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Original Article

The Effect of Psychological Intervention on Mother-Infant Bonding and Breastfeeding

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ABSTRACT

Background: The emotional bond that a mother feels towards her infant is critical to their social, emotional, and cognitive development. This concept has a major influence on an infant's future health, and growth, so the assessment of parental-fetal attachment and related factors is of great importance. This study aimed to examine the effect of psychological intervention on attachment and persistency of lactation.

Methods: This clinical trial was carried out on 71 pregnant women who visited Milad and Vali-Asr hospitals in Tehran, Iran. The subjects were selected by convenience sampling method and randomly divided into control (n=36) and intervention (n=35) groups. In the intervention group, the subjects received three sessions of supportive group psychotherapy supplemented by training packages. Avant's mother-infant attachment behavior questionnaire, Maternal Attachment Inventory, 28-item General Health Questionnaire, and the short form of the Coopersmith Self-Esteem Inventory were used to evaluate attachment behaviors and related factors. Attachment of mothers was examined at six different times. Statistical data was analyzed using independent t-test, Fisher's exact test.

Results: The findings indicated that the intervention group had increased attachment and breastfeeding persistency (P<0.001). Regression test also showed that maternal attachment was significantly influenced by psychological interventions, self-esteem, and depression (P<0.001).

Conclusion: According to the results, psychological interventions are suggested during pregnancy to increase attachment and breastfeeding persistency, and thereby, improve mental health of both mother and newborn.

Keywords: Bonding, Lactation, Supportive psychotherapy

Introduction

Mother-infant attachment is one of the most wonderful and beautiful relationships that begin even before birth. Maternal-fetal attachment during pregnancy makes a mother ready to establish an enjoyable relationship (1). Ainsworth believes that the interaction between mother and infant deeply affects a child's behavior, such as reduce anxiety. Any disruption in this relationship increases the chance a baby may form mental disorders in the future. Attachment disorder is caused by separation from the mother or lacking care or interaction with her. Its complications include failure to thrive, psychosocial dwarfism, separation anxiety disorder, avoidant personality disorder, criminality, educational problems, and borderline intellectual functioning (2).

Attachment is a warm and lasting relationship between mother and child, which is satisfactory to both and facilitates their interaction (3). Bonding is a one-way emotional relationship between mother and infant established immediately after birth (4). Attachment is a varying pattern accompanying humans. This emotional relationship is formed during pregnancy and promoted by having eye contact, smelling, and touching (5). It can take the form of skin-to-skin contact between mother and infant, resulting in an interactive bonding after birth. The quality of parent-child

relationship profoundly affects child's mental, social, and emotional health. Skin-to-skin contact between mother and infant was first designed by Rey and Martinez in Bogota, Colombia. It is a kind of interventional care, which helps infant's neural and behavioral growth. It also increases a mother's care skills and confidence by developing a close bond. Since this type of care facilitates breastfeeding, it improves infant's chance of survival and it is regarded as an optimal method for adapting infants with the extrauterine environment. In particular, it protects infants against hypothermia and hypoglycemia (6). Touching infants by skin-to-skin contact produces a strong attachment pattern and significantly increases care (7).

Prodromidis compared the behavior of mothers having immediate and continuous contact with their infants to that of mothers having contact with their babies only during breastfeeding. It was found that the former was more likely to exhibit attachment behaviors such as eye contact, verbal communication, and touching the infant (8). Curry demonstrated that skin-to-skin contact between mother and infant at early hours after birth did not influence maternal attachment behavior at 36 hours and three months after delivery (9). Several other studies also did not show any significant correlation between parent-infant bonding and kangaroo care (10).

Attachment in pregnancy has been discussed for decades, and as a result, maternal-fetal attachment was proposed. Cranly et al. (1981) gave the first ideas in this regard and defined maternal-fetal attachment as their connection and interaction level (11). Shieh et al. (2001) identified three major cognitive, emotional, and altruistic aspects in maternal-fetal attachment. They are described respectively as the tendency to get to know the baby, enjoyment from interacting with baby, and the tendency to care for the fetus (12).

