

The Effect of Education of Fetal Movement Counting on Maternal-Fetal Attachment in the Pregnant Women: a Randomized Controlled Clinical Trial

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Abstract

Background

Prenatal care is a good opportunity for evaluating and improving maternal-fetal attachment. In the present study the effect of early education of fetal movement counting in the second trimester on maternal-fetal attachment was evaluated.

Materials and Methods

52 eligible pregnant women were selected through simple sampling and then randomly allocated into control (n=29), and intervention groups (n=23). First, demographic characteristics questionnaire and Cranely's Maternal-Fetal Attachment Scale (MFAS), were completed by pregnant women. Face to face training about counting and recording the daily fetal movement was provided in the intervention group and from the 24th to 28th weeks of pregnancy, daily counting of fetal movements were conducted. Then at the end of the 28th week of pregnancy, MFAS was again completed by both groups. Data analysis was conducted using SPSS version 16.0.

Results

The mean score of MFA scale in the intervention group was 86.63 ± 11.62 and in the control group was 87.48 ± 10.31 (total score of 120). No significant difference was observed between two groups. After the intervention, the mean score of MFA was increased to 96.30 ± 10.81 in the intervention group and 88.64 ± 10.31 in the control group. The difference was statistically significant between two groups ($P < 0.001$). Only the mean score of MFA in the intervention group showed a significant change before and after the intervention ($P < 0.001$).

Conclusion

The present study showed that education of fetal movement counting would significantly increase maternal-fetal attachment. The training of this method is inexpensive and its performance is easy, and it could be recommended to mothers as a useful intervention.

Key Words: Education, Fetal movement, First time pregnancy, Maternal fetal relationship.

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1- INTRODUCTION

The majority of richness and beauty of life comes from individual's close relations with a limited number of people including mother, father, sister, brother, spouse, child and a small group of close friends. The individual feels a special attachment and bond to each member of this group. Maternal-fetal attachment is one of these specific bonds (1, 2).

Attachment is an affectionate-emotional, warm, close and dynamic relationship between the mother and her child (2). Mothers, who have high attachment to their infant, usually feel more sensitive toward providing the needs of their child, and this sensitivity would affect many aspects of the developing personality of the infant including curiosity, socialization skills, self-esteem, independence, cooperation, etc. (3, 4). Attachment, which is one of the most beautiful and amazing phenomena would be created long before the birth of the child (5). In fact, the cornerstone of attachment takes form when the mother realizes that she is pregnant (6); it would gradually increase during the pregnancy in a way that it would reach its highest peak during the third trimester (7, 8). It would continue after giving birth (9).

This relationship, that is called maternal-fetal attachment, could lead to a desirable relationship between the mother and the infant, and cause improved cognitive, affective and emotional development in the infant (7). Actually, reaching a successful motherhood includes creation of an emotional relationship between the mother and her unborn child, which is maternal-fetal attachment (10-12). It is believed that changes in maternal-fetal attachment could be started before birth (5), and maybe, through interventions, mother's preparation for having a pleasant relationship with her fetus, could be increased (1, 2). Therefore prenatal care is a good opportunity for evaluating and improving maternal-fetal attachment, and

it is important to conduct interventions during this period to provide support and improve maternal-fetal attachment. Some interventions could increase maternal-fetal attachment; for example training mother to speak to her fetus, touching her fetus from the abdomen, and paying attention to fetal movement could increase attachment (2); in some of the conducted studies, mother's attention to fetal movement has increased maternal-fetal attachment (13, 14).

A midwife is the person who has the most chances for creating a relation with the pregnant mother. considering their important role in consulting, educating, supporting in providing correct physical and mental cares during pregnancy and after delivery, their ability to provide professional support (15), and based on midwifery duties (the article three and four) that was approved by the Ministry of Health and Medical Education, which stated that preparation of pregnant mothers for accepting their maternal role, is one of the most important responsibilities of midwives, and since most of the prenatal cares in our country is limited to physical care and the psychological aspects of maternal-fetal relationship are rarely attended (12), and also considering the uncertain effects of these interventions (16, 20), and recommendations for conducting more clinical studies, it was decided to perform this study. Reviewing the evidences revealed that previous studies in Iran, have evaluated the effects of interventions on maternal-fetal attachment during the third trimester of pregnancy (7, 13, 21, 22), because during the third trimester maternal-fetal attachment would reach its highest peak (9). Therefore the present study evaluated the effect of education of fetal movement counting during second trimester on maternal-fetal attachment in the first time pregnant women.

