

# Effect of Mindfulness-Based Stress Reduction Program on “Coping Behaviors” and “Attachment” of Mothers of Neonates with Congenital Anomalies: A Randomized Clinical Trial

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## ABSTRACT

**Background:** Reduction of stress in mothers of neonates with congenital anomalies is necessary to improve their coping behaviors and attachment to their neonates. In this regard, the present study aimed to determine the effect of mindfulness-based stress reduction (MBSR) program on “coping behaviors” and attachment of mothers of neonates with congenital anomalies.

**Methods:** This randomized clinical trial (code: IRCT20190123042471N1) was conducted on 70 mothers of neonates with congenital anomalies under medical treatment in two medical-education centers of Shahid Beheshti University of Medical Sciences, Tehran, Iran in 2019. The subjects were selected based on the inclusion criteria and were randomly assigned to two groups of intervention and control (n=35 per group). The intervention group, which included 10 subgroups of 1-3 subjects, received a modified four-session MBSR program (once a week, 1-1.5 h per session). The control group received routine care in the hospital during their hospitalization. The Coping Health Inventory for Parents questionnaire and Maternal Postnatal Attachment Scale tool were completed by the intervention and control groups, both before and after the intervention. The data were analyzed in SPSS (version 25.0) using multivariate analysis of variance.

**Results:** The MBSR program affected the pattern of coping behaviors and maternal-neonatal attachment. There was an increase in the mean scores of coping behaviors and maternal-neonatal attachment in the intervention group, compared to the control group (P<0.05).

**Conclusion:** The MBSR program is recommended as a cost-effective and reliable method for promoting coping behaviors and attachment of mothers to their neonates hospitalized in neonatal intensive care units.

**Keywords:** Attachment, Coping, Mindfulness, Mothers, Neonates

## Introduction

Congenital anomalies are defined as errors in human evolution that occur during the growth and development of the fetus. In Iran, an average of 30,000-40,000 neonates is born with congenital anomalies (1). The birth of these neonates is mostly associated with consequences, such as long-term hospitalization, and they often require treatments in form of major surgical interventions. Moreover, the birth of a child with congenital anomalies is a great challenge that

affects families as a whole and can have adverse effects on the health of each family member. Among family members, the mother is the most vulnerable individual due to her physiologic condition after giving birth and her responsibilities as the primary caregiver to the child. In several studies, mothers have been reported to have various reactions, such as anxiety, depression, tension, and grief, to the birth of neonates with congenital anomalies (2, 3).

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Birth of a neonate with congenital anomalies can cause psychological crisis in the mother and cause her to use several forms of coping behaviors. Coping usually refers to the association of internal needs and external demands in difficult circumstances to regain personal balance. Coping behaviors are the reactions of individuals to stressful situations with goals, such as gaining management, controlling the situation, and adapting to the situation. Coping behaviors are categorized based on different criteria, including the coping style (emotion-driven and problem-driven), concentration of coping (problem vs. emotion), the form of coping (behavioral, emotional, and cognitive), and the extent of the role one plays in that behavior (passive or active) (4).

Regarding the behaviors of the parents of a child with chronic health conditions and disabilities, various characteristics, such as competence, desirability, acceptance, and support-seeking, are referred to as adaptive coping strategies. Moreover, other characteristics, such as isolation, sense of being different, and irritability, are referred to as incompatible coping strategies (5). Coping behaviors of an individual can occur in one or several ways of these four forms: search for information, direct action, inhibition of action, and intrapsychic processes. The process of coping depends on available resources, including personal factors, positive beliefs, problem-solving skills, social skills, social supports, and financial resources (4).

Disturbance of the maternal-neonatal relationship, progression of psychological connection process, or attachment are among the consequences of the birth of a child with a congenital anomaly. This is due to a resultant tension or is a mechanism to avoid attachment to an infant with anomalies (6). Emotional attachment is a reciprocal interaction that covers behaviors, such as intimacy and a sense of closeness to an individual and belonging to them. Maternal-neonatal attachment acts as an invisible link between the mother and the child, binding them together (3). Researches on interactive behaviors of mothers and neonates with congenital anomalies (which is required for the advancement of the attachment process) have indicated that sensitivity and acceptance of the responsibility of feeding and caring of such mothers are lower than normal (3, 7).

