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The effect of mindfulness-based intervention on mother's body image and maternal fetal attachment

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Abstract:

BACKGROUND: Pregnancy is associated with a wide range of physiologic and psychologic changes that could affect a mother's body image and maternal-fetal attachment. One of the presented interventions regarding body image and maternal fetal attachment is mindfulness-based intervention. According to the evidence, mindfulness could be affected by various variables such as sociocultural background. Therefore, the present study was conducted to determine the effect of mindfulness-based intervention on mothers' body image and maternal fetal attachment among women who referred to the comprehensive health center of Isfahan-Iran.

MATERIALS AND METHODS: The present quasi-experimental study was conducted on 70 pregnant women who were referred to the comprehensive health centers of Isfahan. The sampling method was convenient, and participants were allocated into two groups. While both groups received routine prenatal care, the intervention group also participated in a 6-session mindfulness counseling course. Demographic characteristics questionnaire, body image, and maternal fetal attachment scale were completed before and 1 month after the end of the intervention by both groups. Data were analyzed using the student *t*-test, Chi-square test, and Fisher's exact test.

RESULTS: No significant difference was observed between the intervention and control group before (respectively, 105.3 and 103.3) and after (respectively, 106 and 105.4) the intervention regarding the score of body image. In the control group, the mean maternal-fetal attachment score did not differ significantly after the intervention compared to before (respectively, 93.6 and 93.5). However, in the intervention group, there was a significant difference between the score of attachment before and after (respectively, 93.4 and 99.06) the intervention ($P = 0.004$). The mean score of maternal fetal attachment after the intervention showed a significant difference ($P = 0.009$) between the intervention and control group (99.06 and 93.5), meaning that the mean score of maternal fetal attachment was higher in the intervention group.

CONCLUSIONS: Mindfulness-based counseling was effective in the improvement of maternal fetal attachment and could be used in interventional programs related to the mental health of pregnant mothers. Also, to design interventions for improvement of body image in pregnant mothers further studies should be conducted.

Keywords:

Attachment, body image, mindfulness, pregnancy

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Introduction

Although pregnancy and becoming a mother is one of the enjoyable events of life for women, due to its physical and psychological changes, it could be associated

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with tension and anxiety.^[1,2] Changes caused by pregnancy might distance women from their ideal body and lead to a feeling of conflict with the concept of beauty and a feeling of dissatisfaction with their body image.^[3] Body image is defined as an individual's mental image of their shape or their perception, which has been formed

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from others' reactions in their mind.^[4] Dissatisfaction with body form could directly or indirectly affect maternal and fetal mental health,^[5] or lead to behavioral disorders such as eating disorders,^[6,7] increased exercising^[8] that could cause insufficient weight gain during pregnancy, preterm delivery and preterm birth,^[9,10] delayed fetal development and in some cases, even, maternal or fetal mortality,^[11] increased risk of abortion^[12] and caesarian section, anxiety,^[13,14] depression and decreased self-esteem.^[10,11]

Another issue that would be affected by changes, anxiety, and the tensions of pregnancy is maternal-fetal attachment. This attachment means a deep and permanent emotional bond between a mother and her child.^[15] Maternal-fetal attachment would lead to on-time start and continued pregnancy care, adherence to a healthy diet, regulated sleep schedule, increased physical exercise, better application of medical cares, inhibiting the use of unauthorized drugs, and alcohol and drugs abuse, and willingness to get to know the fetus during pregnancy. All of these would eventually lead to desirable pregnancy outcomes and improved health of the mother and her child.^[16]

Various interventions have been conducted to improve body image and maternal-fetal attachment, for example, cognitive behavioral therapy and mindfulness education had positive effects on body image,^[17] physical activity has direct significant effects on satisfaction with body image,^[18] and water sports improved body image during pregnancy.^[19] Regarding maternal-fetal attachment, group counselling,^[20] aerobic exercises,^[21] haptonomy interventions,^[22] and cognitive behavioral counselling,^[23] have been reported as effective on this attachment.