Sandbrook and Adamson-Macedo et al. (2004) conceptualized maternal-fetal attachment in a phenomenological study and found that mothers did not like the experienced feelings but had an innate and natural tendency to care for their fetus. Protective instinct in mothers leads to behavioral variation to make the environment inside the uterus more suitable and safer for the fetus (13). Anxiety causes mothers' inappropriate responses to the fetus during pregnancy and reduces mother-infant attachment. Anxiety and depression are more likely observed in mothers having lower fetal

attachment, resulting in the incidence of adverse pregnancy complications (14). Maternal-fetal attachment is one of the most effective ways to cope with stress and anxiety (15). Pillitteri believes that this attachment is formed at the beginning of pregnancy, gradually increases, reaches its peak in the third trimester, and continues after the baby is born. It plays an important role in mothers' successful adaptation to pregnancy (16). Maternal-fetal attachment is one of the specific items, taking form in different manners such as talking to fetus, touching and caressing the abdomen, and detecting the fetus's position during pregnancy. It is a major factor for accepting a maternal role and developing an infant. This attachment is necessary to help develop and sustain a healthy infant, and its effects are observable throughout life (17). Evidence indicates that maternal-fetal attachment gives detailed information about maternal attitude and performance after delivery, interaction with infant, and attachment patterns after birth. The higher the maternal attachment is in pregnancy, the higher the mothers interact with their infants. It, in turn, can significantly influence baby's emotional, cognitive, and social interactions (18).

Breastfeeding is the best method to fulfill the emotional needs of an infant and develop a secure attachment. Eye and skin contact during breastfeeding can lead to a baby's healthy emotional development. Hugging and talking to baby during breastfeeding also helps their cognitive development. The physical and mental aspects of breastfeeding ensure mother-child health. Mother's anxiety and depression are reduced due to psychological satisfaction gained from breastfeeding. According to the importance and sensitivity of the initial four weeks of life, breastfeeding is regarded as a major factor to prevent neonatal death. Breastfeeding is the first and most important emotional role of mother and child during breastfeeding, and at the same time, hugging a baby meets their biological, emotional, and mental needs. It makes mothers calm and affects her health. Mothers can develop a secure attachment to their babies by transmitting love and affection during breastfeeding (19).

Successful breastfeeding necessitates sufficient awareness, necessary skills, as well as full support of the mother. Although breastfeeding is a simple and natural process, it requires mothers to be informed of proper breastfeeding. The purpose of this study was to determine and identify maternal-fetal attachment factors. The obtained

results can promote mother-baby mental health. It seems that attachment behaviors need to be trained at the beginning of pregnancy.

Methods

This clinical trial was conducted on 71 pregnant women, who visited the maternity clinic of Milad and Vali-Asr hospitals, Tehran, Iran, during 2013-2015. Convenience sampling method was used to select the participants, who were randomly assigned to the intervention (n=35) and control (n=36) groups. In so doing, the first group was chosen at random, and then daily qualified visitors were assigned to the groups alternately. Thus, the samples gradually formed the two required groups.

The inclusion criteria included an age range of 18 to 35 years, junior high school degree, being at least 12 weeks pregnant, singleton pregnancy, lack of obstetric complications, and intentional pregnancy. History of heart problems, postpartum psychosis or serious mental illness, pregnancy complications such as bleeding, diabetes, hypertension, preterm birth, as well as breast-feeding-related abnormalities and diseases in mother and infant were the exclusion criteria. Sample size was obtained from the formula (sample size calculation by comparing two means).

Avant's mother-infant attachment behavior questionnaire, Muller Maternal Attachment Inventory (MMAI), a demographic characteristics form, two scales or subtests including anxiety, sleep disorders, and depressive symptoms of 28-item General Health Questionnaire, and 35-item short form of the Coopersmith Self-Esteem Inventory were used to collect the data.