Ineffective compatibility and lack of favorable attachment of the mother to her neonate are directly related to the health of the neonate with congenital anomaly (8, 9). Numerous studies

have suggested that multiple psychological-supportive and educational interventions can reduce the tension in mothers of neonates with congenital anomalies, help them select more effective coping behaviors, and improve the attachment process (10). Nevertheless, based on the literature review, it can be said that studies in this field are insufficient. Accordingly, there is no knowledge of the effect of the interventions based on third-generation treatment strategies, such as Mindfulness-Based Stress Reduction (MBSR), on the disorders caused by tension in this population (11).

Mindfulness exercises have a long history in eastern nations. Mindfulness (consciousness) refers to being aware of all internal-external experiences at the moment and is based on three elements of "preventing judgment", "promoting awareness", and "focusing on the present moment" (12). Given the fact that mindfulness consists of paying attention to and focusing on specific aspects of the mental experiences of the individuals, it encourages people to concentrate on their thoughts and emotions regardless of the judgments of others. Concentration on the present moment can become possible through cognitive (i.e., thinking about the past and the future) and metacognitive (i.e., emotions, thoughts, and behavioral processes) processes by mindfulness.

Various studies have indicated that direct improvement of the flexibility, control, and monitoring strategies of emotions is possible through mindfulness (11). The MBSR program was developed by Kabat-Zine in 1992 as a management tool for controlling intractable pains. Recently, this program has been brought into focus for stress reduction in numerous clinical conditions. This approach has been studied for the reduction of stress in mothers of children with cerebral palsy, autism, chronic conditions, cancer, and asthma (13-15).

When caring for infants with congenital anomalies, paying full attention to their parents, especially their mother is of great importance (3). Comprehensive family-oriented caring and the satisfaction of families are among the major requirements of pediatric nursing (16). Nursing is completed once the infant is placed within the care of the mother, who peacefully takes care of the child with full awareness and continues to do so at home.

No clinical trial was found on the subject of "the effect of MBSR" on coping behaviors and maternal-neonatal attachment. In this regard, the present study aimed to determine the effect of the

MBSR program on coping behaviors and the level of attachment of mothers of neonates with congenital anomalies.

## Methods

This randomized clinical trial was conducted on two controlled groups based on a pretest-posttest design in 2019. The study population consisted of mothers of neonates with congenital anomalies that were hospitalized in the neonatal intensive care unit or were among the visitors of clinics and neonatal emergencies of hospitals of Shahid Beheshti University of Medical Sciences (Mahdiah and Mofid Hospitals), Tehran, Iran in 2019.

The inclusion criteria were 1) literacy, 2) ability to speak Persian, 3) having an infant with a definite diagnosis of a non-fatal congenital anomaly, 4) lack of mental, anxiety, or cognitive-sensory illness (i.e., blindness and deafness) based on self-disclosure, 5) no previous record of children with congenital anomalies, 6) lack of education in psychology or medical sciences, 7) biological relationship with the child, and 8) tendency and ability to participate in meetings. The exclusion criteria consisted of 1) absence from more than one-fourth of the sessions, 2) failure to perform the tasks, 3) withdrawal of the mother from the program, or 4) death of the infant by any cause.

