16<sup>th</sup>-18<sup>th</sup> weeks of gestation and multiple pregnancy and fetal malformations were excluded (n=4). Thirty-eight of participants did not return the baseline questionnaire and 208 women were randomly allocated into the two groups to either fetal movement counting

or to standard antenatal care. Main outcome was maternal-fetal attachment, measured by the Prenatal Attachment Inventory. The analysis was performed by SPSS and p<0.05 was considered significant.

**Results:** No difference was found between the groups with respect to individual characteristics. At 28 weeks of gestation, the mean scores given to Prenatal Attachment Inventory items, was 90.23±9.64 in the intervention group and 90.00±10.04 in the control group and the difference was not significant (Mean difference=0.230, p=0.866). Also, no significant difference was found at 37 weeks of gestation between the two groups (93.75±7.59 vs 92.78±9.90 respectively, mean difference=0.961, p=0.433).

**Conclusion:** The counting of fetal movements by mother from 28 to 37 weeks of gestation did not affect the maternal-fetal attachment in nulliparous women. The investigation of fetal movement counting on psychological factors of mother was suggested.

**Keywords:** Gestation period, Mother-to-child attachment behaviour, Ultrasound screening

## INTRODUCTION

One of the methods for assessing the health of the fetus, is the count of his/her movements by the mother [1,2]. With the reduction of fetal activity, the risk of problems such as preterm delivery, fetal death, fetal growth restriction and emergency cesarean section are increased [3]. One of the most common reasons of unplanned visits to a doctor or health care providers is a decrease in fetal movements [4]. The aim of fetal movements counting is to increase the maternal awareness about fetal movement as a sign of fetal compromise and timely reporting of the decrease in fetal movements may decrease the risk of fetal death [5,6]. A study which compared the effects of acupressure on maternal-fetal attachment in primiparous women, reported that the acupressure increased the maternal-fetal attachment [7]. The counting of fetal movements is an unstructured, inexpensive and easy method which is done by the mother with or without the administration of doctor or health care providers [8,9]. Because there is not enough evidence to support the benefits of fetal movement counting, there is concern about its possible negative effects [7]. Some of studies reported a strong sense of psychological connection between the mother and fetus that is associated with the fetal movement counting [10,11].

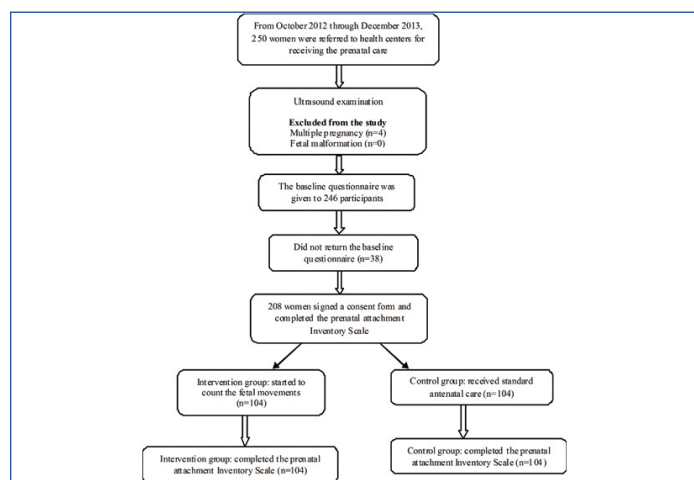
The first relationship between the mother and fetus that begins during pregnancy and develops along pregnancy [12], is as a result of dynamic psychological events that increases the maternal-fetal attachment [13]. Maternal fetal attachment which is increased in the third trimester of pregnancy, encourages the mother to get more prenatal care visits and this leads to better health of the mother, fetus and pregnancy outcomes [14]. The previous study reported that if the mother is aware of fetal health, this awareness affects her relationship with the unborn baby and this may also affect the

relationship between mother and baby after birth [15]. It is estimated that about 8-15% of women who feel the fetus move early in pregnancy, may have more attachment to their babies [16]. A study reported that the feeling and counting of fetal movements by mother, may increase the attachment process [17]. This study was one component of a large study that examined the effect of fetal movement counting on anxiety [18], depression [19], mental health of mother [20] and outcome of pregnancy [21]. Because, so far the effect of fetal movements counting on maternal fetal attachment has not been studied in Iranian women, this study attempts to address this important and the aim of this study was to detect the effects of fetal movements counting on maternal-fetal attachment.