Mother-infant attachment behavior questionnaire was originally used by Avant, who confirmed its reliability and validity. Vakilian et al. revised Avant's mother-infant attachment behavior questionnaire based on the viewpoints of experts in the field of nursing and midwifery. It is a checklist of three types of behaviors, namely, emotional (kissing, looking, caressing, talking to, smiling at, and rocking the cradle), contiguous (hugging without body contact, hugging with close contact, and hugging in which hands are put around the infant's arms), and caring (changing infant's diapers and clothes and patting the infant on the back to release gas from stomach) behaviors. The inter-rater reliability was verified (98%) (20).

MMAI was designed by Muller in 1994. This 26-item questionnaire is on the conceptual basis of the attachment theory. Items are scored from almost never (1) to almost always (4). The minimum and maximum possible scores were 26 and 104, respectively, with the higher scores suggesting stronger maternal-fetal attachment. The validity and reliability of this tool were confirmed by content analysis and Cronbach's alpha coefficient (Ra=0.89), respectively (21).

General Health Questionnaire (GHQ) examines non-psychotic disorders. It can only be used to screen healthy individuals from patients in acute conditions. The test consists of four subtests each containing seven questions, including somatization, anxiety, insomnia, social function, and depression. The anxiety and insomnia subtests assess clinical signs and symptoms such as serious anxiety, stress, fear, nervousness, and insomnia. Feelings of worthlessness, disappointment, and absolute uselessness at work, as well as having suicidal thoughts are evaluated on a depression subtest. Scoring system was (0-1-2-3). Cut-off score is six for each item, that is, psychiatric symptoms are reported for scores equal to 6 and higher than 7. The sensitivity and specificity of the test are 84.7±2.7 and 93.7±2.7%, respectively, and the overall classification error was 8.2±2.7% (22, 23). In addition, 35-item short form of the Coopersmith Self-Esteem Inventory (CSEI) is rated from strongly disagree (1) to strongly agree (4). The minimum and maximum possible scores were 35 and 140, respectively, with higher scores indicating higher self-esteem. The reliability and validity of this tool was calculated at 90% and 92%, respectively (24).

At first, we selected the women who exhibited pregnancy symptoms. Prior to initiation of the study, the purpose and method of the study were explained to the participants, and informed consent was obtained from them. Demographic questionnaire, GHQ (anxiety-depression), and CSEI were distributed among the participants of the study (at least 12 weeks pregnant). The mothers were randomly divided into intervention and control groups. The mothers in the intervention group were provided with routine pregnancy care. They also took part in three supportive psychotherapy group sessions held by a clinical psychologist. Eight of ten individuals took part in the supportive psychotherapy group sessions, which lasted 90 minutes each.

The clinical psychologist provided the mothers with in-depth and thorough information on attachment behaviors during pregnancy in each session. These attachment behaviors included father and mother having a conversation with the fetus, father touching mother's abdomen, caressing and touching mother's abdomen to feel fetal

movements, addressing the fetus, mother singing a song or lullaby to the fetus, finding fetal position, paying attention to fetal movements and other interactive behaviors with the fetus, counting fetal movements, imagining the facial features of the fetus positively, mother imagine breastfeeding her infant, physical contact between mother and infant through seeing, touching, and smelling, and father supporting and paying attention to mother. Further information was presented about the benefits of breastfeeding and the positive outcomes of talking to infants. The mothers were allotted thirty minutes to ask questions and receive answers at the end of each session. They were also given an instructional package and a CD-ROM associated with mother-infant attachment behaviors aside from the group sessions. The control group was only provided with the routine pregnancy care. On the third and seventh days after delivery and discharge, both groups went to the hospital for the first time and filled out Avent's mother-infant attachment behavior questionnaire.