The subjects were selected using the convenience sampling method. The sample size was determined based on similar studies (14). Accordingly, in the present study, the effect size,  $\alpha$ , and  $\beta$  were considered 0.93, 0.05, and 0.2 for calculations, respectively. By assuming the equality of the variances ( $\delta_1 = \delta_2 = 7$ ), 95% quality assurance, and 80% power of the test, the sample size was determined to be around 30 subjects. Regarding the possibility of reduction in sample size, it was considered 35 subjects:

$$n = \frac{(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2 (\delta_1^2 + \delta_2^2)}{(x_1 - x_2)}$$

The coping behaviors of mothers were measured using the "Coping Health Inventory for Parents" which was designed by McCubbin et al. in 1991. This inventory contains 45 items and three subscales. The first subscale is "maintaining family integration, cooperation, and an optimistic definition of the situation" and includes 19 items. The second subscale is "maintaining social support, self-esteem, and psychological stability" and consists of 18 items. The third subscale is "understanding the medical

situation through communication with other parents and consultation with medical staff" and contains eight items (17).

If the participant had used the desired coping behaviors, she could evaluate its effectiveness based on a four-point Likert scale, ranging from "it was not useful at all" to "it was very useful". If the participant had not used the intended coping behaviors, she could use either "I did not want to use it" or "I could not use it" which had the same score (i.e., 0). According to the developer of the tool, its Cronbach's alpha coefficient was calculated by two studies at 0.79 and 0.71. In this instrument, higher scores indicate better adaptation from the point of view of the parent. This instrument was translated to Persian by Nik Farid et al. in 2012, and its face and content validity were determined. Cronbach's alpha of the questionnaire in the present study was calculated at 0.87 (18).

Maternal attachment was measured using the "Maternal Postnatal Attachment Scale" which was developed by Condon and Corkindale in 1993. They considered maternal affection toward the child as a central concept for laying the theoretical foundation and designed a scale to measure the attachment of mothers to their infants under one year old. The scale included three subscales, namely "the quality of attachment", "non-existence of hostility", and "satisfaction from interaction". The structure of the scale indicated that these three subscales included almost 40% of the variance in attachment scores.

This scale consists of two parts; the first part is a set of items that start with a part of a sentence and the mothers have to complete it by selecting one of the three, four, or five options that are provided for them (19). The second part includes phrases and the mothers can choose one of the options as an answer for them. The options include "often", "sometimes", "rarely", or "never". The lowest and highest scores for showing the "quality of attachment" are 9 and 45, respectively. Moreover, the lowest and highest scores for "non-existence of hostility" are 5 and 25, respectively. In addition, the lowest and highest scores for "satisfaction from interaction" are 5 and 25, respectively. Therefore, each item is scored based on a scale from one (i.e. lowest attachment level) to five (i.e. highest attachment level).

Cronbach's alpha of this instrument was reported to be 0.81 and 0.91 by numerous studies (20). Cronbach's alpha coefficient of the questionnaire was 0.83 in the present study. The Persian version of this instrument was used for

the first time in Iran in 2011 in a study performed on 214 mothers with children younger than 36-month-old. The translation method of this instrument was not explained by the authors. In this study, the internal correlation values of the instrument for the whole scale and its factors were determined as 0.69, 0.45, 0.56, and 0.23, respectively (21).

During the three months of this research, the first author of the article visited the research environments 2-3 times a week. After obtaining consent from all of the mothers, eligible subjects were selected and randomly divided into intervention and control groups. For group allocation, all of the eligible subjects were listed and each was randomly assigned a number. Afterward, the required number of subjects were selected using random allocation.

It should be mentioned that the participants were selected in several stages. In several visits to Mofid and Mahdih hospitals, 48 and 22 people were identified as eligible, respectively. The participants were allocated to the control and intervention groups using the block randomization method. In this method, the samples were placed in 14 blocks of 5 and then randomly allocated to control (n=35) and intervention (n=35) groups. The intervention was performed three days a week and lasted for two weeks; after that, there was a two-week interval

before the control groups were examined (parallel sampling was used to prevent contact between mothers in the two groups).

After the selection of samples, a pretest was performed in both groups using the related questionnaire. Intervention based on the MBSR program was provided for the intervention group (n=35). After four weeks of participation in the program (completion of the program in one month), both intervention and control groups (who did not participate in the program) completed the post-test in the hospital. In case of discharge from hospital or non-continuation of the infant hospitalization, the questionnaire was completed one month later when the mother brought her infant for a routine checkup.