In the existing studies, one of the effective methods for improvement of body image and maternal-fetal attachment has been reported as mindfulness-based interventions.^[24] Mindfulness means conscious, intentional, and non-judgmental attention to experiences in the present moment. This includes attention to thoughts, emotions, physical senses, and environmental phenomena without the desire to change or judge them.^[25] Mindfulness is increased awareness and better perception of an individual's inner and outer experiences. This increased awareness would allow the individual to confront the challenges and situations in life with a healthier and more productive method.^[26] Regarding body image, it seems that mindfulness could help women to become more aware of their thoughts, emotions, and judgements of their own bodies. This awareness could help them get along with their body's changes during pregnancy more productively. Various studies have been conducted to evaluate the effect of mindfulness on body image, which have indicated the positive effect of this intervention on body image.^[27,28]

Regarding maternal-fetal attachment, evidence has shown that mindfulness exercises could help establish a deeper and more intimate relationship with the fetus and strengthen mother's attachment to her fetus.^[29]

Various factors would influence the effect of mindfulness on different populations and different aspects of mental health. For example, the study of Matiz *et al.* showed that mindfulness intervention could not decrease stress and improve an individual's inner awareness because the results of the intervention were under the influence of the study's method, duration, and frequency of the mindfulness exercises.^[30] Some studies have also shown that mindfulness would be affected by individuals' age and gender.^[31,32] Also, the race, gender, and culture of the studied population have been mentioned as underlying factors that would affect mindfulness interventions.^[33,34] Based on the mentioned reasons, and also, considering that almost all the achieved evidence has been from studies on populations with a cultural background different from Iran's cultural background, and to ensure its effectiveness and designing measurements in proportion to the background, performing a study on Iranian women seemed necessary. Also, considering the psychological, biological and social challenges of pregnancy, and almost little attention that has been paid to prevent cognitive behavioral problems during pregnancy, despite their long-term effect on mother's and fetus' mental health, the present study was conducted to determine the effect of mindfulness intervention on body image and maternal-fetal attachment in women who referred to the comprehensive health centers of Isfahan.

Materials and Methods

Study design and setting

The present study was a quasi-experimental two-group clinical trial using a pretest-post-test method, which was conducted from October to March 2024. The study location was the health centers of Isfahan city.

Study participants and sampling

From each of the 4 geographical districts of Isfahan, two health centers (based on the centers' list) were randomly selected. Then, by referring to the health centers, from the covered pregnant women, eligible individuals were selected using a convenient sampling method.

The number of participants for each group was calculated to be 32 using this formula: $N = (Z_1 + Z_2)^2 (2S^2) / d^2$.

$Z_1 = 1.96$, $Z_2 = 0.84$, $d = 0/7s$, considering a 10% loss of participant, the final number for each group was set at 35.

The inclusion criteria were willingness to participate in the study, having the first pregnancy, singleton

pregnancy, not using any assisted reproductive methods, not having a history of infertility, having an intended pregnancy, being aged from 18 to 49 years old, having a gestational age of 27–30 weeks,^[35] being Iranian, being able to read and write, being able to communicate in Persian language, living with their husband and not being on the verge of divorce, lack of any fetal diseases or abnormalities, not having any underlying medical conditions or a risky pregnancy, not having any psychological diseases such as depression or severe anxiety (based on the recorded information in mother's medical file), having a body mass index (BMI) of 18.5–25 at the beginning of the pregnancy, and not performing any professional sports during pregnancy. The exclusion criteria were unwillingness to participate in the study at any stage of the study, missing at least two sessions of mindfulness education, and premature delivery before the end of the intervention or before completing the final questionnaire.

Data collection tool and technique

Data was gathered using demographic and reproductive characteristics checklist (Included: Gestational age, Mother's age, Maternal education, Maternal employment status, Spouse's age, husband's educational status, husband's occupation, family's income level, Weight, BMI before pregnancy, Exercise before pregnancy), Cranelly maternal-fetal attachment scale,^[36] and pregnancy body image questionnaire by Sohrabi *et al.*,^[37] which were completed once before the intervention and then, 1 month after the end of the educational sessions^[38] by the participants using self-report method. Cranelly maternal-fetal attachment scale evaluates mother's attachment to her fetus through 24 items and includes the following dimensions: accepting the role of motherhood (4 items), interaction with the fetus (5 items), assigning characteristics to the fetus (6 items), distinguishing between herself and the fetus (4 items), and sacrifice (5 items). Items are scored based on a 5-point Likert scale (absolutely yes "5 points", yes "4 points", not sure "3 points", no "2 points", and absolutely no "1 point") and the score ranges from 24 to 120. Reliability of the original version of Cranelly scale was 0.84^[36] and the content validity and reliability of its Persian version, were approved in the study of Khoramrody ($r = 0.85$).^[39] Pregnancy body image questionnaire has 30 items which are scored based on a 5-point Likert scale (absolutely yes "5 points", yes "4 points", not sure "3 points", no "2 points", and absolutely no "1 point"). The total score of the questionnaire ranges from 30 to 150 and higher scores indicate more positive body image. Reliability and validity of this questionnaire have been approved in the study of Sohrabi *et al.* (Cronbach's α of 0.879).^[37]

