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The effects of Mindfulness Training on Primiparous Pregnant women's Emotion Control and the formation of secure attachment style among their infants

Vida Derakhshanpour [1], *Hassan Pasha Sharif [2], Parvin Kadivar [3]

[1] Department of Educational Psychology, Central Tehran Branch, Islamic Azad University, Tehran, Iran.

[2] Corresponding author: Department of Educational Psychology, Central Tehran Branch, Islamic Azad University, Tehran, and Roodehen Iran.

[3] Professor, Department of Educational Psychology, Kharazmi University, Tehran, Iran.

Abstract

Background: Pregnancy is one of the most crucial and stressful periods in the life of the women, influenced by physiological and psychological changes during pregnancy that affect mother-fetus attachment during pregnancy. The present study aimed to determine the effects of mindfulness training on emotion control of primiparous pregnant women and to investigate its impacts on the formation of secure attachment style in infants.

Methods: This pretest posttest control group single blind study was done on pregnant women who were chosen from the healthcare centers of Tehran, Iran. From among 150 women screened for eligibility to participate in the study, 38 Primiparous Pregnant women met the inclusion criteria and were randomly assigned into the study groups. The intervention group received seven weekly mindfulness training sessions. The control group received the prenatal routine care. The participants answered the Motion Control Scale at the pretest and posttest. Data were collected using the strange situation in the two groups and analyzed by statistical tests, eight weeks after the intervention.

Results: According to the findings, the average age of the sample is in the range of 23 to 39 years. The pregnancy week of the subjects was between 15 months and 41 months. After the intervention, the mean maternal emotion control score was significantly higher in the intervention group than the control group (F=15.894; P=0.001). Moreover, the Chi Square test revealed that in terms of infant's safe attachment style (P=0.570; $\chi 2$= 7,644a), there is no difference between the mothers in the studied groups.

Conclusions: The results showed that Mindfulness was effective in the formation of secure attachment style in infants and in promoting maternal-infant attachment. Therefore, it was recommended that such interventions be integrated in the prenatal care programs of pregnant women to improve the secure attachment of infants.

Key Words: Emotional Control, Infants, Mindfulness, Primiparous Pregnant Women, Secure Attachment Style.

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**** Corresponding Author:***

Hassan Pasha Sharif, Corresponding author: Professor, Department of Educational Psychology, Roudehen Branch, Islamic Azad University, Roudehen, Iran. Email: hpssr@yahoo.com

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1- INTRODUCTION

Early care partnerships have a substantial lasting influence on a number of life-span factors of health and well-being (1). The development of a relationship with the fetus is a part of maternal adaptation to pregnancy in this period. The early connection between the mother and the fetus prior to birth is described as a maternal-fetal attachment (1). According to Pillitteri, the attachment behavior that progressively enhances from the first trimester of pregnancy, peaks in the third trimester, and remains after delivery is essential for pregnancy adaptation (2). Maternal-fetal attachment activities may improve the health of the mother and child and contribute to satisfaction with the impact of pregnancy with regard to adequate prenatal care, nutritional conditions, and the tendency to know about the fetus (1). Then, impaired maternal-fetal attachment, even in the presence of adequate prenatal treatment, can decrease the degree of maternal satisfaction. Jafarnezad et al. reported an inverse link between pregnancy aggression and mother-infant attachment in Iran (3).

Attachment is a relationship between the mother and the child that is soft, positive, and durable, which is satisfying for both of them and promotes the connection between mother and child. Researchers have shown that an improvement in attachment contributes to long-lasting relationships in which it is very important to minimize mother anxiety (4). There are several variables that influence the attachment of a mother to the fetus. These include social support, mental status, gestational age, maternal age, birth number, marital status, income, education, and pregnancy at high risk. Attachment is a significant mental health indicator (5). The direct relationship between life expectancy and attachment has been verified in numerous studies (2-5).

Noroozi et al. (2020), found that during pregnancy, hope and resilience are positively and significantly related to maternal attachment to the fetus. Several studies have been carried out on faith, bonding, and the principle of attachment (5). An important association between maternal-fetal attachment and spirituality was seen in these studies. In addition, several studies have shown contradictory results regarding the relationship between spiritual wellbeing and maternal-fetal attachment (1). The maternal-fetal attachment appears to be a factor linked to postpartum maternal self-efficacy, indicating that it can increase maternal-fetal attachment and thus maternal self-efficacy; thus it can help recognizing and treating women with low self-efficacy (6 - 8).