The MBSR program was provided in four sessions for groups of one to three participants, once a week for 60-90 min. The participants were invited to participate in the sessions during medical visits of infants when they were not allowed to enter the NICU. The sessions were held in their resting rooms where the mothers stayed during the hospitalization of their infants in the NICU. The program was executed by a therapist (the first author) after receiving adequate training and under the supervision of the other members of the research group (Figure No.1). The following is a summary of the sessions of the MBSR program.

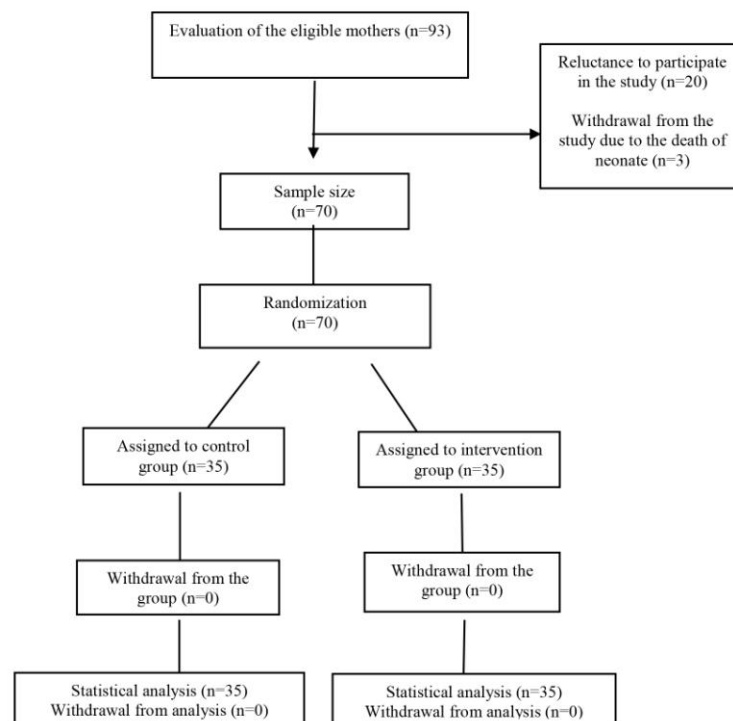


Figure 1. Flowchart of the participants of the study

### Session one

After the introduction of the program, participants were provided with a brief report of the goals of the program. Next, the participants were asked to discuss the feeling of eating a raisin. It was followed by practicing body scan meditation for 30 min (concentration on different parts of the body while taking deep breaths). For homework, they were asked to repeat what they had learned about feeling the raisin on their teeth, washing the dishes, or any other activity that was not related to their child, at home or the hospital.

### Session two

After discussing the homework, the participants were asked to look around in a non-judgmental manner for two min and listen. This practice was followed by two meditations called "sitting" and "breathing", along with concentrating on sensations of the body. Afterward, the responses of the participants to the stress caused by difficult situations, beliefs, and alternative behaviors were discussed. At the end of the session, they practiced walking in a mindful manner. The homework included sitting meditation, body scan, and three-min breathing space (during an unpleasant event).

### Session three

At the beginning of the session, the participants were asked to practice sitting meditation and three-min breathing space. Afterward, homework was discussed in groups of two or among all of the participants, and yoga moves were taught to the participants. The homework of this session included practicing yoga and a combination of meditations that they preferred. Moreover, they

were told to practice three-min breathing space during an unpleasant event and also mindfulness on a new daily activity

### Session four

In this session, the participants practiced "whatever they had learned so far" followed by meditation and three-min breathing space practice. In addition, the methods of overcoming the obstacles to meditation were discussed. Next, a few questions were asked from the participants: Did they reach the goals they had expected to reach? Did they feel any positive changes? Did they feel that they had gained new coping behaviors? Did they want to practice their meditations from now on?

Table 1 summarizes the structure of the sessions and the content of the MBSR program. It should be noted that according to the condition of the mother, exercises and homework were pursued and reviewed by the therapist, every other day after the session.

