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Effect of mindfulness-based cognitive infertility stress therapy on psychological well-being of women with infertility

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ABSTRACT

Objective: Infertility is a critical major life problem that has deleterious effects on the psychological well-being of infertile women. Infertile women experience greater stress in their life compared to fertile women and have a lower quality of life. The present study aimed to evaluate the effectiveness of mindfulness-based cognitive infertility stress therapy (MBCIST) for the promotion of the psychological well-being of women with infertility.

Methods: In a clinical trial, 60 infertile women who were referred to the Fatemeh Zahra Infertility Research Center of the city of Babol were randomly assigned to four groups (15 persons in an experimental group with a pre-test, 15 persons in an experimental group without a pre-test, 15 persons in a control group with a pre-test, and 15 persons in a control group without a pre-test). The 30 participants of the experimental groups received MBCIST in eight group sessions (120 min each week). The control group received no intervention. Thirty participants completed Ryff's Well-Being Questionnaire at the beginning of the study and all 60 participants completed the questionnaire at the end of the study.

Results: The results showed that MBCIST improves the psychological well-being of infertile women, including their self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth. There was no significant difference in psychological well-being or all six of the subscales from pre-treatment to post-treatment in the two control groups.

Conclusions: The findings demonstrate that MBCIST is an efficient method for improving the psychological well-being of women referred to infertility clinics.

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1. Introduction

Infertility is defined by the World Health Organization as the “lack of clinical pregnancy after 12 months of regular intercourse to have children” [1]. A marked trend for delaying the time of the first birth in both developed and developing countries has increased the number of women seeking help for assisted reproductive technologies [2]. A systematic review has reported that the prevalence of infertility is 13.2% in the Iranian population [3].

Infertility is a critical major life problem and it affects the life of infertile couples in all aspects [4]. Infertile couples face psychological problems, such as with marital intimacy, sexual dissatisfaction, and social relationship disturbance [5,6]. There is also some evidence that infertility is often associated with impulsive angry behaviors, feelings of isolation, low self-efficacy, and physical

complaints [7,8]. The prevalence of major depressive disorders, using structured clinical interviews, has been reported to be 17% of infertile women. In addition, it has been found that 26.8% of infertile women meet the criteria for mood disorders and 9.8% meet the criteria for dysthymia. Worry and anxiety are other emotional consequences of infertility. Anxiety disorders were reported in 23% of an infertile sample [9]. Research has categorized the stress of infertile couples into five categories: the need for parenthood, rejection of a child-free lifestyle, social concerns, marital relationship problems, and sexual concerns [10].

Segal et al. developed mindfulness-based cognitive therapy (MBCT) [11]. Kabat-Zinn [12] defined mindfulness as “intentional and nonjudgmental awareness, and paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally.” MBCT consists of two skill sets: thought and mindfulness. The skills taught in MBCT aim to help participants to identify and accept negative thought patterns and to respond in intentional ways. The aim of the cognitive therapy in MBCT is for an individual to gain freedom from automatic reactions to thoughts, feelings, and

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events. The cognitive therapy in MBCT emphasizes the acceptance of thoughts and feelings without judgment. The mindfulness skill consists of teaching participants various stress management techniques, including yoga and self-care techniques, in a systematic way. MBCT also uses meditation practice to increase attention and awareness [12]. Evidence indicates that MBCT reduces psychological problems anxiety and depression in women [13].

There are indications that psychological interventions improve psychological problems in infertile women. Although previous studies of infertile women have shown that cognitive behavioral therapy improved depression symptoms, anxiety symptoms, social functioning, marital concerns, sexual concerns, and self-efficacy [14–17], there is limited information about MBCT and infertility. Li et al. [18] reported the effect of a mindfulness-based intervention on the quality of life of 58 women who were subjected to their first in vitro fertilization treatment. They showed that women who attended the intervention had a significant increase in mindfulness, self-compassion, and meaning-based coping strategies, and in all domains of quality of life [18]. Furthermore, Sherratt and Lunn [19] evaluated the effect of a group program of MBCT for nine women with fertility problems who completed measures of well-being before and after the treatment. They showed a clinically significant improvement in their well-being scores [19]. Galhardo et al. [20] examined the effect of a mindfulness-based infertility program on the self-efficacy of 37 infertile women and they reported that the intervention improved their skills and self-efficacy to deal with infertility. They concluded that a mindfulness-based program for infertility was an effective psychological intervention for women experiencing infertility [20].