Preliminary evidence was given by Alhusen et al. (2020) for the effects of perinatal depression intervention in a group environment to alleviate depressive symptoms and enhance maternal-fetal attachment and maternal sensitivity (9). It means that there are various approaches to strengthening maternal-fetal attachment by an intervention. For instance, Salehi et al. (2019) found that attachment-based strategies during pregnancy are successful in helping health care providers develop the health of pregnant women and infants and increase their attachment while providing prenatal care (10). Ekrami et al (2020) found that therapies contribute positively to strengthening maternal-fetal bonding in women with unplanned pregnancies (11).

Through their knowledge of safety and protection with primary caregivers, the early work of Bowlby and Ainsworth offered a wealth of understanding of the changing experience of a person in the world, and of her/himself. The on-going impact was emphasized by Ainsworth's categorization of specific attachment profiles and Bowlby's theory of cognitive

processing, which effectively maintain pre-conceptualizations and provide habitually driven behaviors (12, 13).

This basis of understanding offers strong guidelines for research into potential entry points for prevention and intervention. The interruption of cognitive processing and behavior modification are included in these mechanisms. To date, research has shown that the mother-infant dyad may have a beneficial effect on improvements in maternal behavior through therapeutic intervention (14); and more recently, the commonality between stable attachment patterns and understanding has been highlighted (15). How changes in maternal behavior will affect mother-infant dyads appears clear at a superficial level. However, where cognitive processing strategies rely heavily on previous learning, alternative cognitive processing mechanisms need to be investigated for making progress in potential relationships. Given our current understanding of stable attachment and consciousness, it seems logical to say that new learning involves awareness of the present moment, i.e., conscious awareness (5-9).

A healthy lifestyle is an important activity in order to achieve a good pregnancy that benefits both mother and newborn. The involvement of women in healthy activities can help the state of attachment between mother and fetus and depression during pregnancy. These factors can influence the health and well-being of the woman, but little attention has been paid to understanding this relationship, which warrants further exploration. According to related studies on attachment disorders, early detection and interventions are of vital importance in this area (10, 11).

It is also important to consider the role of maternal-fetal attachment in the creation of prenatal interventions and to avoid weak bonds of mother-child attachment. Research has recently centered on mindfulness as a potential variable to disrupt the transmission of unstable attachment and its influence over generations. The present study was conducted to assess prenatal interventions, given the relevance of these interventions and their effects on mother-child health. The aim of this study was to examine the impact of mindfulness training on emotion Control of Primiparous Pregnant women and on the formation of secure attachment styles in infants.

2- METHOD

2-1. Study design and population

The research method was quasi-experimental and used a pretest and posttest design with control and placebo groups. The statistical sample included all primiparous pregnant women in District 1 of Tehran who had referred to healthcare centers of Tehran, Iran, during 2018.

2-2. Methods

In this analysis, the purposeful sampling approach was used. For example, among pregnant women referring to Farmaniyeh and Nikan private hospitals and all clinics, initially, 150 primiparous pregnant women were selected. After the interview and exploring their desire to participate in the experiment, they were matched based on their educational characteristics, type of job, and socio-economic level. Then, they completed the emotion control questionnaire for the first time (pre-test). Next, the 39 mothers were replaced in three groups: mindfulness, placebo, and control. At the end of the intervention, all groups completed the emotion control questionnaire for the second time (posttest). They were followed up at 3 to 6 months. Also, infants aged 9 to 12 months were tested twice for attachment. The data collection tool included three parts. The first part covered demographic information of the participants, the second part, the Roger & Nashower Emotion Control Scale, Mindfulness intervention, and the

third part was The Ainsworth's laboratory method of attachment (13).

2-3. Measuring tools: validity and reliability

2-3.1. Roger & Nashower Emotion Control Scale (1987) has four components of emotion inhibition, inhibition of aggression, rumination or mental review, and benign inhibition (16). Questions 1 to 14 are related to emotion inhibition, questions 15 to 28 are related to control of aggression, questions 29 to 42 deal with chewing or mental review, and questions 43 to 56 test benign control. This questionnaire is scored based on a Likert scale of six choice options (16). To validate the measurement tool, Namdar et al. (2020), used Cronbach's alpha reliability coefficient, the value of which for the whole scale and subscales of emotional inhibition, aggression inhibition, rumination, and benign inhibition were 61.2, 72. 2, 69.2, 72.2 and 77.2, respectively, indicating that the scale has a high internal consistency (17).