The collected data were analyzed using descriptive statistics (i.e., frequency, mean percentage, and standard deviation) and analytical statistics (i.e., multivariate analysis of covariance) in SPSS (version 25.0) with a p-value of less than 0.05. Chi-square test and paired t-test were used to compare the variables in the groups.

### Ethical consideration

This study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences (registration ID: IR.SBMU.PHARAMCY.REC.1397.198) and is registered at the Iranian Registry of Clinical Trials (registration ID: IRCT20190123042471N1).

**Table 1.** Structure of the sessions and the content of mindfulness-based stress reduction program

Session	Content of the session
One	Introduction, presentation of a brief report about the program and its purposes, meditation, and body scan for 30 min
Two	Review of the exercises and homework of the previous session (body scan), sitting meditation, three-min breathing space, and discussion about pleasant and unpleasant events
Three	Review of the exercises and homework of the previous session (sitting meditation and three-min breathing space), yoga practices, discussion about pleasant and unpleasant events along with three-min breathing space
Four	Review of the exercises and homework of the previous session (sitting meditation, three min breathing space, and yoga practice), discussion about what they have learned this far, discussion about positive changes, and whether they would like to continue mindfulness and meditation

## Results

Results of the Kolmogorov-Smirnov test indicated the normal distribution of scores of coping behaviors and attachment; therefore, parametric tests were used in this study. Based on

Table 2 (demographic characteristics of the mothers), the mean ages of the mothers in intervention and control groups were  $25.65 \pm 4.02$  and  $25.02 \pm 3.76$ , respectively. Moreover, it was found that the majority of the neonates were male



and delivered by cesarean section. The most common anomaly in both groups was esophageal atresia with 12 cases in the intervention group and 21 cases in the control group (34 cases total).

Table 3 summarizes the mean scores of coping behaviors and maternal-neonatal attachment of the subjects before and after the intervention. The results of the Chi-square test and independent t-test indicated no significant difference between the two groups in terms of demographic characteristics. According to Table 3, the mean score of coping behaviors after participation in the MBSR program significantly increased from  $2.27 \pm 0.21$  to  $2.45 \pm 0.20$  ( $p$ -value=0.001). This mean value decreased from  $2.26 \pm 0.15$  to  $2.29 \pm 0.19$  in the control group ( $p$ -value=0.593). Moreover, the mean value of changes in coping behavior scores in intervention and control groups were calculated at  $-0.168 \pm 0.048$  and

$0.022 \pm 0.010$ , respectively. Independent t-test indicated that there was no significant difference in coping behavior scores of the control group before and after the intervention ( $p$ -value=0.849). However, coping behavior scores of the intervention group underwent a significant change after participation in the MBSR program ( $p$ -value=0.001).

Results of the study on maternal attachment indicated that the mean scores of attachments in the intervention and control groups before the intervention were  $2.87 \pm 0.25$  and  $2.85 \pm 0.16$ , respectively, which changed to  $3.12 \pm 0.17$  and  $2.81 \pm 0.19$ , respectively, after the intervention. Results of the independent t-test indicated that the mean values of changes in the maternal attachment scores of the intervention and control groups were  $-0.246 \pm 0.051$  and  $0.036 \pm 0.030$ , respectively, and that the difference is significant

**Table 2.** Demographic characteristics of the mothers and neonates with congenital anomalies hospitalized in Mahdih and Mofid hospitals, Tehran, Iran (2019)