Before the start of the study, the researcher attended an educational course and learnt the necessary skills for

performing mindfulness sessions from a specialized psychologist, and received approval. Then, necessary permissions for performing the study were obtained from research and technology deputy of Isfahan University of Medical Sciences, health deputy of the city and the selected comprehensive health centers. Eventually, based on the inclusion criteria, the researcher started the sampling. After introducing themselves and explaining the goals and methods of the study to the mothers, they were invited for participation in the study. From all the mothers who referred to health centers, 66 were selected using convenient sampling method. Then, a pocket containing two pieces of paper, one with a 1 written on it and the other with a 2, was given to each participant and by randomly selecting one of these papers, they were allocated into the intervention and the control groups (35 participants in each group). To prevent contact between participants in the control and intervention groups, one center was designated for sampling the intervention group and one for sampling the control group in each geographic area of the city. After explaining the goals to the participants, written consent was obtained from them, and questionnaires were distributed among the participants of both groups to be completed as self-report under the supervision of the researcher. Educational intervention was performed at the selected comprehensive health centers during six 45-minute group (5–6 participants) sessions (based on the Kabat-Zinn protocol^[38]) three times per week. In the present study, basic mindfulness skills were educated to the participants, which are the simplest method for mindfulness education, and could be used for educating individuals of any age with any level of literacy. Also, at each session, some exercises were given to the participants to be performed at home (practicing what was taught in the face-to-face class). Follow-up of the homework was conducted by asking all of the mothers using social media, and they were asked to check the performed exercises off a checklist that was given to them and then send the checklist to the researcher, weekly. The content of mindfulness sessions included the Table 1. At each session, some exercises were provided to the participants to be performed at home. One month after the end of the sessions, the questionnaires were again given to the participants to be completed.

Ethical consideration

At all stages of the study, all ethical considerations, such as the introduction of the researcher, explaining the goals and methods of the study, obtaining informed consent, confidentiality of the information, and the right to withdraw from the study, were respected. Also, the initial design of the study was approved by the research and technology deputy of Isfahan University of Medical Sciences and ethics committee (IR.MUI.NUREMA.REC.1401.123).

Table 1: Content of mindfulness counseling sessions

Subject	Activity
Session1 Generalities and focusing on the moment	Introduction and awareness of the program content, definition of mindfulness, and its positive consequences Four minutes of body-breath meditation, followed by sharing experiences with mindfulness Discussion with participants about thoughts and feelings at the moment Description of home practice
Session2 Body awareness	Introduction to the concept of mindfulness in the moment, seeing the wonders of the present moment The Raisin Exercise- eating raisins with awareness by feeling them using five senses (touch, taste, smell, hearing, sight) Breath and body scan, paying attention to the fetus. Focus on areas of body changed in pregnancy, sharing of experiences Description of home practice
Session3 Emotional awareness	Defining and recognizing emotions and feelings Being aware of feelings and emotions, listening to unpleasant emotions about their body appearance and image Listening to unpleasant feelings about the pregnancy and fetus, followed by sharing experiences Conversation about noticing pleasant moments Description of home practice
Session4 Mindfulness of thoughts	Recognizing thoughts, the need to recognize the difference between thoughts and feelings The concept of thought in mindfulness Thought fault Description of home practice Recording 3 min of thoughts loudly (remembering that you are not your thoughts)
Session5 Mindfulness body, thoughts and feelings	Introduction to the concept of mindfulness of body, thought and feeling Mindful breathing, smiling and grinning Body scan meditation Inspiring the participants to identify the situation causing stress in them about body image and fetus, inspiration for their mindfulness of the reaction given to this by their body Description of home practice
Session6 Mindfulness diet	Some key practices for a mindful life, mindfulness in mindful activities Providing a conversation space for the participants about their state of avoiding an unpleasant situation related to their appearance, facing it, and accepting that distressing situations are a process in their life Discussion on the duration for which the participants are able to practice mindfulness in their daily lives Discussion on mindful behaviors experienced by the participants in their daily life

Statistical analysis method

Gathered data was analyzed using SPSS software version 22 and independent *t*-test, dependent *t*-test, Chi-square test and Fisher's exact test.