2- MATERIALS AND METHODS

2-1. Study design and population

The present study was a randomized controlled single-blind clinical trial (the person analyzed the data was blinded toward the type of groups). In this study the effect of education of fetal movement counting (independent variable) was evaluated on the maternal-fetal attachment (dependent variable). Considering a confidence interval of 95% which mean 1.96, a test power of 80% which mean 0.84, and also considering an attrition rate of 20% for each group, the sample size for each group was calculated to be 29.

2-2. Methods

Two health care centers which were under the supervision of Isfahan health center No. 2, were randomly selected through drawing. At these health care centers, eligible pregnant mothers were selected through simple sampling and then randomly allocated into two groups of intervention and control using table of random numbers. Being odd or even for the intervention group was selected through drawing. After providing sufficient information for and taking informed consent from the participants, demographic-reproductive characteristics questionnaire and Cranley's (1981) Maternal Fetal Attachment Scale (23), were filled by the participants of both groups at the 24th week of pregnancy.

2-3. Measuring tools: validity and reliability

Demographic and reproductive characteristics of the participants were assessed through questions such as age, maternal education level, economic status and housing condition, gestational age, wanted or unwanted pregnancy, prediction of fetal gender, and the type of prediction of fetal gender. Cranley's Maternal Fetal Attachment Scale, has 24 items and mother's feelings toward each phrase, would be scored from 1 to 5 (definitely

yes: 5, yes: 4, not sure: 3, no: 2 and definitely no: 1). Item 22 is scored in reverse. The lowest score for the questionnaire is 24 and its highest score is 120. Its validity has been approved through content validity by Khoramrudi and its reliability has been approved by test-retest method with a correlation coefficient of 0.85 (22).

2-4. Intervention

Face to face education about counting and recording the daily fetal movement was provided by the researcher in the intervention group. They were asked to, for four weeks, lie down for half an hour after their breakfast every day on their left side to count and record the movements of the fetus. The subjects in the intervention group counted and recorded fetal movements from the 24th to the 28th week of the pregnancy in specific forms. They returned their specific forms after their 28th week of pregnancy. At this time, Cranley's Maternal Fetal Attachment Scale was again completed by both groups. During the time of intervention, the control group only received routine prenatal care. The questionnaires were given to the participants at a peaceful private place and necessary guide were provided for them to complete the questionnaires. So, sampling continued until reaching the calculated samples size for both groups.

2-5. Ethical consideration

After explanation of research stages, an informed written consent was obtained from the subjects. This study was adapted from a research project that was approved by the Nursing and midwifery Cares Research Center of Isfahan University of Medical Sciences by No. 293259 and necessary permissions were administered to start sampling. Also, the protocol of this study was registered at Iranian Registry of Clinical Trials by the ID code IRCT201610183936N2.

2-6. Inclusion and exclusion criteria

The inclusion criteria were being able to read and write, having Iranian nationality, being 18 to 35 years old, first pregnancy, having a natural pregnancy without the help of assisted reproductive technology (ART), singleton pregnancy, having a gestational age of 20 to 22 weeks and willingness to participate in the study.

The exclusion criteria were having medical complications or a history of psychological problems, drugs abusing, experiencing any terrible life events during the past 6 months. In case of occurrence of any severe pregnancy-related complication, severe psychological or stressful event during the study and not recording the fetal movement for more than 1 week, the participant were excluded.

2-7. Data Analyses

Data analysis was conducted using SPSS version 16.0 with a significance level of $P < 0.05$. Paired *t*-test was used to compare the mean score of MFA before and after the intervention in each group and independent *t*-test was used for comparing between two groups. To compare the groups concerning demographic and reproductive quantitative variables means, independent *t*-test, and for qualitative variables, Chi-square and Mann-Whitney tests were performed.