Variables	Statistical indicators	Population	Minimum	Maximum	Mean	Standard deviation	Independent t-test
Age of neonate (days)	Intervention group	35	8	28	19.40	5.82	P=0.43
	Control group	35	8	27	18.34	5.54	
Age of mother (years)	Intervention group	35	19	33	25.65	4.02	P=0.50
	Control group	35	19	34	25.02	3.76	
Gender of neonate			Intervention Population	group Percent	Control Population	group Percent	Chi-square test
	Male		22	62.85	24	68.57	P=0.61
	Female		13	37.15	11	31.43	
Total		35	100	35	100		
Hospitalization record	Present		18	51.43	18	51.43	P=0.59
	Not present		17	48.57	17	48.57	
	Total		35	100	35	100	
Type of delivery	Cesarean		21	60	18	51.43	P=0.47
	Natural vaginal delivery		14	40	17	48.57	
	Total		35	100	35	100	
Education level of the mother	Below high school		12	34.28	10	28.58	P=0.85
	High school		15	42.85	17	48.57	
	Bachelor's degree		8	22.87	8	22.85	
	Master's degree and above		0	0	0	0	
	Total		35	100	35	100	

**Table 3.** Mean scores of coping behaviors and maternal-neonatal attachment before and after intervention among mothers of neonates with congenital anomalies hospitalized in Mahdih and Mofid Hospitals, Tehran, Iran (2019)

		Before the intervention	After the intervention	Changes	Paired t-test
		Mean	Mean	Mean	
Coping behaviors	Intervention group	$2.27 \pm 0.21$	$2.45 \pm 0.20$	$-0.168 \pm 0.048$	0.001
	Control group	$2.26 \pm 0.15$	$2.29 \pm 0.19$	$-0.022 \pm 0.010$	0.593
	Independent T-test	0.849	0.001	<0.001	
Maternal-neonatal attachment	Intervention group	$2.87 \pm 0.25$	$3.12 \pm 0.17$	$-0.246 \pm 0.051$	<0.001
	Control group	$2.85 \pm 0.16$	$2.81 \pm 0.19$	$0.036 \pm 0.030$	0.378
	Independent T-test	0.589	<0.001	<0.001	

**Table 4.** Mean scores of subscales of coping behaviors and maternal-neonatal attachment before and after the intervention among mothers of neonates with congenital anomalies hospitalized in Mahdiah and Mofid hospitals, Tehran, Iran (2019)

Title	Subscale	Time	Before the intervention	After the intervention	Changes	Paired t-test	
Coping behaviors	Maintaining family unity, cooperation and optimism toward the situation	Group	Mean	Mean	Mean		
		Intervention	2.42±0.28	2.61±0.42	-0.185±0.081	0.024	
		Control	2.40±0.39	2.41±0.29	-0.016±0.082	0.847	
			Independent t-test	0.760	0.024	<0.001	
	Maintaining social support, self-esteem and psychological stability	Intervention	2.40±0.24	2.52±0.24	-0.125±0.056	0.027	
		Control	2.39±0.20	2.42±0.11	-0.038±0.032	0.399	
		Independent t-test	0.908	0.032	<0.001		
	Understanding the medical situation through communication with other parents and consultation with medical staff	Intervention	2.01±0.32	2.21±0.29	-0.196±0.078	0.013	
		Control	2.02±0.13	2.04±0.36	-0.017±0.006	0.789	
Independent t-test		0.916	0.031	<0.001			
Maternal-neonatal attachment	The quality of attachment	Intervention	3.58±0.52	3.97±0.37	-0.392±0.107	<0.001	
		Control	3.53±0.32	3.37±0.44	0.160±0.091	0.084	
		Independent t-test	0.614	<0.001	<0.001		
	Non-existence of hostility	Intervention	2.45±0.35	2.62±0.21	-0.169±0.070	0.017	
		Control	2.40±0.29	2.43±0.27	-0.023±0.016	0.726	
		Independent t-test	0.507	0.009	<0.001		
Satisfaction from interaction	Intervention	2.59±0.29	2.77±0.20	-0.177±0.059	0.004		
	Control	2.62±0.26	2.64±0.23	-0.030±0.026	0.608		
		Independent t-test	0.745	0.016	<0.001		

(p-value<0.001).

Analysis of the data represented in Table 4 about the subscales of coping behaviors indicated that the mean score of the subscale “maintaining family unity, cooperation, and optimism toward the situation” in the intervention group changed from 2.42±0.28 to 2.61±0.42 which indicates a significant change (p-value=0.024). Results of the independent t-test showed that there was a significant change in the scores of this subscale in the intervention group (p-value=0.024), while this was not the case with the control group (p-value=0.847).

