



The Effect of Mindfulness-based Cognitive Therapy on Self-concept of Infertile Women

Ziba Raisi Dehkordi^{1,2}, Marzie Reisi^{1,2}

¹Community-Oriented Nursing Midwifery Research Center, Nursing and Midwifery School, Shahrekord University of Medical Sciences, Shahrekord, Iran

²Department of Pediatric and Reproductive Health, School of Nursing and Midwifery, Shahrekord University of Medical Sciences, Shahrekord, Iran

Abstract

Background and aims: Infertility is a major life stressor that can significantly impact women's psychological well-being. One of the comprehensive indicators of mental health is self-concept. This study aimed to evaluate the effect of mindfulness-based cognitive therapy (MBCT) on the self-concept of infertile women.

Methods: This quasi-experimental study was conducted in 2020 among infertile women attending Hazrat Zahra Infertility Center and affiliated healthcare centers in Shahrekord, Iran. A total of 90 women were randomly assigned to the intervention (n=45) and control (n=45) groups. Prior to the intervention, all participants completed a two-part questionnaire including demographic data and the validated Rogers' Self-concept Inventory. The intervention group participated in eight 2-hour sessions of MBCT. Both groups completed the questionnaire again immediately and 2 months after the intervention. Data were analyzed using SPSS version 20, employing Chi-square and repeated measures ANOVA tests.

Results: There were no significant differences in self-concept scores between the groups at baseline. However, the intervention group showed significantly higher self-concept scores both immediately and 2 months after the intervention compared to the control group ($P < 0.001$).

Conclusion: Group-based MBCT effectively improved self-concept in infertile women. These findings suggest that MBCT can serve as a cost-effective and accessible psychological intervention, potentially improving mental health outcomes and complementing conventional infertility treatments.

Keywords: Infertility, Self-concept, Mindfulness-based cognitive therapy, Women, Mental health

*Corresponding Author:

Marzie Reisi,
Email: mrz.reisi@gmail.com

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Introduction

Infertility is defined as the inability to achieve pregnancy after 12 months or more of regular, unprotected sexual intercourse (1, 2). Although infertility is primarily a physiological condition, it has profound psychological and social consequences (3). Studies have shown that the psychological distress associated with infertility ranks among the most stressful life events and can trigger negative emotional responses (4, 5). Globally, infertility affects about 10–15% of couples of reproductive age (6, 7), while its prevalence in Iran is reported to be higher than the global average (8).

Infertility represents a major life crisis that leads to emotional strain, anxiety, depression, and diminished self-esteem (9). These psychological outcomes are closely linked to how individuals perceive themselves, known as self-concept (10). The self-concept is a core component of personality, shaping behavior, emotions, and coping

mechanisms (11, 12). According to Rogers, self-concept develops through the interaction between personal experiences and external feedback, and a positive self-concept reflects psychological well-being (13). Therefore, studying self-concept among infertile women provides valuable insight into their emotional adjustment and mental health (14, 15).

In recent years, mental health professionals have turned to mindfulness-based interventions to enhance emotional regulation and reduce psychological distress in vulnerable groups. Mindfulness-based Cognitive Therapy (MBCT) integrates Beck's cognitive therapy with mindfulness principles proposed by Segal et al, aiming to cultivate non-judgmental awareness of the present moment (16, 17). Empirical studies have shown that MBCT can reduce stress, anxiety, and depressive symptoms in various populations, such as patients with chronic diseases or emotional disorders (18–22). However, few studies have

explored its effect on self-concept, especially among infertile women (23, 24). These studies often focus on general well-being rather than the specific cognitive and emotional aspects of self-concept.

Given the relatively high prevalence of infertility in Iran and the limited focus on its psychological dimensions, this study aimed to evaluate the effect of MBCT on the self-concept of infertile women.

Materials and Methods

This study was quasi-experimental research with a pretest-posttest control group design, conducted to investigate the effect of MBCT on the self-concept of infertile women. First, ethical approval was obtained from the Ethics Committee of Shahrekord University of Medical Sciences (IR.SKUMS.REC.1396.242). Then, the researcher referred to the Hazrat Zahra Infertility Clinic in Shahrekord and affiliated health centers, explained the study objectives to the staff, and began the sampling process.

Participants were selected using a simple random sampling method. Then, they were assigned to experimental and control groups, matched in terms of socioeconomic and cultural conditions. Inclusion criteria were: diagnosis of primary infertility by a gynecologist, a minimum of one year since the infertility diagnosis, no adopted children, willingness and informed consent to participate in the study, no major psychiatric disorders or psychiatric medication use, and at least basic reading and writing literacy.