2-3.2. Mindfulness intervention: In the present study, the pregnant mothers in the experimental group of mindfulness underwent the mindfulness training based on the method suggested by Segal et al. (18).

2-3.3. Ainsworth's laboratory method of attachment (1967): Ainsworth designed this experimental study to investigate attachment for 9- to 18-month-old children in eight steps of less than half an hour. In this method, the cases are observed for 2 minutes while the caregiver and the stranger enter and leave the room. The child plays, a process that is repeated throughout the child's life, and familiar and unfamiliar people come and go; and children respond to different situations which vary in the degree of stress (13).

2-4. Interventions

After receiving an official letter of introduction from the Vice Chancellor for Research and Information Technology as well as the Vice Chancellor for Health of the university, the researcher referred to the comprehensive care centers and made the necessary coordination with the relevant authorities to implement the study. The eligible subjects were selected from the target population and their written informed consent was obtained. A total of 150 eligible subjects were examined, 112 of whom were excluded (70 subjects did not meet the inclusion criteria and 32 failed to participate in the training sessions). As a result, the study was conducted and followed up with 38 subjects. Subsequently, the eligible women were randomly assigned into the study groups. Both groups took the pretest by completing the Roger & Nashower Emotion Control Scale. The intervention group received seven weekly sessions of supportive-educational intervention based on the content presented in **Table 1**. After eight weeks, to perform the posttest, the scale was completed again by the intervention group either at home or in the care center. Meanwhile, the control group did not receive any program other than the routine care. The time was chosen in a way that the participants feel as comfortable as possible. The counselor tried to provide a private environment to build trust. The intervention was held in a quiet room in the comprehensive care centers. The time of each session varied from 60 to 90 minutes based on the content of each session. At the beginning of each session, the objective was described. Each session was initiated by reviewing the previous meeting, continued with presenting of the specified content, answering questions, and clarifying ambiguities and ended with setting up the next session.

Table-1: Description of The mindfulness-based cognitive therapy adherence scale (18)

Session 1: Self-directing: Eating mind-conscious raisins (meditation in which participants spend a few minutes examining the sensory-visual, olfactory, taste, and tactile properties of a raisin seed). Homework: Practice mindfulness in a normal daily activity every day (washing, eating, brushing, etc.) during the week.
Session 2: Dealing with obstacles: Practicing thoughts and feelings. Homework: Recording pleasant events.
Session 3: Presence of mind or breathing technique: sitting meditation. Homework: 3 minutes of breathing space three times a day; mindful walking; recording unpleasant events.
Session 4: Staying in the present: meditating to see / meditating to hear. Homework: Sitting meditation. Homework: 3 minutes of breathing space not only three times a day but also whenever you notice stress and unpleasant emotions.
Session 5: Permission: Sitting meditation. Homework: Guided sitting meditation
Session 6: Thoughts are not facts: sitting meditation is visualization; Shorter guided meditation for at least 40 minutes. Ambiguous scenarios. Homework: 3 minutes of breathing space not only three times a day but also whenever you notice stress and unpleasant emotions.
Session 7: The use of what has been learned: physical examination, homework, reflection, feedback

Table-2: Stages of the strange situation Ainsworth (13) attachment test on 9-12-month infants

Session 1: The mother (or familiar caregiver) and the child enter the room.
Session 2: The silent mother sits in a chair and responds if the child asks for her attention.
Session 3: The stranger enters, talks to the mother, and gradually approaches the child with a toy. The mother leaves the room.
Session 4: The stranger leaves the game with the child, unless the child becomes inactive and does not play, in which case the stranger tries to attract the child's interest in the toy, if the child is stressed, this stage ends.
Session 5: The mother enters and waits to see how the child welcomes her. The stranger quietly leaves the room and the mother waits for the child to be stabilized. Then she leaves the room too.
Session 6: The child is alone; this stage also ends if the child is upset.
Session 7: The stranger returns and repeats the third step.
Session 8: The mother returns and the stranger leaves. Repeated behaviors are observed and noticed and the observation ends.