We applied MMAI to both groups (intervention and control) to investigate maternal attachment behavior persistency. We prepared the five questionnaires upon the first visit and distributed them among the mothers at five different times, including the first, third, sixth, ninth, and twelfth postpartum days. At the times that the mothers were supposed to complete the questionnaire, we contacted them to fill out the questionnaires and had them complete and send them back by a registered mail or courier. We filled out some of the questionnaires through telephone conversations with several mothers. We also asked questions and gathered information about breastfeeding and its persistency until the twelfth month after delivery (until the baby reached one). We used the SPSS, version 20, to analyze the data. Descriptive statistics, including frequency distribution, mean, and standard deviation, were applied to present the characteristics of the participants and performed independent t-test to analyze the data. Fisher's exact test and multiple regressions were used to compare the means of both groups.

Results

There were no significant differences between the two groups in terms of demographic characteristics such as age (P=0.628), parity (P=0.501), family support (P=0.095), support of husband (P=0.986), depression (one individual in the control group 2.8% and two individuals in the intervention group (5.7 %), anxiety (13 [36.1%] individuals in the control group and 16 [45.7 %] individuals in the intervention group), with a cut off score of equal or greater than 7 (P=0.539 and P=0.441, respectively), and self-esteem (P=0.726); in other words, the two groups were homogeneous. Table 1 shows the demographic characteristics of the mothers in both psychological intervention and control groups. The data is reported in terms of frequency, percentage, mean, and standard deviation.

Table 1. Demographic characteristics of mothers in control group and intervention group

Variables	Control group (n=36) F (%)	Intervention group (n=35) F (%)	Variables	Control group (n=36) F (%)	Intervention group (n=35) F (%)
Occupation			History of abortion	6 (15.7%)	7 (20%)
Housewife	27 (75%)	30 (85.7%)	Planned pregnancy	25 (69.4%)	26 (74.3%)
Employed	9 (25%)	5 (14.3%)			
Education			Child gender		
Lower education	24 (66.7%)	21 (61.8%)	Female	10 (27.8%)	13 (37.1%)
Higher education	12 (33.3%)	13 (38.2%)	Male	14 (38.9%)	17 (48.6%)
			Unspecified	12 (33.3%)	5 (14.3%)
Number of children					
			Social support	31 (86.1%)	33 (94.3%)
0	17 (47.2%)	20 (57.1%)			
1	17 (47.2%)	13 (37.1%)			
2	2 (5.6%)	2 (5.6%)			
Variables	Control group (n=36) M (SD)	Intervention group (n=35) M (SD)	Variables	Control group (n=36) M (SD)	Intervention group (n=35) M (SD)
Age (yr)	29.2±4.37	28.7±4.44	Depression	1.78±2.29	2.06±2.62
Anxiety	6.19±3.56	7.08±4.17	Self-esteem	104.97±10.47	104.11±10.04

*Mean±Standard Deviation

Table 2. Mean attachment scores at different postpartum times in the control and intervention groups

	Control group mean (SD)	Intervention group mean (SD)	P-value
Attachment 3-7 days after childbirth	74.52±20.79	90.74±18.13	0.001
Attachment 1 months after childbirth	82.41±6.17	87.94±6.82	0.001
Attachment 3 months after childbirth	83.36±6.54	89.54±6.98	0 <0.001
Attachment 6 months after childbirth	84.83±6.36	91.65±8.23	0 <0.001
Attachment 8 months after childbirth	86.08±6.78	94.08±8.10	0 <0.001
Attachment 12 months after childbirth	87.36±6.66	97.71±8.98	0 <0.001

We used mother-infant attachment behavior (Avant) questionnaire within the third and seventh postpartum days and MMAI during the first, third, sixth, ninth, and twelfth postpartum days to investigate the effect of psychological intervention on mother-infant attachment (Table 2). As shown, psychological interventions within the third or seventh days and monthly follow-ups until one year after childbirth significantly increased the attachment in the intervention group. Although the attachment in the control group gradually improved, the increased attachment was more significant in the intervention group, that is, the intervention group had a steeper gradient. Figure 1 presents the mean attachment scores in both groups.