The sample size for comparing two independent means was calculated using the formula

$$n = ((Z_{1-\alpha/2} + Z_{1-\beta})^2 \times 2\sigma^2) / (\mu_1 - \mu_2)^2.$$

Considering a confidence level of 95% ($Z_{1-\alpha/2} = 1.96$), a power of 80% ($Z_{1-\beta} = 0.84$), an estimated standard deviation (SD) of 5, and an expected mean difference of 3 between groups, the minimum sample size was determined to be 32 per group. Considering potential attrition, the final sample included 45 participants in each group (total=90).

Participants were assigned to the intervention and control groups using a simple randomization method. Each eligible participant was given a unique number, and random numbers were generated using a computer-based random number generator. Women corresponding to the first 45 numbers were allocated to the intervention group, and the remaining 45 to the control group. This procedure ensured that each participant had an equal chance of being assigned to each group and minimized selection bias. Participants were assured that the study results would not be disclosed to any individual or organization without their permission.

Data Collection Instruments

Data were collected using a two-part questionnaire:

Part I: Demographic information (woman's and

husband's age, education level, occupation, place of residence, family income level, duration of infertility, and previous treatments).

Part II: Data were collected using Rogers' Self-Concept Inventory, which assesses an individual's perception of their real and ideal self (13). The inventory consists of two forms: Form A (real self) and Form B (ideal self), each containing 25 personality traits. Participants rate each item on a 7-point Likert scale, indicating the extent to which the trait describes them. The self-concept score is calculated by taking the squared difference between the two forms for each item, summing them, and then taking the square root. Scores between 0 and 7 indicate a normal self-concept, while scores above 7 indicate a negative or weak self-concept.

The original Self-concept Inventory has demonstrated good validity and reliability, with Cronbach's alpha coefficients ranging from 0.85 to 0.90. The Persian version of the questionnaire was used in a study by Pasha et al, in which Cronbach's alpha was 0.78 for Form A and it was 0.79 for Form B (25). In a study conducted by Taghizadeh et al, the reliability of the questionnaire was assessed again using Cronbach's alpha, reporting 0.69 for Form A and 0.63 for Form B (15). These findings confirm that the Persian version of the Self-Concept Inventory has acceptable reliability for use in research among Iranian populations.

Intervention

The MBCT training program for the experimental group was conducted by a clinical psychologist over eight weekly 2-hour sessions in an active face-to-face format, including lectures, question and answer, group discussions, active participation, and brainstorming. The session objectives included teaching relapse prevention strategies for anxiety and depression, enhancing moment-to-moment awareness of emotions and thoughts, accepting unpleasant thoughts, changing dysfunctional thought patterns, and identifying early warning signs of mood changes. The content of each session is presented in Table 1, which shows the content and objectives of the eight MBCT sessions for the intervention group. Participants were required to complete homework assignments. Additionally, weekly follow-ups were conducted to ensure compliance.

All participants completed the self-concept questionnaire at three time points: before the intervention (pre-test), immediately after the 8-week intervention (post-test), and assessment two months later (follow-up). Both the intervention and control groups completed the questionnaire at all three time points, with the control group receiving no intervention. After completing the second questionnaire, participants in the control group were provided with educational materials summarizing the MBCT program in the form of a booklet. This allowed them to benefit from the information and practices covered in the intervention while maintaining ethical standards and fairness (Figure 1).

Table 1. Content of MBCT Sessions

| Session | Content | Objectives |
|---------|---|---|
| 1 | Introduction to mindfulness and cognitive therapy | Build trust, understand automatic thoughts, practice mindful breathing |
| 2 | Awareness of body sensations and breathing | Improve body awareness, reduce mind-wandering |
| 3 | Thoughts are not facts | Identify negative automatic thoughts, cognitive distancing |
| 4 | Dealing with barriers | Learn to face negative thoughts/emotions with acceptance |
| 5 | Acceptance and being in the present moment | Practice non-judgmental awareness, observe feelings without reaction |
| 6 | Recognizing patterns of negative thinking | Identify rumination, learn to disrupt unhelpful mental habits |
| 7 | Mindful response instead of automatic reaction | Apply learned skills to real-life emotional challenges |
| 8 | Review and integration | Summarize practices, develop a personal plan for continuing mindfulness |