According to Ryff's [21] model, psychological well-being is a multidimensional construct and it is merely about happiness or positive emotions. In this model, a good life is balanced and whole and it engages in each of six aspects of well-being. Ryff's factors of psychological well-being include self-acceptance (accepting multiple aspects of yourself; both good and bad qualities), personal growth (seeing yourself as growing and expanding), purpose in life (having aims and objectives for living), positive relationships with others (close and valuable connections with others), environmental mastery (the ability to set and manage daily issues of life), and autonomy (being self-determining and independent, and having the ability to follow personal principles even if they disagree with social demands and traditions) [21]. There is sufficient evidence for the link between a lack of the six dimensions of Ryff's model of psychological well-being and mental illness [22,23]. Although a systematic review has demonstrated the negative impact of infertility on psychological well-being [24], there is not enough evidence of the efficacy of psychotherapies for improving the psychological well-being of infertile women.

Despite a widespread belief in the value of MBCT for improving psychological problems, relatively few studies have evaluated the effectiveness of MBCT in the field of infertility [25]. No RCTs have been published that have assessed the impact of group MBCT on the promotion of Ryff's psychological well-being in infertile women. Therefore, in the current study, we tested the hypothesis that MBCT would be a reliable method for improving the psychological well-being of infertile women.

2. Material and Methods

2.1. Participants

The study protocol was registered at the Iranian Registry of Clinical Trials (IRCT2017021132321N2). All aspects of this protocol were approved by the committee of Allameh Tabataba'i University. The results related to effect of MBCT on quality of life published

previously [26]. Participants were recruited from infertile women who had been referred to the Infertility and Health Reproductive Research Center from 2015 to 2016. The eligibility criteria included being interested in entering the study, having more than five years of education, not currently participating in any psychotherapy interventions, not currently practicing any meditation or relaxation technique, being willing to provide written informed consent, and not beginning fertility treatment until 8 weeks later. In addition, patients with a history of major psychiatric disorders, such as major depression disorder, manic depressive disorder, schizophrenia disorder, and substance abuse disorder were excluded from the study. A total of 146 women were invited to participate in the study. Seventy-one women refused to enter the study because they wanted to begin the ART procedure in <8 weeks. Fifteen women did not meet the other criteria to enter the study. A total of 60 women who met the eligibility criteria to take part in the study and who provided informed consent were entered into the study. Fig. 1 shows the flow chart of participants through each stage of the study.

2.2. Procedure

The 60 eligible participants were randomly allocated to an experimental or control group. The randomization method, which was prepared by a statistician, allocated the participants to the control or experimental group in a 1:1 ratio in blocks of four, according to a paper list-generated random assignment sequence stratified by completing Ryff's Well-Being Questionnaire at baseline. The randomization was carried out by an independent research assistant who was not involved in writing up the study or the statistical analysis. Participants and researchers were not blinded to the allocated condition. In addition, serial evaluations of the patients' questionnaires were performed by a staff member who was blinded to the treatment status of the patients, using Ryff's Well-Being Questionnaire at two time points: at the beginning of the study (baseline) and at post-treatment (8 weeks after baseline).

Patients in the control group received routine ART care while those in the experimental group received ART care plus mindfulness-based cognitive infertility stress therapy (MBCIST). In the beginning of the study, at baseline (pre-test), 15 patients of the experimental group (Experimental 1) and 15 patients of the control group (Control 1) were asked to complete Ryff's Well-Being Questionnaire. The other 15 patients of the control group (Control 2) and 15 patients of the experimental group (Experimental 2) did not complete the questionnaire at baseline (pre-test). All patients in the four groups (Control 1, Control 2, Experimental 1, and Experimental 2) completed the questionnaire at the end of the study (8 weeks after baseline).

2.3. Experimental design

The experimental group received MBCIST in eight group sessions (120 min each) over 8 weeks. Each group consisted of 15 participants. The MBCIST model treatment outline was based on a combination of established mindfulness elements of the mindfulness-based stress reduction (MBSR) method [12] and five domains of specific stress in infertile women [27]. The program drew on traditional mindfulness meditation techniques as well as guided meditation (a daily activity related to infertility stress) in order to address specific issues pertaining to infertile women. The MBCIST sessions were constructed in a dynamic way to consider the cognitive therapy-based domains of infertility stress during the basic mindfulness examinations. The outlines of the eight sessions are presented in Table 1.