We used Fisher's exact test to investigate breastfeeding and its persistency until one year after delivery. The results showed that the rate of breastfeeding increased in the intervention group by 100% (35 individuals) versus 86% (31 individuals) with a confidence level of P=0.028.

We used multiple regression model to study the effect of various variables on attachment. The results showed that a significant relationship between attachment and depression, self-esteem, and psychological interventions (P<0.001). There was an negative relationship between attachment and depression. On average a one-point increase in the depression test score, decreased 1.651 score of the attachment test. In other words, as the depression score increased, the attachment of mothers decreased. On the other hand, with a one-point improvement in the self-esteem test score, we observed an average decrease of 0.311 in the attachment test score, i.e., as self-esteem increases, maternal attachment increases, as well. Results also showed that attachment in the intervention group was 9.263 times more than the control group.
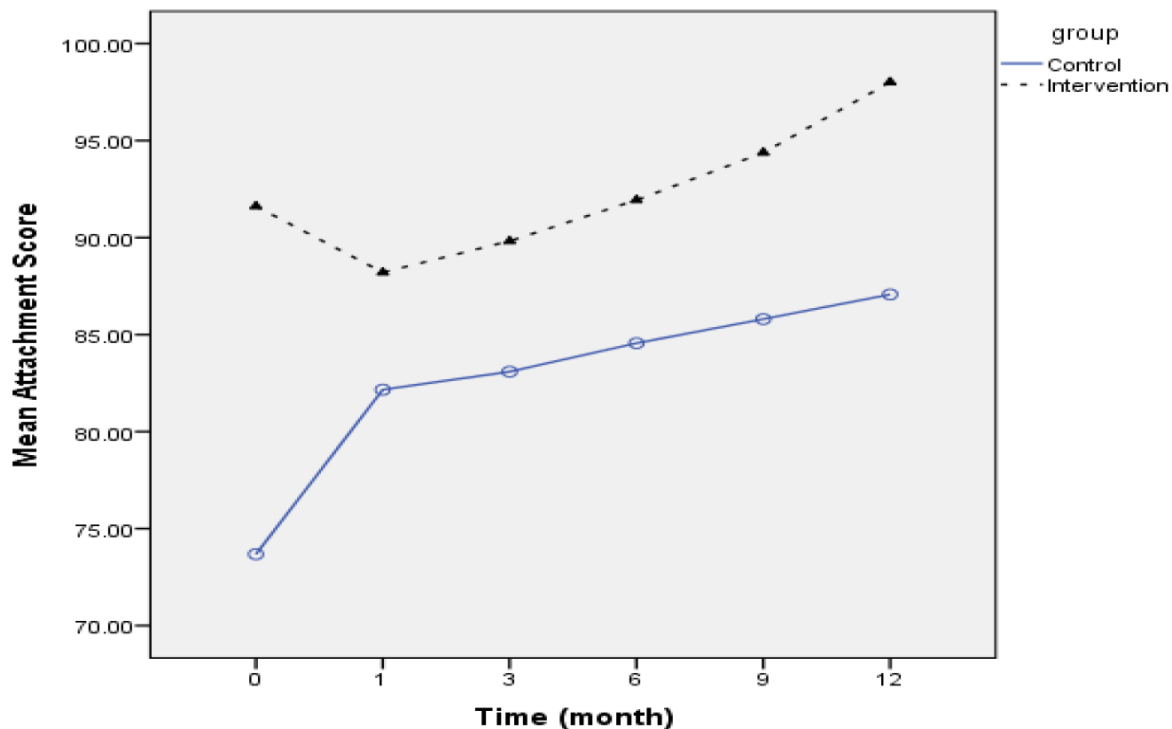