2.5-Ethical consideration

It should be noted that this article is the result of the first author's dissertation on the Ph.D. degree in Educational psychology approved by the Vice-Chancellor of Central Tehran Branch, Islamic Azad University, No. 10120702962039.

2-6. Inclusion and exclusion criteria

The criteria for entering the study, included being in the age range of 20 to 45 years, having no previous pregnancy or abortion history and experiencing pregnancy for the first time. In addition to psychiatric and psychotropic drugs, the use of sedatives, alcohol, and narcotics, and frequent psychiatric hospitalization, led to withdrawal from the study, which was requested as an individual report about the participants.

2-7. Data Analyses

After being collected, the data were analyzed using SPSS version 21.0. Initially, frequency, percentage, mean, standard deviation, and minimum and maximum values were measured by descriptive statistics (ANOVA; **χ2)**. Before examining the results of analysis of variance, the assumptions of analysis of variance, i.e., Levene's tests were examined.

3. RESULTS

Based on the obtained findings, the frequency of subjects was 16 in the groups of mindfulness training, 11 in the placebo group, and 11 in the control group. According to the findings, the average age of the sample was in the range of 23 to 39 years. Also, according to the mean, the pregnancy weeks of the subjects were between 15 to 41 months (**Table 3**). The education level of the respondents was categorized in 4 degrees of bachelor's, masters, doctorate, and sub-diploma. The highest percentage of the participating mothers had a bachelor's degree and the average family income was over 4 million and 450 Tomans.

The results of **Table 4** showed that the effect of mindfulness training on emotional control while controlling emotional control variables in the pretest is equal to (15,894), and the significance level of F is equal to 0.001, which is less than 0.05. Therefore, it can be concluded that after eliminating the effect of pre-test, mindfulness training had an effect on the emotional control of the pregnant mothers.

As shown in **Table 5**, the Chi Square test revealed that in terms of infant attachment style (P=0.570 χ2=7,644a), there was no difference among the mothers and safe attachment style was observed in the infants of all groups. Regarding the second observation reported by the observer, the Chi Square test showed that in terms of infant attachment style (P =0.428 χ2 = 9.097a), there was no difference among the mothers in the three studied groups; and safe attachment style was observed in neonates of all study groups.

Table-3: The mean and standard deviation of age and gestational age of the subjects

Groups	Variable	Mean ±SD	Min	Max
Mindfulness training	Age	31.63 ± 2.84	27	35
	Gestational age of subjects	24.81 ± 5.23	15	32
Placebo	Age	32.91 ± 3.08	27	36
	Gestational age of subjects	26.36 ± 15.77	20	40
Control	Age	31.36 ± 4.27	23	39
	Gestational age of subjects	33.45 ± 6.28	22	41

SD: Standard Deviation

Table-4: ANCOVA results for the effect of mindfulness training on emotion control in pre-test, controlling the effect of the emotion control variable

Source	Sum of Squares	df	Mean Square	F	P	Partial Eta Squared
Emotion control pre-test	.734	3	.245	4.385	.008	.317
group	.887	1	.887	15.894	.001	.163
Error	.734	3	.245	4.385	.008	

Table-5: χ^2 test results comparing the frequency of infant attachment style to mothers in the three groups

Observation of attachment	Type Groups	Secure		Avoidant		Anxious		Disorganized		Total	
		F	P	F	P	F	P	F	P	$\chi2$	P-value
The first observation of attachment	1	15	93.8%	0	0.0%	0	0.0%	1	6.3%	7. 644a	0. 570
	2	10	90.9%	1	9.1%	0	0.0%	0	0.0%	53	
	3	9	81.8%	1	9.1%	1	9.1%	0	0.0%		
The second observation of attachment	1	12	75.5%	2	12.5%	0	0.0%	2	12.3%	9.097a	0.428
	2	10	90.9%	1	9.1%	0	0.0%	0	0.0%		
	3	9	81.8%	1	9.1%	1	9.1%	0	0.0%	53	

F: Frequency; P: Percentage
Group 1: Mindfulness training, Group 2: Placebo, Group 3: Control

4- DISCUSSION

The current study was conducted to determine the effect of mindfulness training on the emotion control of Primiparous Pregnant women and on the formation of secure attachment style in infants. The study findings showed that mindfulness training has led to positive effects on emotion control of Primiparous Pregnant women and this condition made the infants to have a secure attachment. In the same line with this study, many studies aimed at training approaches to promote mother-fetal attachment (5-9).