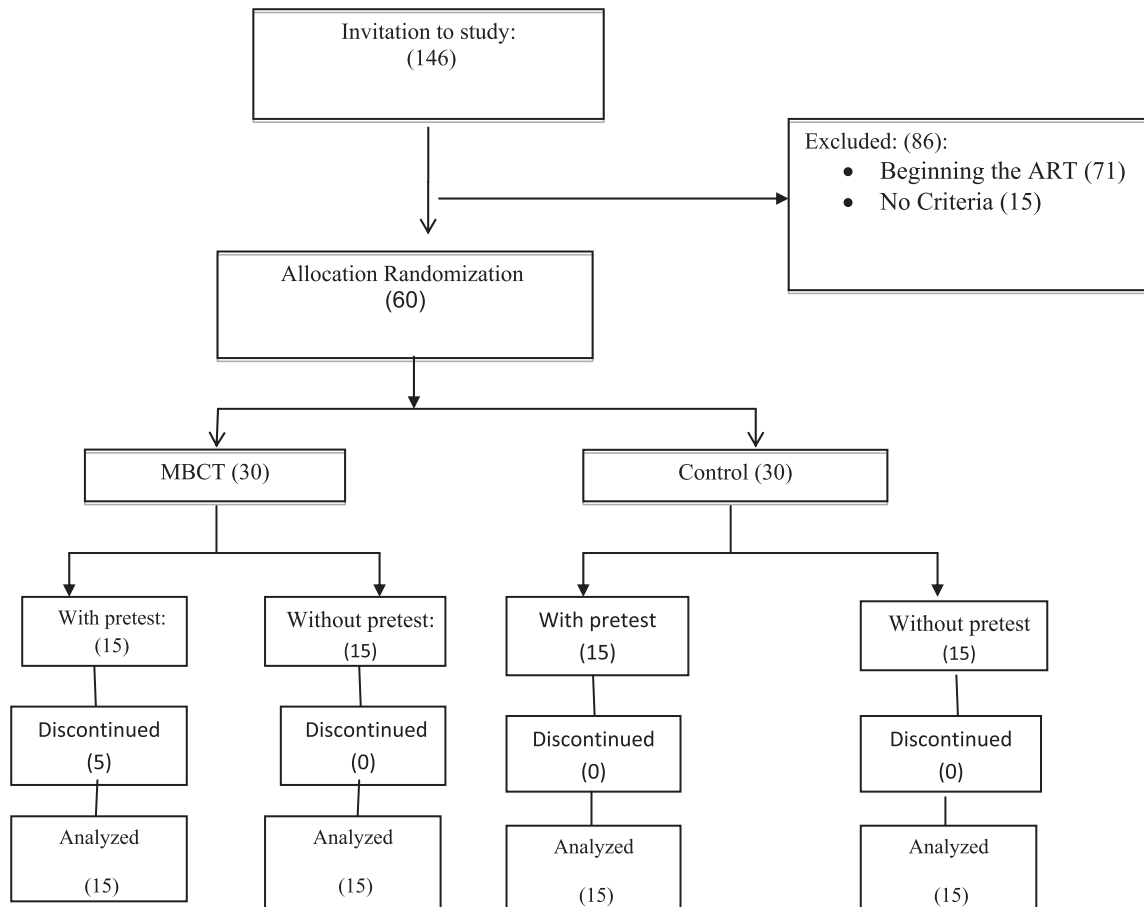


Fig. 1. Flowchart of the Subjects during trial.

Table 1
Demographic characteristics of the population study.

	Experimental group		Control group	
	E1 (n = 15) N (%)	E2 (n = 15) N (%)	C1 (n = 15) N (%)	C2 (n = 15) N (%)
<i>Age (years)</i>				
<20	1 (7)	0 (0)	2 (13)	1 (7)
20–30	11 (73)	9 (60)	5 (33)	7 (47)
>30	3 (20)	6 (40)	8 (73)	7 (47)
<i>Education (years)</i>				
<12	3 (20)	2 (13)	7 (47)	2 (13)
12	9 (60)	9 (60)	6 (40)	4 (27)
>12	3 (20)	4 (27)	2 (13)	9 (60)

A female coach, who was trained in MBCIST by a supervisor (M. Faramarzi) before the trial, conducted the sessions. The coach taught the women through lectures, group work, and guided exercise. To consolidate their knowledge, the participants were given home exercises and were encouraged to write their exercises on a daily record sheet. At the beginning of each session, the coach asked the participants to perform mindfulness skills during the class and described one person's individual experience of mindfulness outside of the class. The coach then helped the participants to document the corrected mindfulness skills.