Figure 1. Mean attachment scores in both groups

Table 3. Prediction of attachment using the multiple regression model

Model variables	Coefficients		With 95% confidence level for adjusted		P-value
	Adjusted beta	SE	Minimum	Maximum	
Age	0.191	0.196	-0.200	0.582	0.332
Number of children	-2.761	1.512	-5.783	0.262	0.073
Depression	-1.651	0.313	-2.276	-1.025	0<0.001
Self-esteem	0.311	0.074	0.163	0.459	0<0.001
Interventions	9.263	1.396	6.472	12.054	0<0.001
Social support	1.303	2.430	6.160	-3.554	0.594
College education	-2.766	1.672	-6.109	0.577	0.103

†Average score of all six-time measurements of attachment
*Adjusted for other variables in the table
SE (Std. Error)

Discussion

There is no doubt that attachment theory is recognized as one of the most prominent and important achievements of contemporary psychology. John Bowlby believes that attachment is one of the basic needs of human beings. He stated that attachment develops when the newborn has a persistent intimate and warm relationship with their mother, which results in mutual contentment and satisfaction. Maternal attachment has profound effects on both development of the infant and the performance of maternal role (21).

This study was conducted to investigate the effects of psychological interventions (supportive psychotherapy) on mother-infant attachment and its persistency until 12 months after childbirth (when the baby is one year old). Findings showed that the level of mother-infant attachment in the intervention group increased significantly compared to the control group. This increase could be due to the influence of psychological treatments (supportive psychotherapy), instructions, interactions, visualization, and more communication with the fetus in the intervention group. The results of the study by Kim, et al. (2004) showed that training maternal attachment behaviors, such as talking to and feeling the fetus by touching the mother's abdomen, promoted maternal attachment in the experimental group compared to the control group (25, 26). Abbasi et al. found that women who were in the training intervention group exhibited more maternal behaviors. This could influence mothers' mental health and deeply reduce their anxiety (27).

Learning attachment behaviors increases mother-infant attachment, which in turn, lowers anxiety in pregnant women; therefore, it is recommended that training be included in a prenatal care schemes (25). Nagata, et al. also concluded that there is a significant relationship attachment during pregnancy and attachment one year after childbirth. As a result, the emergence of attachment-related issues and problems in this period would affect mother-infant relationship and bring about negative

side effects. Tousi et al. (28) conducted a clinical trial on 84 pregnant women. Their aim was to determine the effect of training attachment behaviors on mother-infant attachment in primiparous women. They found that mean score of mother-infant attachment in both experimental and control groups were 60.8±4.6 and 60.2±4.5, respectively (P=0.544). However, these mean scores after the intervention in both experimental and control groups were 64.6±3.5 and 61.1±5.5, respectively, indicating a significant difference (P<0001). The results showed that training attachment behaviors resulted in the increased level of mother-infant attachment. In a study conducted by Mikhail et al., the level of attachment after intervention (mother counts the fetal movements) in the intervention group was significant. Bellieni et al. showed that the attachment score of the group provided the training (four one-hour sessions) was higher than the control group.

A study by Soon et al. revealed that prenatal training sessions (weekly two-hour sessions held for four weeks) aimed at training the interactive maternal-fetal behaviors, breathing techniques, and prenatal exercise can increase maternal-fetal attachment. As Mikhail reported, this increase may be related to behaviors such as counting fetal movements and positive impressions of the fetus, which involve the mother with behaviors that stimulate her feelings toward the fetus, and thus, encouraging further interaction. Interventions that are aimed at increasing maternal sensitivity toward fetus activities, such as fetal movement, can improve maternal-fetal relationship. Mothers receiving these interventions show maternal behaviors more effectively, which in turn affects their own health. In addition, maternal-fetal attachment can adequately predict the initial mother-infant relationship, as increased attachment during pregnancy can give mothers more confidence in playing the maternal role and help mothers cope better with postpartum conditions and exhibit a more positive response to infant behaviors.