In the intervention group, the mean score of the subscale “maintaining social support, self-esteem, and psychological stability” changed from 2.40±0.24 to 2.52±0.24 (p-value=0.027). Changes in the mean scores of this subscale were significant in the intervention group, compared to the changes in the mean scores of the control groups (p-value<0.001). In the intervention group, the mean score of the subscale “understanding the medical situation through communication with other parents and consultation with medical staff” increased from 2.01±0.32 to 2.21±0.29 after the MBSR program (p-value=0.013). The mean score of this subscale in the control group changed from 2.02±0.13 to 2.04±0.36 which indicated no significant changes in the scores of this group (p-value=0.789). Moreover, the mean values of the changes of the scores of this subscale in the intervention and control groups were -0.196±0.078 and -

0.017±0.006, respectively.

The mean scores of the subscale “the quality of attachment” in the intervention group before and after participation in the MBSR program were 3.58±0.52 and 3.97±0.37, respectively. The mean values of changes in the intervention and control groups were -0.392±0.107 and 0.160±0.091, respectively, both of which were significant (p-value<0.001). The mean value of the change of the subscale “non-existence of hostility” in the intervention group was significant (p-value=0.017); however, this was not the case with the control group (p-value=0.726). The mean score of the subscale “satisfaction from interaction” in the intervention group increased from 2.59±0.29 to 2.77±0.20, which was significant (p-value=0.004). The mean values of changes in the intervention and control groups were -0.177±0.059 and -0.030±0.026, respectively (p-value<0.001).

## Discussion

This study aimed to examine the effect of modified MBSR on coping behaviors and attachment of mothers of hospitalized infants. Findings of the present study indicated the improvement of the attachment and coping behaviors of the mothers who participated in the MBSR program. The number of studies that have investigated the effects of this intervention on the psychological variables of mothers during the postpartum period is limited.

In a study, Perez-Blasco et al. held this intervention for breastfeeding mothers with

normal neonates and found that it elevated their efficacy and reduced their stress (22). Based on the knowledge of the authors of this article, no research has been carried out on the effects of this intervention on the psychological variables of the mothers of neonates with congenital anomalies. Nevertheless, it should be mentioned that the results of the present study support those of other studies performed on the other psychological variables of the parents of neonates with chronic conditions or congenital disabilities. Some of these studies are presented in the following paragraphs.

Lo et al. performed a study on mood and functional and behavioral conditions of the parents of children with attention deficit disorder and hyperactivity and found that the MBSR program improved their psychological variables (23). Furthermore, Amaral et al. conducted a study on the parents of children with asthma and reported that a decrease of stress due to mindfulness reduced the depression and improved the quality of life and resilience of the parents (24). Neece et al. reported the effectiveness of the stress reduction caused by mindfulness program on the promotion of the psychological health of the parents of children with developmental delay (25).

In a meta-analysis performed by Khoury et al. (2015) on 29 studies about the MBSR program, it was shown that this intervention had the highest effects on stress and moderate effects on anxiety, depression, distress, and the quality of life while its effect on fatigue was the lowest of all. All of these researchers acknowledged the need for further studies in this field for reducing the limitations caused by the heterogeneity of the samples in the studies and emphasized using different methods for performing the intervention (12).

There are several points to note in the explanation of the effects of the MBSR program on patterns of coping behaviors and attachment levels of mothers of neonates with congenital anomalies. In this psychological treatment, through careful observation of their inner events, the participants perceived that positive emotions (e.g., happiness) are not dependent on the outside world and its changes. In this method, the participants learn to focus on their activities (e.g., breathing or walking) and stay aware of their situation at every moment.

The mothers were provided with the opportunity to process and observe their emotions and self-knowledge without being judged (26). While the mind is surrounded by thoughts, memories, or dreams, participants can

bring back their focus to the present moment by observing the content and nature of their thoughts. Therefore, the participants are taught to concentrate on their thoughts and emotions, but not focus on their content (27).