The training consisted of five main mindfulness modules that were based on each other and it was extended by the management of the five basic women's infertility stress problems. Therefore, each mindfulness module was combined with the five main concerns of infertile women. The first mindfulness module focused

on the basic requirements for mindfulness practice with several basic exercises, such as breathing exercises and a body scan. In this module, participants learned to keep their attention on one stressful infertility experience and the need for parenthood. The second module expanded the first module and consisted of paying attention to develop the ability to flexibly and intentionally switch from one aspect of infertility stress (the need for parenthood) to another (social concerns). The third mindfulness module emphasized the acceptance of unchangeable events (a child-free lifestyle). The participants learned to deal with failures of the ART procedure and living without childbirth. The fourth mindfulness module focused on the realization and nonjudgmental comprehension of the momentum of thoughts, especially about social concerns, marital concerns, and relationship concerns. The participants could discover that the mind consists of the continual coming and going of thoughts. In the fifth mindfulness module, the participants learned to detach themselves from unwanted thoughts about the five domains of infertility stress (the need for parenthood, rejection of a child-free lifestyle, social concerns, marital relationship problems, and sexual concerns) by focusing on the present moment with a nonjudgmental attitude. For individual practice, participants read printed copies of material about an important part of the program (i.e., infertility stress), performed daily formal practice for 30 min, and listened to a 20–60 min pre-recorded CD two times per day over a period of 8 weeks [28].

2.4. Measures

The well-being of the infertile women was assessed using the Persian version of Ryff's Well-Being Questionnaire that has 84

items [27]. This scale was developed by Ryff [21]. This questionnaire evaluates six main components of psychological well-being including self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth. Participants answered each item on a six-point Likert scale ranging from 1 “strongly disagree” to 6 “strongly agree.” The results related to effect of MBCT on quality of life published previously [21]. In this study, the overall mindfulness scale showed a high internal consistency at the beginning and end of the study (.97).

2.5. Data analysis

First, we assessed whether the four groups differed on any of the demographic characteristics at admission to examine if the two control groups and two experimental groups could be considered equivalent. Second, in order to test the efficacy of MBCIST on the psychological well-being of infertile women between the groups, the means of the four groups were compared post-treatment with analysis of variance (ANOVA). In addition, we conducted the Scheffe method post-test to examine the pairwise comparisons. Third, in order to assess changes over time within the Experimental 1 and Control 1 groups, we separately applied a repeated measures ANOVA to the pre-test and post-test scores for each group. Furthermore, we used an intention-to-treat analysis to examine the data. The last-observation-carried-forward technique was used to handle missing data. The data were analyzed with SPSS 20. $P < 0.05$ was considered a significant level.

3. Results

We hypothesized that the application of MBCIST would positively affect the well-being scores of infertile women. The demographic characteristics of the population are presented in Table 2. More than half of the women were between 20 and 30 years old. The majority of the infertile women (70%) had ≤ 12 years of education, with 30% at the higher education level. There were no significant differences between the four groups at baseline in terms of the demographic characteristics.

Table 3 shows the pre- and post-intervention means and standard deviations for the four groups in this study. The comparison of the means at post-test for the total score of Ryff's Well-Being Questionnaire and the six subscales was performed with a series of ANOVAs. Then, the Scheffe test was performed post-hoc to compare the pairwise means. The results of the ANOVA of the total scores of Ryff's Well-Being Questionnaire of the four groups showed that there was a significant difference between the groups post-treatment. The Scheffe test revealed that both MBCIST groups reported higher total well-being scores than the two control

Table 3

Comparison of mean pairwise of psychological well-being with post-doc Sheffe model in post -test.

groups	Group j	Mean difference (i - j)	Standard errors	Significant
Experimental 1	Control 1	64.0000	11.39	<0.001
	Experimental 2	-31.87	11.39	<0.001
Experimental 2	Control 2	85.53	11.39	<0.001
	Control 1	95.87	11.39	<0.001
Control 1	Control 2	117.40	11.39	<0.001
	Control 2	21.53	11.39	<0.001

groups ($P < 0.05$). There was no significant difference between the means of the total well-being scores between the two control groups (Table 3).

The ANOVA that compared the mean scores of the four groups for the self-acceptance subscale showed that there was a significant difference between the groups post-treatment. The Scheffe test revealed that both MBCIST groups reported higher self-acceptance scores than the two control groups ($P < 0.05$). There was no significant difference between the means of the self-acceptance scores between the two control groups. The mean comparison of the four groups for the personal growth subscale revealed that there was a significant difference between the groups post-treatment ($P < 0.05$). The Scheffe test revealed that both MBCIST groups reported higher personal growth scores than the two control groups ($P < 0.05$). There was no significant difference between the means of the personal growth acceptance score between the two control groups. In addition, both MBCIST groups reported higher relationship with others scores than the two control groups post-treatment ($P < 0.05$). There was no significant difference between the means of the relationship with others score between the two control groups post-treatment ($P > 0.05$). The mean environmental mastery scores were higher in both MBCIST groups than in the two control groups. There was no significant difference between the means of the environmental mastery scores between the two control groups ($P > 0.05$). The results of the comparison of the post-treatment means revealed that both MBCIST groups had higher autonomy scores than the control groups ($P < 0.05$). There was no significant difference between the means of the autonomy scores between the two control groups post-treatment ($P > 0.05$). Furthermore, both MBCIST groups reported higher purpose in life scores than the two control groups post-treatment ($P < 0.05$). There was no significant difference between the means of the purpose in life scores between the two control groups post-treatment ($P > 0.05$).