Arasteh et al. (2020) explored the link between maternal–fetal attachment in the third trimester and postpartum anxiety, suggesting a potentially protective association between these variables. Additionally, the mediating influence of postpartum bonding and partnership satisfaction has been hypothesized as additional measurements of attachment capacity (19). Matthies et al. (2020) showed that a close maternal–fetal attachment buffers postpartum symptoms of anxiety, partially mediated through postpartum bonding and partnership satisfaction. Therefore, strengthening the maternal–fetal attachment and the partnership during pregnancy has the potential to reduce maternal postpartum symptoms of anxiety. It was predicted that a secure attachment style and higher levels of mindfulness measured prenatally would be associated with greater maternal responsiveness postpartum. The hypothesis was supported for both the secure and insecure (fearful and profoundly distrustful) attachment styles. Mindfulness did not mediate the relationship between attachment and maternal distress. The mindfulness subscale was significantly associated with maternal response to distress. These findings support the role of prenatal mindfulness skills and attachment security for later postnatal maternal sensitivity to the baby (20).

Prenatal attachment history was found to predict early infant response to the caregiver. This is consistent with previous research identifying the propensity for the cross generational transmission of similar attachment patterns between mother and their infant (5, 8, 9). In all of the three mentioned studies, attachment scores were lower than the present study. This difference might be due to the type of questionnaires used, the sample sizes, and the culture of the subjects. None of these studies reported attachment dimension scores (5).

It is further reported that there is a significant negative relationship between the score of fear of childbirth and the mother's attachment to the fetus, and a significant positive relationship between the sense of cohesion and the mother's

attachment to the fetus. As a result, more attention from pregnant women caregivers to the psychological issues of the pregnant mother and her fears and worries can lead to appropriate interventions in this area. Thus, the mothers' attachment to their fetus increases, if they can have proper care during pregnancy and subsequently in the postpartum period and they can also have a stronger relationship with their child. Ultimately, children's mental health is ensured at every stage of life (8).

Sroufe et al. (23) indicate that the organization of attachment behaviors are largely functional, e.g. avoidant attachment behaviors serve to decrease contact with painful experiences such as rejection, and yet increase the potential for proximity to the caregiver when critically needed. Contact with previously conceived threatening stimuli in contemporary experience, e.g., new relationships can be considered risky and/or difficult. The emphasis of a nonjudgmental stance in mindfulness mitigates this risk by separating awareness from previous association; however, where there are consistent findings emerging regarding association between attachment style, mindfulness, emotional regulation and psychological health, a clear understanding of the relationship between these variables requires further exploration (24). Mindfulness has been associated with interpersonal and intrapersonal benefits, including reduced rejection sensitivity, less anticipatory anxiety (25), improved interpersonal functioning, acceptance of partner, and reduced relationship stress (21).

Pregnant mother's mental state during pregnancy has a great impact on fetal health. Psychiatric disorders in the mother prevent her from fully caring for her baby, fetus, or infant and have adverse consequences. The process of emotional attachment, which gradually begins to develop as the mother's attachment to the fetus increases, motivates her to gain competence and satisfaction in the role of motherhood after childbirth. Maternal and fetal attachment can be affected by the following issues: social support, psychological status, gestational age, and maternal age, number of births, marital status, income, education, and high-risk pregnancies.

4-1. Limitations of the study

One of the limitations of the current study was collecting data through self-assessments. A problematic issue was working with infants, the lack of having enough time, and time restrictions in mother-infant relationships. In addition, our study population was restricted to Primiparous Pregnant women only, which restricted the generalization of our findings.

5- CONCLUSION

The results showed that maternal-fetal attachment behaviors were increased as a result of the mindfulness training. These results suggest the importance of strengthening mindfulness training during pregnancy, as an effective strategy for increasing attachment behaviors; since the infant’s health is closely related to the mother’s mental health, promotion of mother’s mental health can be effective in protecting public health. Then it is important that the mothers receive education and training on maternal mental health. Prevention, care, and treatment strategies throughout this period should be well designed to be carried out in a multidisciplinary way to the women at risk or in need of care.

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