The MBSR exercises encourage the mothers to ignore the judgments and concentrate on their own thoughts and emotions in every moment. Concentration on the present moment becomes possible with cognitive (i.e., thinking about the past and the future) and metacognitive (i.e., emotions, thoughts, and behaviors) processes as well as mindfulness. In addition to leading the cognition away from the stress factor (e.g. children with congenital anomalies), it affects the psychological reactions of the body (28). In fact, after gaining freedom from stress and its psychological consequences, the mother can engage in required emotional activities after the birth of the child (e.g., attachment to the child).

Attachment is one of the most important psychological aspects of the postnatal period for the mother, which is greatly affected by her stress level. Previous studies have indicated that impaired health conditions of the neonate are among the risk factors of the process (10). Ineffective management of the stress can lead to weak maternal-neonatal attachment, negative health consequences for the neonate, and postnatal depression of the mother (29).

Achievement of control over the cognitive and meta-cognitive processes through mindfulness can help a mother to improve her self-efficacy. Improvement of the self-efficacy of the mothers leads to their collaboration and contribution to the provision of care for their sick child. Increased participation of mothers in the provision of care would accelerate the treatment process and improve family-oriented care (30). Birth of a child with a congenital anomaly is an important issue that due to its chronic nature can have psychological consequences for the family, especially the mother. It should be noted that raising a child who does not have a normal life and is struggling with health problems for a long period can cause psychological distress in the mother (31).

Based on previous studies, psychological interventions about the stress level and self-efficacy of the mothers of children with chronic health problems can lead to better results and improve their contribution to caring for the child (32). According to the significance of the relationship between mind and stress and its effects on daily performance, a great deal of



attention has been paid to the role of psychological treatments, along with the provision of health services. Therefore, addressing the problems of health and psychological issues at the same time improves the integrated healthcare services.

Kabat-Zinn suggested that mindfulness reduces the psychological pressures and stresses along with physical symptoms (33). Moreover, mindfulness techniques can reduce tension, depression, and anxiety by providing opportunities for caring and relaxation (26). In addition, MBSR exercises improve the function of mothers by reducing or stopping unpleasant emotions and thoughts and can lead to better adaptation by improving the coping behaviors. Furthermore, mindfulness elevates maternal-neonatal attachment by concentrating on the present moment and consequently, improves the contribution of the mother to the provision of care for her child (34).

Findings of recent research and similar studies indicate that mind-based strategies can make stress-reduction factors more efficient by transferring the responsibilities to the individual. Recently, these methods have been brought to attention since they are based on the individual, low-cost, and available to the individuals at any time and place (12).

One of the important aspects of this study is the family-oriented caring for the child with a congenital anomaly and transferring the responsibility of the neonate to a mother who is gaining strength in terms of mental health. This approach has added to the acceptance of the method since the suggested method can be carried out with the lowest costs at home. Moreover, mind-body-based programs that have been brought to public attention in recent years (35) are independent of common biological-medical treatments; hence, they can be taught to the patients by the nurses.

The limitations of the present study included the usage of the modified and shortened version of the original program and the short duration of follow-up time of the mothers at home. Further studies with larger sample sizes in more educational centers during longer periods are suggested by the authors. In addition, it is suggested to study the effectiveness of this method on fathers of neonates with congenital anomalies as well.

## Conclusion

In conclusion, it can be said that stress reduction using mindfulness-based programs is an

effective and low-cost method for the elevation of maternal-neonatal attachment and improvement of patterns of coping behaviors in mothers of neonates with congenital anomalies. Evidently, the elevation of the health of the mother has positive effects on the child with congenital anomaly (30). As the nature of family-oriented care implies, the health of such children is related to the health of the family that raises them and cares for them in the long term.

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## Conflicts of Interests

The authors declare that there was no conflict of interest in this study.

## Authors' Contributions

All the authors contributed to the design and implementation of the research, analysis of the results, and writing of the manuscript.

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