A repeated measures ANOVA was used to test the effect of MBCIST on psychological well-being in the Experimental 1 and

Table 2

Mean and standard deviance of psychological well-being of four groups in baseline and post-test.

Well being	Experimental group				Control group			
	Experimental 1 (n = 15)		Experimental 2 (n = 15)		Control 1 (n = 15)		Control 2 (n = 15)	
	Mean (SD)		Mean (SD)		Mean (SD)		Mean (SD)	
Self-acceptance	Baseline 49.07 (5.338)	Post test 60.20 (10.67)	Baseline 68.33 (4.04)	Post-test 73.13 3.270	BASELINE 46.00 (9.20)	Post test 53.07 (7.32)	Baseline 47.27 (6.46)	Post-test 53.87 (3.56)
Personal growth	54.20 (5.031)	65.20 (7.87)	-	73.13 3.270	52.67 (4.77)	53.93 (6.91)	-	52.60 (5.64)
Relationship with other	54.93 (6.21)	66.80 (6.97)	-	69.26 4.543	54.47 (6.34)	54.13 (5.71)	-	52.27 (5.89)
Environmental mastery	52.33 (4.62)	64.27 (9.49)	-	69.73 3.751	51.73 (6.54)	53.40 (5.24)	-	52.20 (5.29)
Autonomy	48.40 (4.05)	60.60 (8.52)	-	64.40 4.564	47.13 (4.32)	50.93 (6.49)	-	48.07 (9.24)
Purposeful life	56.00 (4.27)	66.80 (9.49)	-	70.93 2.549	54.80 (5.80)	54.40 (5.04)	-	53.87 (3.56)
Total score of well-being	314.93 (15.56)	383.87 (47.61)	-	415.73 10.05	306.80 (24.75)	319.87 (24.55)	-	298.33 (30.31)

Control 1 groups. The repeated measures ANOVA of the experimental group showed that MBCIST improved total psychological well-being and all of the six subscales from baseline to post-test ($P < 0.05$). The control group did not show an improvement in well-being or all of the six subscales from pre-treatment to post-treatment ($P > 0.05$).

4. Discussion

This study demonstrated that significant improvements in the well-being of infertile women can be achieved through the use of MBCIST. The MBCIST was successfully applied in the infertility field. As expected by our hypothesis, the MBCIST group had significantly better aspects of psychological well-being compared to the control group. The MBCIST influenced the total scores of psychological well-being in infertile women. Our study is the first RCT study to show that MBCIST improves the psychological well-being of infertile women. Few published studies have reported the effects of psychotherapy on Ryff's six domains of well-being in infertile women, and no previous studies have used an RCT. One study described the effectiveness of MBCT in nine women with infertility, in which the women completed measures of well-being and psychological distress before and after the program. The results showed that the well-being scores of the infertile women were improved [19].

However, the improvement of psychological well-being after MBCT is in line with previous research [29–32]. The results of a study of 171 adults showed that there was an improvement in psychological well-being and a reduction in stress from pre- to post-mindfulness-based stress therapy [30]. A study revealed that mindfulness training can be developed to empower clients in the ways to nurture their own psychological well-being [31]. Contrary to our results, Kingston et al. reported that six (1 h) sessions of mindfulness skills did not increase mood scores or the psychological well-being of students [32].

This study demonstrated that MBCIST improves self-acceptance in infertile women. In one study, in which 167 college students completed two measures of mindfulness and unconditional self-acceptance, a positive correlation was reported between mindfulness and unconditional self-acceptance [33].

In a cross-sectional study of 415 college students, which examined the relationship between mindfulness and depressive symptoms, it was found through structural equation modeling that self-acceptance was the strongest mediator of mindfulness and depression [34].

The significant impact of MBCIST on the improvement of positive relations with others is in line with some previous research. One study found that greater practice of mindfulness predicted the improvement of the relationship stress [35]. In addition, mindfulness was a positive predictor of interpersonal closeness [36].

In accordance with our hypothesis, the results showed the efficacy of MBCIST for the improvement of autonomy in infertile women. In one research study has shown that mindfulness meditation can increase the sense of control [37].