Results

Eventually, 70 pregnant mothers were enrolled in the intervention and control groups (35 individuals in each group) and data from the completed questionnaires of all the participants was analyzed. The mean age of the mothers in the intervention group was 29.2 ± 5.10 and in the control group was 28.86 ± 4.95 years. The mean of gestational age in the intervention group and the control group was 28.18 ± 1.22 and 28.27 ± 1.26 weeks, respectively. No statistically significant difference was observed between both groups regarding gestational age, mother's age, father's age, mother's weight, and BMI before pregnancy [Table 2]. Also, the two groups had no significant difference regarding the mother's educational

status, the mother's occupational status, performing physical exercises before pregnancy, and performing physical exercises during pregnancy [Table 3]. Regarding other background variables such as the husband's educational status ($\chi^2 = 1.34$, $P = 0.5$), the husband's occupation ($\chi^2 = 2.57$, $P = 0.43$), and the family's income level ($\chi^2 = 0.65$, $P = 0.42$), no significant difference was observed between both groups.

Data analysis showed no significant difference in the attachment and body image scores of the control group before and after the intervention. However, in the intervention group, the attachment score showed a significant difference before and after the intervention; meaning that, after the intervention, mother's attachment to fetus was increased. But no significant difference was observed in the score of body image of the intervention before and after the intervention [Table 3]. Results showed that the total mean scores of maternal-fetal attachment and body image had no significant difference

between the intervention and the control groups before the intervention. Also, comparing the total mean score of body image between the intervention and the control group after the intervention showed no significant difference. But the total mean score of maternal-fetal attachment after the intervention was higher in the intervention group than the control group and statistical analysis indicated a significant difference [Table 4].

Discussion

The present study aimed to determine the effect of mindfulness intervention on body image and

maternal-fetal attachment among mothers who referred to comprehensive health centers of Isfahan. The results showed that mindfulness only significantly increased the maternal-fetal attachment score in the intervention group and had no effect on other variables.

Regarding the improvement of maternal-fetal attachment in the intervention group, not only was this result in line with the results of previous studies, but almost all of the previous studies in this field had reported similar results. For example, the studies of Ekrami *et al.*^[20] Kalmbach *et al.*,^[40] Kordi and Mohamadirizi^[41] De Luna^[42] and Williams^[43] have indicated that mindfulness based intervention has been effective in improvement of maternal-fetal attachment and it has also been associated with decreased anxiety, constant thinking, rumination, and sleep disorders in the intervention group.

In general, it could be said that mindfulness would increase maternal-fetal interactions, and these interactions start with a mother's attachment to her fetus during pregnancy. This strengthened relationship is one of the promising aspects regarding internal supportive resources.^[44]

In the present study, after the intervention, no significant difference was observed in the mean score of body

Table 2: Comparing qualitative demographic and pregnancy variables between the intervention and the control groups

Variable	Mean±SD		Independent t-test	
	Control group	Intervention group	t	P
Gestational age (weeks)	28.27±1.26	28.18±1.22	0.28	0.78
Mother's age (years)	28.86±4.95	29.20±5.10	0.28	0.77
Spouse's age (years)	33.34±4.27	33.49±5.01	0.12	0.89
Weight (kg)	75.89±9.21	65.97±11.44	0.03	0.97
BMI before pregnancy	23.82±1.36	23.56±1.42	0.59	0.55

BMI=Body mass index, SD=Standard deviation

Table 3: Comparing the frequency of qualitative demographic variables of mothers between the intervention and the control group

Variable	Control group		Intervention group		Chi square test	
	Frequency	Percentage	Frequency	Percentage	χ^2	P
Maternal education						
Elementary	1	2.9	1	2.9	0.36	0.83
High school/diploma	8	22.9	6	17.1		
University	26	74.3	28	80		
Maternal employment status						
Employed	27	77.1	25	71.4	0.29	0.78
Housewife	8	22.9	10	28.6		
Exercise before pregnancy						
Yes	4	11.4	5	14.3	*	0.5
No	31	88.6	30	85.7		