However, Carson reported no significant

relationship between mothers massaging and touching the abdomen and postpartum maternal behaviors (27). The results of the present study seem to be consistent with those of other studies reflecting the efficacy of psychological interventions in maternal-fetal attachment. This highlights the importance of providing attachment training to improve the health of both mothers and infants.

The results of this study showed that age, parents' educational level, mother's occupation, route of delivery, planned or unplanned pregnancy, infant's gender, high-risk pregnancy, number of pregnancies, history of abortion, support of spouse and family, anxiety, depression, and self-esteem of the two groups (intervention and control) were not significantly different, and this highlights the significant impact of psychological interventions on maternal attachment behaviors.

A meta-analysis performed on 14 studies reported that maternal age has a significant impact on mother-infant attachment, while social support and prenatal testing had a moderate impact. Furthermore, anxiety, self-esteem, depression, planned pregnancy, age, number of pregnancies, ethnicity, marital status, income, and educational level had a low impact, and high-risk pregnancy had no impact on maternal-fetal attachment (29). A study by Abbasi showed that social support and mother's educational level had a significant relationship with maternal-fetal attachment, however, some studies confirmed and some others challenged the presence of such a relationship (27). A study by Tarshizi on various aspects of maternal-fetal attachment behaviors and their related factors indicated that attachment had a significant relationship (confidence level of 95%) with the level of parents' education, mother's occupation, marital satisfaction, age, and type and number of pregnancies, but had no significant relationship (confidence level of 95%) with maternal age, as well as history of abortion, stillbirth, and high-risk pregnancy (30).

Attachment increase self-confidence of mother, and therefore, promotes the ability to cope with stress. In addition, postpartum mental health of mothers is highly associated with her attachment and ability to care for her baby; skin contact between mother and infant increases attachment; this type of care establishes an interactive bond between mother and her infant and enhances mother's infant care skills as well as her self-confidence. A clinical study on the relationship between antepartum depression and postpartum attachment of 217 mothers over the period of 6 to 8 weeks after childbirth reported that factors including antepartum depression symptoms,

planned or unplanned status of pregnancy, feelings regarding pregnancy, and relationship with spouse were important determinants of early attachment. That study also reported that symptoms of depression in late phases of pregnancy are predictors of the lowest level of maternal-fetal attachment and that unplanned or unwanted pregnancy leads to weak maternal-fetal attachment. Furthermore, a number of studies suggest that there is a relationship between prenatal depression and attachment problems, which seems to be effective on the child's future development (31-33).

An important finding of this study was that psychological interventions (supportive psychotherapy) increased the level of attachment, which significantly improved breastfeeding in the intervention group. Results of a study by Cinar et al. on the impact of social support variables and attachment on the adequacy of breastfeeding showed that high levels of maternal attachment and family support had a positive impact on breastfeeding adequacy (34). A study by Ozluses demonstrated that fathers' knowledge regarding breastfeeding increases the level of exclusive breastfeeding and parents' attachment (35).

Results of the present study, as well as other studies, suggest that attachment has an impact on breastfeeding and its persistency. This reflects the importance of attachment, as a psychological variable, in creating an emotional bond between mother and her infant, which affects their physical and mental health. Parents' attachment to their fetus is associated with improved health behaviors and pregnancy health; thus, determining prenatal attachment and implementing intervention programs can be an effective measure for adjusting the influencing factors, increasing the level of attachment, and thereby, improving the health of both mothers and infants.

Conclusion

This study showed the positive impact of supportive group psychotherapy on mothers' attachment to their infants within a period of one year after childbirth. We also found significant differences between the intervention and control groups in terms of breastfeeding and its persistency. The results of this study suggest that psychological interventions can be used to create and strengthen emotional bonds between mother and her unborn child and to I prove the quality of breastfeeding. Early interventions may need to focus on mother-baby interactions as a key factor for child development and ensure mental health of both mothers and infants.

Acknowledgments

Conflicts of interests

No Conflict.

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