In accordance with our hypothesis, the MBCIST group had significantly better scores for environmental mastery compared to the control group. In one study that hypothesized that mindfulness could enhance the efficacy of health coaching, it was found that mindfulness therapy for 8 weeks could increase the participants' environmental mastery [38]. The MBCIST produced changes in the purpose in life of the women with infertility. In addition, we observed a significant effect of MBCIST on the personal growth of the infertile women. One study has assessed the effect of an MBSR program on the improvement of post-traumatic growth in patients with cancer. Sixty outpatients with cancer attended the 8-week

MBSR program and it was found that they had improved on the items of spirituality, anxiety, and purpose in life [39].

The considerable effect of MBCIST on the improvement of the psychological well-being of infertile women may be related to the nature of both the infertility disease and psychotherapy. The MBCIST focused on the five major domains of stress (need for parenthood, rejection of a child-free lifestyle, social concerns, marital relationship problems, and sexual concerns) in infertile women. Stress plays an important role in the well-being of women with infertility [10]. Previous studies have provided strong support for the efficacy of MBCT in the reduction of stress [40]. As with many applications of mindfulness and related meditation techniques, framing MBCT within a relaxation or stress coping context can play a large role in improving psychological well-being. Moreover, mindfulness might regulate factors of personal functioning, such as mood, the self-concept, and anxiety, that affect the improvement of psychological well-being [34]. Another key aspect of MBCT involves helping patients to recognize how stress may exacerbate their negative affect, and it provides individuals with a heightened ability to simply observe their thoughts, feelings, and experiences in order to disengage automatic and often dysfunctional reactivity, and then allows them to work with more balanced relationships with themselves. This linking process may be an important key factor of the therapeutic mechanism. A release from stress may improve the regulation of emotional affect and have the central healing effect of the improvement of psychological well-being in women with infertility. Thus, it seems that coordination between the method of MBCT and the nature of infertility may contribute to the successful results of MBCIST.

Due to some limitations, the generalization of our results should be made with caution. First, the sample size was small, and we recommend further research with a larger sample. Second, the MBCIST group received more treatment, and the positive results obtained may be due to the additional treatment (i.e., more contact) rather than to anything specific about MBCIST. Further research is needed with a control group of women with infertility who receive a placebo group therapy. Moreover, further research is necessary to compare the effect of MBCIST to other psychotherapies, such as cognitive-behavioral therapy, in women with infertility. Third, our results were obtained from self-report measures. Future study of the clinical improvement of psychological well-being with MBCIST is recommended. Fourth, our study did not include a follow-up of the patients. As such, the effect of MBCIST over a long period of time was not reported in this study. To analyze the longitudinal effects of how the MBCIST might prevent future stressors from arising due to infertility, follow-up measures of stress after 6 and 12 months should be explored in further research. Fifth, the participants were not blind to their treatments, and this may have been amplified by a recruitment bias. Since the participants knew in advance that the study would explore the effect of MBCIST on their psychological well-being, it is possible that those who accepted the therapy anticipated a beneficial effect and already believed in the benefits of the model. This may have affected the way that they rated their psychological well-being at the end of the study. Further research is needed to assess the change with a placebo group. Sixth, we did not measure homework compliance despite there being regular homework assignments for the participants.

In conclusion, in accordance with previous research, we found significant effects of mindfulness. The MBCIST improved the psychological well-being of infertile women, including their self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth. These results may be important for health professionals, especially those who work in infertility centers. This study supports the implications of MBCIST for the promotion of the psychological well-being of

women with infertility. Furthermore, an economic evaluation of the addition of MBCIST to medical therapy for infertile women who are beginning ART would be useful.

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Compliance with ethical standards

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Conflict of interest

All Authors declare that they have no conflict of interest.