3- RESULTS

First, 58 eligible pregnant mothers were enrolled in the study. Of them, 52 completed the study; 23 (79%) in the intervention group and 29 (100%), in the control group. Six participants (10%) were excluded from the study: 3 persons for not regular counting and daily recording of fetal movements, 1 person due to preterm delivery (27th week), and 2 persons for not referring at the end of the study and completing the questionnaire after the intervention. Eventually data from 52 participants were analysis.

Studied participants were similar regarding their age, husbands' age, gestational age, duration of marriage and number of performed ultrasounds. Independent *t*-test showed no significant difference between both groups regarding their demographic characteristics (**Table.1**).

More than half of the participants in the intervention group (52.2%), and 48.3 percent of the control group, and also about half of the spouses in each group (50% in the intervention group and 57.7% in the control group), had college degrees. In both groups more than half of the participants mentioned their economic status to be moderate (intervention: 69.6%, control: 79.3%). The satisfactions with the husband for 73.9% of subjects in the intervention group and 65.5 percent of the control group, were reported to be high. Mann-Whitney test showed that the frequency distribution of participants and their husbands' educational levels, their economic status and the level of satisfaction with the husband, had no significant difference between both groups.

Also, 95.7 percent of the intervention group and 91.7% of the control group were housewives. Most of the husbands in both groups were free lancers (intervention group: 72.7%, control group: 74.1%). Chi-square test showed no significant difference between both groups. Statistical tests showed that the frequency distribution of the housing condition, pregnancy, type of the performed ultrasound during pregnancy, prediction of fetal gender and the type of predicted gender, had no significant difference between both groups (**Table.2**).

Results showed that at the beginning, the mean score of maternal-fetal attachment in the intervention group was 86.63 ± 11.62 (out of 124), and in the control group was 87.48 ± 10.31 , before the intervention. Independent *t*-test showed that the mean score of maternal-fetal attachment had no

significant difference between both groups ($P > 0.05$). At the end of the study, the mean score of maternal-fetal attachment was increased to 96.30 ± 10.81 in the intervention group, and 88.64 ± 10.31 in the control group. The difference between both groups after the intervention was significant ($P < 0.001$). Paired t-test showed

that the difference in the mean score of maternal-fetal attachment of the intervention group before and after the intervention was statistically significant ($P < 0.001$, $t = 5.24$); but the change was not significant in the control group ($P = 0.32$, $t = 1.00$).

Table-1: Determining and comparing the mean of demographic characteristics of the participants in the intervention and the control groups

Variables Group	Age (year)		Husband's age (year)		Gestational age (week)		Duration of marriage (year)		The number of ultrasounds	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Intervention	25.33	3.48	29.55	2.20	20.26	3.55	2.91	2.16	2.24	1.04
Control	26.31	4.26	30.35	4.53	21.69	3.32	3.09	1.56	2.43	0.92
Independent samples test	-0.95		0.80		-1.50		-0.34		-0.68	
P- value	0.35		0.43		0.14		0.74		0.50	

Table-2: Determining and comparing the frequency distribution of demographic and reproductive characteristics of the participants between two groups

Variable Group	Prediction of fetal gender		The predicted gender		Type of ultrasound			Pregnancy's condition		Residence's status	
	Yes	No	Male	Female	Both	3D	Normal	Unwanted	Wanted	Ownership	Rental
Intervention	59.1	40.9	46.2	53.8	9.50	19	71.50	8.7	91.3	21.7	78.3
Control	75	25	61.9	38.1	14.3	14.3	71.4	3.4	96.6	21.4	78.6
Chi-Square test	1.43		0.81		*0.39			**0.58		0.001	
P- value	0.23		0.37		0.82					0.98	

* Likelihood Ratio, **Fisher's Exact Test.