*Fisher's exact test

Table 4: Comparing the scores of body image and maternal-fetal attachment before and after the intervention within and between the intervention and control groups

Variable	Time	Mean ± SD		Independent t test	
		Intervention group	Control group	t	P
Body image score	Before intervention	105.3 ± 20.55	103.37 ± 17.99	0.35	0.72
	After intervention	106 ± 15.34	105.43 ± 20.57	0.13	0.89
Pair t-test		t = 0.22 P = 0.82	t = 0.44 P = 0.65		
Mother-Fetal Attachment Score	Before intervention	93.49 ± 7.69	93.69 ± 7.12	0.11	0.91
	After intervention	99.06 ± 8.01	93.54 ± 9.16	2.69	0.009
Pair t-test		t = 2.96 P = 0.004	t = 0.07 P = 0.94		

SD = Standard deviation

image of the intervention and the control groups and also between the intervention and the control groups. This result is in contrast with the results of previous studies that have used mindfulness or other cognitive-behavioral interventions. For example, studies of Cengizhan and Uçar^[45] Shen *et al.*,^[46] Zamiri-Miandoab *et al.*,^[47] Balciuniene *et al.*,^[48] and Gopan *et al.*^[49] have indicated that cognitive-behavioral interventions like mindfulness significantly improved body image in women during pregnancy and after delivery.

The contrast between the result of the present study and results of previous studies might be due to the different methods of study or the difference in the tools used for the measurement of data, which would make direct comparison between the studies difficult.^[50] Most of the studies that have been conducted for investigation of body image during pregnancy, have used scales that have been developed and validated for investigation of body image for non-pregnant population or have specifically focused on satisfaction with the looks.^[5] The used questionnaire in the present study has been specifically developed for investigation of body image in pregnant women by Sohrabi *et al.*, which includes the dimensions of fitness and beauty, lower body obesity, drawing attention to pregnancy changes, being ashamed of pregnancy changes, sexual attraction, negative emotions about changes in the skin, and symbol of motherhood.

It seems that another reason for the different results is the different inclusion criteria in the present study. In the study by Cengizhan and Uçar^[45], pregnant women with a gestational age of 10 to 28 weeks, in the study by Talebi *et al.*^[51] pregnant women with a gestational age of 3 to 12 weeks, and in the study by Zamiri-Miandoab *et al.*^[47] pregnant women with a gestational age of 10 to 28 weeks have participated; in the present, the gestational age of participants was 27 to 30 weeks, and the intervention was conducted during the third trimester. It seems that body image and satisfaction with the looks of pregnant women is at the lowest stage during the third trimester and would not have a significant improvement until a couple of weeks after delivery. Boscaglia *et al.* conducted a study on women from 6 weeks before pregnancy until 6 weeks after delivery with little and high exercise to compare satisfaction with body image. This study showed that the score of satisfaction with body image in women with little exercise had a descending trend during the third trimester and after delivery and its mean score would reach the lowest point after delivery.^[11]

Limitation and recommendation

One of the limitations of the present study was the short time for performing the intervention (since the participants were enrolled in the study at the beginning

of their third trimester, and the likelihood of preterm birth and pregnancy complications increases in this trimester, we plan the intervention in a short period to reduce sample attrition). This matter might have influenced the effectiveness of the intervention. Based on the results, in general, it is recommended that in future studies, at the beginning, the convergent validity of the selected scale would be compared to other scales used for evaluation of body image and then, similar studies with more participants and longer time for intervention would be conducted. Also, starting the intervention at younger gestational ages is recommended.

Conclusions

The results of the present study indicated the effect of mindfulness intervention on the improvement of maternal-fetal attachment. Therefore, performing this method, as an applicable and effective method, for improvement of attachment during pregnancy by prenatal caregivers is recommended. Since mindfulness did not improve mothers' body image scores in this study, the authors suggest that conducting more studies for designing effective interventions on improvement of body image (that would be applicable in the current cultural-social background and the form of the existing services) be considered.

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Using AI

The authors assert that artificial intelligence was not employed at any stage of this research or in the writing of the article.

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Conflicts of interest

There are no conflicts of interest.

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