References

- [1] F. Zegers-Hochschild, G. Adamson, J. de Mouzon, O. Ishihara, R. Mansour, K. Nygren, E. Sullivan, International Committee for Monitoring Assisted Reproductive Technology (ICMART) and the World Health Organization (WHO) revised glossary of ART terminology, *Fertil. Steril.* 31 (92) (2009) 1520–1524.
- [2] M. Mills, R.R. Rindfuss, P. te McDonald, E. Velde, ESHRE Reproduction and Society Task Force. Why do people postpone parenthood? Reasons and social policy incentives, *Hum. Reprod. Update* 17 (2011) 848–860.
- [3] A. Direkvand Moghadam, A. Delpisheh, K. Sayehmiri, The prevalence of infertility in Iran, a systematic review, *Iran. J. Obst. Gynecol.* 16 (81) (2014) 1–7.
- [4] C. Stellar, C. Garcia-Moreno, M. Temmerman, S.A. vander Poel, Systematic review and narrative report of the relationship between infertility, subfertility, and intimate partner violence, *Int. J. Gynaecol. Obstet.* 133 (1) (2016) 3–8.
- [5] H. Pasha, Z. Basirat, M. Faramarzi, et al., Pharmacological and non-pharmacological therapeutic strategies for improvement of state-trait anxiety, a randomized controlled trial among iranian infertile women with sexual dysfunctions, *Crescent J. Med. Biol. Sci.* 4 (2) (2017) 47–53.
- [6] H. Pasha, Z. Basirat, S. Esmailzadeh, M. Faramarzi, H. Adibrad, Marital intimacy and predictive factors among infertile women in northern Iran, *J. Clin. Diagn. Res.* 11 (5) (2017) 13–17.
- [7] D. Minucci, Management of infertility today psychological and ethical implications related to infertility, *Int. J. Gynecol. Obstet.* 123 (2013) 36–38.
- [8] H. Pasha, M. Faramarzi, S. Esmailzadeh, F. Kheirkhah, H. Salmalian, Comparison of pharmacological and nonpharmacological treatment strategies in promotion of infertility self-efficacy scale in infertile women, a randomized controlled trial, *Iran. J. Reprod. Med.* 11 (6) (2013) 495–502.
- [9] T.H. Chen, S.P. Chang, C.F. Tsai, K.D. Juang, Prevalence of depressive and anxiety disorders in an assisted reproductive clinic, *Hum. Reprod.* 19 (23) (2004) 13–18.
- [10] C.R. Newton, W. Sherrard, I. Glavac, The Fertility Problem Inventory, measuring perceived infertility-related stress, *Fertil. Steril.* 72 (1) (1999) 54–62.
- [11] Z.V. Segal, J. Williams, J.D. Teasdale, *Mindfulness-Based Cognitive Therapy for Depression, a New Approach to Preventing Relapse*, The Guilford Press, New York, NY, 2002.
- [12] J. Kabat-Zinn, Wherever you go, there you are. *Mindfulness meditation in everyday life*, Hyperion, New York, 1994.
- [13] M. Faramarzi, S. Yazdani, S. Barat, A RCT of psychotherapy in women with nausea and vomiting of pregnancy, *Hum. Reprod.* 30 (2015) 2764–2773.
- [14] M. Faramarzi, F. Kheirkhah, S. Esmailzadeh, A. Alipor, M. Hajahmadi, J. Rahnama, Is psychotherapy a reliable alternative to pharmacotherapy to promote the mental health of infertile women? A randomized clinical trial, *Eur. J. Obstet. Gynecol. Reprod. Biol.* 141 (2008) 49–53.
- [15] M. Faramarzi, H. Pasha, S. Esmailzadeh, F. Kheirkhah, S. Heidary, Z. Afshar, The effect of the cognitive behavioral therapy and pharmacotherapy on infertility stress, a randomized controlled trial, *Int. J. Fertil. Steril.* 7 (3) (2013) 199–206.
- [16] M. Faramarzi, A. Alipor, S. Esmailzadeh, F. Kheirkhah, K. Poladi, H. Pasha, Treatment of depression and anxiety in infertile women, *Cognitive Behavioral therapy versus fluoxetine*, *J. Affect Disorder* 108 (2008) 159–164.
- [17] J.R. Vittengl, R.B. Jarrett, E. Weitz, S.D. Hollon, J. Twisk, I. Cristea, et al., Divergent outcomes in cognitive-behavioral therapy and pharmacotherapy for adult depression, *Am. J. Psychiatry* 173 (5) (2016) 481–490.
- [18] J. Li, L. Long, Y. Liu, W. He, M. Li, Effects of a mindfulness-based intervention on fertility quality of life and pregnancy rates among women subjected to first in vitro fertilization treatment, *Behav. Res. Ther.* 77 (2015) 96–104.
- [19] K.A. Sherratt, S. Lunn, Evaluation of a group programme of mindfulness-based cognitive therapy for women with fertility problems, *J. Obst. Gynaecol.* 33 (5) (2013) 499–501.