## MATERIALS AND METHODS

This randomised, controlled trial, was carried out in Health Centers from October 2012 to December 2013 and the study population was 250 married nulliparous women with singleton pregnancy and without the history of the mental illness. The study protocol was approved by the Ethics Committee of the Shahrekord University of Medical Sciences and the study was registered in www.clinicaltrials.gov. protocol registration system IRCT201207103078N9. All participants who have undergone ultrasound in the 16<sup>th</sup>-18<sup>th</sup> week and those with multiple pregnancy and fetal malformations were excluded (n=4). The baseline questionnaire including individual characteristics was given to 246 of participants at 26 weeks of gestation. Thirty eight of women did not return the baseline questionnaire and others (n=208) signed a consent form and completed the prenatal attachment Inventory Scale at 28 weeks of gestation. Using the random numbers table, the participants were allocated into the two groups; to either fetal movements counting

from 28 weeks of gestation to 37, or to standard antenatal care [Table/Fig-1]. After the allocation, since it was necessary to make changes in the program of prenatal care in the intervention group and they should count the movements of the fetus, it was not possible to blind the study for the participants or health care providers. The prenatal attachment Inventory Scale is a freely usable instrument with 24 items asking women questions about behaviour or thoughts indicate of maternal-fetal attachment during pregnancy. The items have 5 choices ranging from 1 (definitely no) to 5 (definitely yes). The statement of 22 was scored conversely, this means 1 (definitely yes), 2 (yes), 3 (Partially), 4 (no), and 5 (definitely no). The mean scores were obtained by adding the scores and then dividing them on the number of expressions. Thus, the minimum scores were 24 and the maximum was 120. Higher total scores indicative higher levels of maternal-fetal attachment [22]. The scale has been identified as a valid and reliable inventory for assessing the maternal-fetal attachment [23,24], The scale was adapted for Iranian culture by Abasi E et al., [22]. The instrument was pilot tested on 10 pregnant women to assess the clarification of the items. The reliability of scale was approved by Cronbach's alpha ( $\alpha=0.85$ ). Study specific items were developed on the basis of literature reviews and clinical experiences. An information brochure was given to the women who were in the intervention group, and in this brochure they were trained how to count the fetal movements daily at morning from 28 weeks of gestation to 37 and record them on their chart. The intervention group began to count the fetal movements daily from 28 to 37 weeks of gestation, and the control group received the standard antenatal care to Iranian guidelines (no fetal movements counting). To ensure the fetal movement counting in the intervention group, one person of the research team telephoned the women every two weeks. At 37 weeks of gestation, both groups completed the maternal-fetal attachment. All of participants in the intervention



[Table/Fig-1]: Flowchart of data collection and study profile.

group returned their fetal movement chart. Among these, 92 percent had completed the chart at least 4 times per week.

## STATISTICAL ANALYSIS

Statistical analysis was performed by SPSS (version 16.0). We used independent t-test to compare the continuous variables and Fisher's exact test to compare the qualitative variables between the two groups and a  $p < 0.05$  was considered significant.

## RESULTS

The comparison of individual characteristics of the two groups is presented in [Table/Fig-2] and indicated that there is not a significant difference in age, job, level of education, and unwanted pregnancy between the groups.

Comparing the percentage of participants answered yes/definitive yes to Prenatal Attachment Inventory between the intervention

Variables	Intervention Group (n=104)	Control Group (n=104)	p-value
Age (year)	26.35±4.28	26.84±3.97	0.323
<b>Job</b>			
Employed	17 (16.3)	13 (12.5)	0.430
Unemployed	87 (83.7)	91 (87.5)	
<b>Education</b>			
High school graduate	34 (32.7)	25 (24)	0.166
>College graduate	70 (67.3)	79 (76)	
Unwanted pregnancy	5 (4.8)	4 (3.8)	0.733

[Table/Fig-2]: Comparison of individual characteristics between the two groups (Independent-Samples t-test and Chi-Square Test). Data are presented as Mean±SD or No. (%).

Items	Control group (n=104) No. (%)	Intervention group (n=104) No. (%)	p-value
I talk to my unborn baby	83 (76.8)	80 (80)	0.126
I feel that pregnancy is worth all the trouble that occurs	75 (69.4)	71 (71)	0.562
I enjoy feeling the baby move	92 (85.1)	87 (87)	0.851
I imagine myself giving baby milk	85 (78.7)	79 (79)	0.235
I'm waiting to see how is my baby	85 (78.7)	79 (79)	0.238
I do not know whether my baby is feeling pressure	76 (72.9)	70 (70)	0.340
I imagine calling the baby by name	64 (59.2)	61 (61)	0.181
I think I take care of my baby	82 (75.9)	77 (77)	0.265
I guess my baby's character of his/her movements	93 (88.8)	90 (90)	0.354
I have chosen a name for baby girl	84 (77.7)	83 (83)	0.910
I do or not do things to stay healthy myself if I was not pregnant	67 (62)	64 (64)	0.229
I do not know whether or not the baby can hear	96 (88.8)	86 (86)	0.071
I have chosen a name for baby boy	48 (44.4)	42 (42)	0.155
I do not know that kids can think and feels things	73 (67.5)	71 (71)	0.360
I eat meat and fruit to be sure that my child gets a good meal	88 (81.4)	83 (83)	0.477
My baby tells me that it is the time to eat	68 (62.5)	64 (64)	0.201
I push my finger into my abdomen until he answers	78 (72.2)	70 (70)	0.374
Awaiting the birth of a child is difficult	90 (83.3)	85 (85)	0.621
I'm trying to imagine what the baby is doing in there	84 (77.7)	80 (80)	0.410
When the child was moving too much, I touch my abdomen to calm him	56 (51.8)	51 (51)	0.389
I can say that my child was catching voices	95 (87.9)	90 (90)	0.091
I feel my body is ugly	66 (61.1)	58 (58)	0.172
Because I want to help my baby, I've left some things	76 (72.9)	73 (73)	0.256
I touch my baby's feet on my abdomen until he/she moves	91 (84.2)	85 (85)	0.494