4- DISCUSSION

The present study showed that education of fetal movement counting during the second trimester of pregnancy would increase the level of maternal-fetal attachment. Results of this study are in line with some previous studies that were conducted in Iran. Abbasi et al., in their study evaluated the effect of fetal movement counting during the third trimester on the level of maternal-fetal attachment in 83 first time pregnant women in Sari-Iran, and revealed that the level of attachment in the intervention group was significantly increased after the intervention compared to the control group (13). Also, in the study by Akbar-Zadeh et al. in Shiraz-Iran, attachment behaviors decreased anxiety and significantly increased maternal attachment in mothers during the 32nd to 35th weeks of pregnancy (22). In the study by Sajjadi Anari et al., the intervention group participated in eight 1-hour sessions once a week, to learn attachment skills and similar results were reported (24). Saasted et al., in their study revealed different results and reported that counting fetal movements during the 35th to 38th weeks of pregnancy would not increase maternal-fetal attachment (16).

Also, Davachi et al. reported that regularly touching the abdomen and counting fetal movements for two weeks from the 32nd to 35th week of the pregnancy had no significant effect on maternal-fetal attachment (1). Differences in the results could be caused by the differences in the study methodology such as studied population and sampling method. In the study by Saasted, sampling was conducted without considering the history of pregnancy and delivery. Also, in the present study the mean score of maternal-fetal attachment, before the intervention was higher than other studies and these differences in the basic characteristics could cause be reason of the differences between our results and other similar

studies. Also, the level of stress and psychological factors could affect maternal-fetal attachment and cause differences in the results. Demographic and reproductive characteristics (such as age, gestational age and educational level), had no significant difference between both groups. Studies have shown that some of the demographic and prenatal characteristics like mothers' and their husbands' educational levels, their career and number of pregnancies and gestational age, were related to maternal-fetal attachment (25). In fact these factors could affect maternal-fetal attachment. Therefore the homogeneity of both groups was evaluated at the beginning of the study. It seems that fetal movement and paying attention to it have various benefits: increased knowledge of mother about the condition of her fetus could help her realize the presence of the fetus and affect maternal-fetal attachment (14, 16).

Furthermore, since fetal movement could indirectly be an indicator of correct central nervous system performance, and regular fetal movement could indicate fetus' health; fetal movement counting could be a method for being aware of the fetus health (2, 13). Maternal attachment could facilitate mother's personal control during pregnancy. When mother feels that she could control the health of herself and her fetus, she would have better communicational and supportive behaviors with her fetus (5). Also, it could be considered as the first sign of risks for the fetus, so that by performing necessary in-time interventions, undesirable outcomes would be prevented (16).

4-1. Limitations of the study

The level of perceived stress and psychological factors such as personal type could affect maternal-fetal attachment and were out of the study control.

4-2. Suggestion

The present study was the first study to evaluate the effect of early onset of education of fetal movement counting during the second trimester. It is recommended that in future studies the effect of this intervention during the second and the third trimesters would be compared.

5- CONCLUSION

The present study showed that early onset of education of fetal movement counting could significantly increase maternal-fetal attachment. This method is inexpensive and easy to perform and could be recommended to mothers by providers of neonatal care during pregnancy as a helpful intervention.

6- CONFLICT OF INTEREST: None.