- [20] A. Galhardo, M. Cunha, J. Pinto-Gouveia, Mindfulness-based program for infertility, efficacy study, *Int. J. Fertil. Steril.* 100 (4) (2013) 1059–1067.
- [21] C.D. Ryff, Happiness is everything, or is it? Explorations on the meaning of psychological well-being, *J. Pers. Soc. Psychol.* 57 (6) (1989) 1069–1081.
- [22] C.L.M. Keyes, S.S. Dhingra, E.J. Simoes, Change in level of positive mental health as a predictor of future risk of mental illness, *Am. J. Public Health Res.* 100 (2010) 23–66.
- [23] C. Valiente, D. Cantero, C. Vázquez, Á. Sanchez, M. Provencio, R. Espinosa, Implicit and explicit self-esteem discrepancies in paranoia and depression, *J. Abnormal Psychol.* 120 (2011) 691–699.
- [24] B.H.K. Luk, A.Y. Loke, The impact of infertility on the psychological well-being, marital relationships, sexual relationships, and quality of life of couples, a systematic review, *J. Sex Marital Ther.* 41 (6) (2015) 610–625.
- [25] N. Abedi Shargh, N.M. Bakhshani, M.D. Mohebbi, K. Mahmudian, M. Ahovan, M. Mokhtari, A. Gangali, The effectiveness of mindfulness-based cognitive group therapy on marital satisfaction and general health in woman with infertility, *Glob. J. Health Sci.* 8 (3) (2016) 230–235.
- [26] T. Rahmani Fard, M. Kalantarkousheh, M. Faramarzi, The effect of mindfulness-based cognitive on psychotherapy on quality of life in infertile women, *Hayat, J. School Nurs. Midwifery, Tehran Univ. Med. Sci.* 23 (2017) 277–289 (Persian).
- [27] M. Faramarzi, H. Pasha, S. Esmailzadeh, F. Kheirkhah, K. Hajian-Tilaki, H. Salmalian, A survey of correlation infertility self-efficacy with behavioral health scales in infertile women, *Health* 6 (10) (2014) 943–949.
- [28] J.L. Kristeller, Mindfulness, wisdom and eating, applying a multi-domain model of meditation effects, *Construct. Human Sci.* 8 (2008) 107–118.
- [29] M. Parto, M.A. Besharat, Mindfulness, Psychological Well-Being and Psychological Distress in Adolescents: Assessing The Mediating Variables And Mechanisms of Autonomy and Self-Regulation, *Procedia Soc Behav Sci.* 30 (2010) 578–582.
- [30] J. Carmody, A. Ruth, R.A. Baer, J. Carmody, Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program, *Int. J. Behav. Med.* 31 (1) (2008) 23–33.
- [31] C. Aggs, M. Bambling, Teaching mindfulness to psychotherapists in clinical practice, the Mindful Therapy Programme, *Couns Psychother. Res.* 10 (2010) 278–286.
- [32] J. Kingston, P. Chadwick, D. Meron, T.C. Skinner, A pilot randomized control trial investigating the effect of mindfulness practice on pain tolerance, psychological well-being, and physiological activity, *J. Psychosom. Res.* 62 (3) (2007) 297–300.
- [33] B.L. Thompson, J.A. Waltz, Mindfulness, self-esteem, and unconditional self-acceptance, *J. Ration Emot. Cogn. Behav. Ther.* 26 (2) (2008) 119–126.
- [34] S.J. Sherlyn, L.N. Barbara, L.P. Crystal, A mindfulness model of affect regulation and depressive symptoms, positive emotions, mood regulation expectancies, and self-acceptance as regulatory mechanisms, *Pers. Individ. Dif.* 49 (6) (2010) 645–650.
- [35] J.W. Carson, K.M. Carson, K.M. Gil, D.H. Baucom, Mindfulness-based relationship enhancement, *Behavior Therapy* 35 (2004) 471–494.
- [36] K.W. Brown, R.M. Ryan, The benefits of being present, mindfulness and its role in psychological well-being, *J. Pers. Soc. Psychol.* 84 (2003) 822–848.
- [37] J. Astin, Stress reduction through mindfulness meditation: effects on psychological symptomatology, sense of control, and spiritual experiences, *Psychother. Psychosom.* 66 (1997) 97–106.
- [38] G.B. Spence, M.J. Cavanagh, A.M. Grant, The integration of mindfulness training and health coaching, an exploratory study, *Coaching, Int. J. Theory, Res. Practice* 1 (2) (2008) 145–163.
- [39] S.N. Garland, L.E. Carlson, S. Cook, L. Lansdell, M.A. Spica, Non-randomized comparison of mindfulness-based stress reduction and healing arts programs for facilitating post-traumatic growth and spirituality in cancer outpatients, *Support Care Cancer* 15 (8) (2007) 949–961.
- [40] F. Panahi, M. Faramarzi, The effects of mindfulness-based cognitive therapy on depression and anxiety in women with premenstrual syndrome, *Depress Res Treat* (2016), Article ID 9816481.