[Table/Fig-3]: Comparing the percentage of participants answered yes/definitive yes to Prenatal Attachment Inventory between the intervention and control group. The p-values refer to comparisons between the control and the intervention groups, analysed by Fisher's-exact test.

and control group is presented in [Table/Fig-3] and indicated that there is not a significant difference in the scores given to Prenatal Attachment Inventory items between the two groups.

Comparing the mean scores given to Prenatal Attachment Inventory items between the intervention and control group at 28 and 37 weeks of gestation is presented in [Table/Fig-4] and indicated that there is not a significant difference in the scores of Prenatal

	28 weeks of gestation (before the intervention) scores (Mean±SD)	37 weeks of gestation (After the intervention) scores (Mean±SD)
Intervention group	90.23±9.64	93.75±7.59
Control group	90.00±10.04	92.78±9.90
Mean difference	0.230	0.961
p-value	0.866	0.433

**[Table/Fig-4]:** Comparing the mean scores given to Prenatal Attachment Inventory items between the intervention and control group.

Attachment Inventory items between the two groups at 28 weeks of gestation (that's means; before the intervention). Also, there was not a significant difference in the mean scores given to Prenatal Attachment Inventory items at 37 weeks of gestation and after the counting of fetal movements by mother [Table/Fig-4].

## DISCUSSION

The findings of present study indicated that there is not a significant difference in the mean scores given to Prenatal Attachment Inventory items between the two groups and the counting of fetal movements had no effect on maternal-fetal attachment. Similar findings were reported by Saastad E et al., they concluded that the fetal movement counting in third trimester of pregnancy does not stimulate antenatal maternal-fetal attachment [25] which is consistent with the present study findings. A study reported that the fetal movements counting reduced the mother's level of anxiety [18]. The education of mother-to-child attachment behaviour has been one of the interventions, which helps the mothers cope better with the stress during pregnancy [26]. The findings of current study is not consistent with a similar study that has been done in this regard and concluded that the counting of fetal movements significantly increased the maternal-fetal attachment [17]. In the former study, the timing of final measurement of maternal-fetal attachment was at 32 weeks of gestation, but in current study this was at 37 weeks of gestation which is several weeks later than that study and perhaps with the increasing of gestational age and nearing to the time of delivery and the fear of childbirth, the attachment to fetus is reduced. The studies have reported that the maternal-fetal attachment was positively associated with gestational age and quickening of the fetus [16,27]. Also the structure of prenatal care that is given to mothers, can explain the difference between the two studies. In the Mikhail MS et al., study, the participants were of different nationalities and cultures, unmarried, and unemployed [17], but in the current study, all of women are married and more of them well educated and difference in culture and attitudes may affect the maternal-fetal attachment. Although the impact of different cultural backgrounds on maternal-fetal attachment is not well studied and the previous reports have not confirmed together [28,29]. A study has pointed to low relationship between maternal-fetal attachment and family income and education [16]. Winji BA et al., reported that there is no clear evidence of benefit or harm for the fetal movements counting by mother and indirect evidence suggests the improved pregnancy and birth outcomes [5]. In low risk women we can reduce the number of prenatal care without any clinically important increased in the risk of adverse perinatal outcomes [30] and the reduction of antenatal visits increases the responsibility of mothers to conduct self-screening the fetal activity and count the fetal movements.

## STRENGTHS AND LIMITATION

Experimental design study and adequate sample size, were the strengths of present study. The sample size was sufficiently large

to permit a cautious generalisation of the findings. The participants were predominantly well educated. Thus, generalisation should be limited to similar populations. The prenatal attachment Inventory Scale has been identified as a valid and reliable inventory for assessing the maternal-fetal attachment [31]. The recruitment brochure provided information about the aim of the study, namely, to improve our knowledge about the effects of fetal movement counting on expectant mothers. In addition, the purpose of the study was explained to the women by the recruiting midwife, and the women were informed about the possibility of being allocated to the fetal movement counting group. This information may have increased the general awareness toward fetal movement in the total sample. This study had some limitations. One of these was the history of mental illness in participants, which could affect the results and in this regard, the criterion was the statements of participants. Another limitation was that the most women participating in the study in both groups were more educated. Therefore, the findings should be limited to the same population.

## CONCLUSION

The counting of fetal movements by mother from 28 to 37 weeks of gestation did not affect the maternal-fetal attachment in nulliparous women. We suggest the investigation of fetal movement counting on psychological factors of mother in a randomised controlled multi-center study with culturally different populations.

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