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8- REFERENCES

1. Davachi A, Khoramroodi R, Shahpoorian F, Haghani H. Fetal touching! Does it improve maternal fetal or maternal newborn attachment? *Journal of Iran Nursing* 2001; 13: 16-44. (In Persian)
2. Toosi M, Akbarzadeh A, Zare N, Sharif F. Effect of Attachment Training on Anxiety and Attachment Behaviors of first-time Mothers. *Hayat* 2011; 17(3): 69-79. (In Persian)
3. Moghaddam Hoseini V, Jaafarnejadf F, Soltani-Far A. Impact of Maternal Attachment Style on Mother to Infant Attachment. *Qom Univ Med Sci J* 2011; 5 (3), 87-91.
4. Ossa X, Bustos L, Fernandes L. Prenatal attachment and associated factors during the third trimester of pregnancy in Tumeco, Chile. *Midwifery* 2012; 28:689-96.
5. Sadeghi M, Mazaheri A. Comparison of attachment styles in mothers with and without history of fetus abortion (intentional and spontaneous). *Fertility and Infertility Journal* 2007; 8: 60-9. (In Persian)
6. Perry D, Ettinger A, Mendelson T, Le H. Prenatal depression predicts postpartum maternal attachment in low- income latina mothers with infants. *Infant Behavior and Development* 2011; 34:339-50.
7. Abasi A, Tafazzoli M. Effect of attachment behaviours education on Primipara Maternal Foetal Attachment. *Hamedan Nursing & Midwifery school Journal* 2009; 17(1,2): 35-40. (In Persian)
8. Eswi A, Khalil A. Prenatal attachment and fetal health locus of control among low risk and high risk pregnant women. *World Applied Sciences* 2012;18(4):462-71.
9. Mehran P, Simbar M, Shams J, Ramazani- Tehrani F. history of perinatal loss and maternal- fetal attachment behaviors. *Women and Birth* 2013; 26(3):185-89.
10. Alhusen J, Gross D, Hayat M, Woods A, Sharps P. The influence of maternal- fetal attachment and health practices on neonatal outcomes in low- income urban women. *Research in Nursing and Health* 2012; 35:112-20.
11. Mcfarland J, Salis bury A, Battle C, Hawes K, Halloran K, Laster B. Major depressive disorders during pregnancy and emotional attachment to the fetus. *Arch Women Ment Health* 2011;14: 424-34.
12. Jamshidimanesh M, Astaraki L, Behboodi-Moghadam Z, Taghizadeh Z, Haghani H. Maternal-Fetal Attachment and its Associated Factors. *Hayat* 2013; 18(5):33-45. (In Persian)
13. Abasi A, Tafazoli M, Esmaeili H. The Effect of Foetal Movement Counting on Primipara Maternal Foetal Attachment . *J Mazandaran Univ Med Sci* 2010; 20 (77):53-60. (In Persian).
14. Nishikawa N, Sakaki bara H. Effect of nursing intervention program using abdominal palpation of leopolds maneuvers on maternal-fetal attachment. *Reproductive health* 2013;10:12-8.

15. Taavoni S, Ahadi M, Ganji T, Hosseini F. Comparison of Maternal Fetal Attachment between Primgravidas and Multigravidas Women with Past History of Fetal or Neonatal Death . IJN 2008; 21(53): 53-61. (In Persian)
16. Saastad E, Israel P, Gunnes N, Froen F. Fetal movement counting - effects in maternal fetal attachment: a multicentre randomized controlled trial. Birth 2011; 6(12): 282-93.
17. Kim J, Cho K. The Effect of Mother-fetus Interaction Promotion Program of Talking and Tactile Stimulation on Maternal-fetal Attachment. Korean J Child Health Nurs 2004;10(2):153-64.
18. Abasi E, Tafazzoli M, Esmaili H, Hasanabadi H. The effect of maternal fetal attachment educatin on maternal mental health .Turkish Journal of Medical Sciences 2013;43:815-20.
19. Chang S, Kim K, Kim E. Change of maternal- fetal attachment and self efficacy for delivery after the taekyo-prespective prenatal class. Korean Journal of Women Health Nurs 2001;7(1):7-17.
20. Bellieni C, Ceccarelli D, Rossi F, Buonocore G, Maffei M, Perrone S, et al. Is prenatal bonding enhanced by prenatal education courses? . Minerva Ginecol 2007;59(2):125-9.
21. Abasi E, Tahmasebi H, Zafari M, Nasiri Takami N. assessment the effective factors of maternal fetal attachment in pregnant women. Life Science Journal 2012;9(1):68-75.
22. Akbarzadeh M, Toosi M, Zare N, Sharif F. Effect of learning attachment behaviors on anxiety and maternal fetal attachment in first pregnant women. EBCJ 2011;1(1): 21-34. (In Persian)
23. Cranley MS. Development of a tool for the measurement of maternal attachment during pregnancy. Nursing Research 1981; 30: 281-84.
24. Sajjadi Anari S, Zahrakar K, Mohsenzadeh F, Karamnia M, Shokooli Yekta M, Alavinezh S. Efficacy of Maternal Fetal Attachment Techniques on Enhancing Mother's Attachment to the Fetus. Developmental Psychology: Iranian Psychologists 2016; 12(47): 281-88. (In Persian).
25. Torshizi M. Different Dimensions of Maternal-Fetal Attachment Behaviors and Associated Factors in Pregnant Women Referred to Health Centers of Birjand, Iran. IJOGI 2013; 16(72): 13-21. (In Persian)