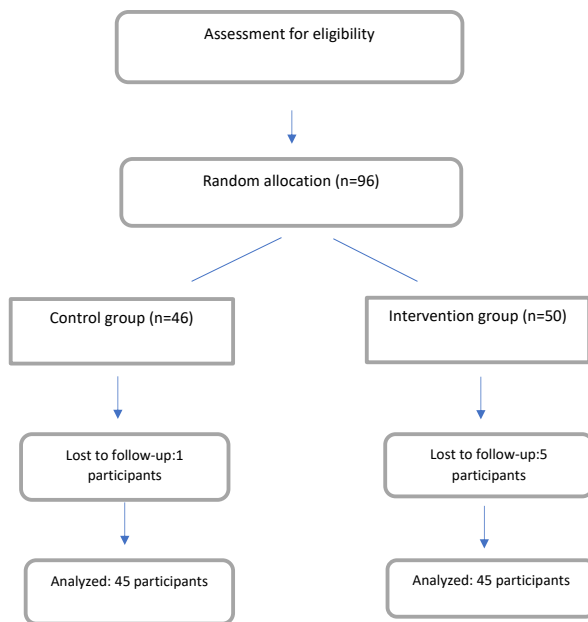


Figure 1. CONSORT Flow Diagram of Participants

Data Analysis

Descriptive statistics, including mean (M), SD, frequency (n), and percentage (%), were used to summarize participants’ demographic characteristics and self-concept scores. To compare the self-concept scores between the intervention and control groups across the three time points (pretest, posttest, follow-up), repeated measures ANOVA was used, which accounts for within-subject correlations over time. Chi-square tests were used for categorical variables. The level of statistical significance was set at $P < 0.05$.

Results

The majority of women in both the intervention and control groups were between 35 and 40 years, had secondary education, were housewives, and lived in urban areas. Most participants reported a moderate economic status and had experienced at least one infertility treatment. The duration of infertility was also similar between groups. Overall, the two groups were comparable across all demographic characteristics ($P > 0.05$) (Table 2).

Table 3 summarizes the distribution of favorable and unfavorable self-concept scores at baseline, immediately after the intervention, and two months after

Table 2. Comparison of Demographic Characteristics in the Intervention and Control Groups

| Demographic variables | Intervention group (n = 45) | Control group (n = 45) | P-value |
|----------------------------------|-----------------------------|------------------------|---------|
| Age (years) | n (%) | n (%) | |
| ≥ 35 years | 36 (80%) | 37 (82.2%) | 0.630 |
| < 35 years | 9 (20%) | 8 (17.8%) | |
| Woman's education | | | |
| Non-university | 34 (75.5%) | 35 (77.7%) | 0.742 |
| University | 11 (24.5%) | 10 (22.3%) | |
| Husband's education | | | |
| Non-university | 35 (77.7%) | 32 (71.2%) | 0.691 |
| University | 10 (22.3%) | 13 (28.8%) | |
| Woman's occupation | | | |
| Housewife | 38 (84.4%) | 36 (80%) | 0.255 |
| Employed | 7 (15.6%) | 9 (20%) | |
| Place of residence | | | |
| Urban | 39 (86.6%) | 41 (91.1%) | 0.166 |
| Rural | 6 (13.4%) | 4 (8.9%) | |
| Economic status | | | |
| Low | 13 (28.9%) | 15 (33.3%) | 0.863 |
| Medium | 31 (68.9%) | 29 (64.5%) | |
| High | 1 (2.2%) | 1 (2.2%) | |
| Number of infertility treatments | | | |
| ≤ 5 times | 23 (51.2%) | 21 (46.6%) | 0.760 |
| > 5 times | 22 (48.8%) | 24 (53.4%) | |
| Duration of infertility | | | |
| 1–3 years | 3 (6.7) | 2 (4.4) | 0.764 |
| 3–5 years | 6 (13.3) | 8 (17.8) | |
| 5–7 years | 13 (28.8) | 13 (28.8) | |
| 7 > years | 23 (51.2) | 22 (49.0) | |

Note: Data are presented as frequency (n) and percentage (%).

the intervention. There was no significant difference between groups at baseline. However, the intervention group showed a significant improvement in self-concept immediately and two months after the intervention compared to the control group ($P < 0.001$).

Table 4 presents the mean self-concept scores of both groups at the three time points. Significant differences were observed immediately and two months after the intervention ($P < 0.001$), while no significant difference

Table 3. Comparison of Favorable and Unfavorable Self-concept Scores in the Intervention and Control Groups before, Immediately after, and Two Months after the Intervention

| Self-concept score | Before intervention n (%) | Immediately after intervention n (%) | 2 months after intervention n (%) | P-value |
|-------------------------------------|---------------------------|--------------------------------------|-----------------------------------|---------|
| Favorable (Score 0–7) Intervention | 8 (17.8%) | 33 (73.3%) | 29 (64.5%) | <0.001 |
| Favorable (Score 0–7) Control | 11 (24.4%) | 13 (28.8%) | 15 (33.3%) | <0.001 |
| Unfavorable (Score >7) Intervention | 37 (82.2%) | 12 (26.7%) | 16 (35.5%) | <0.001 |
| Unfavorable (Score >7) Control | 34 (75.6%) | 32 (71.2%) | 30 (66.7%) | 0.665 |

Note: Data are presented as frequency (n) and percentage (%).

Table 4. Comparison of Mean Self-concept Scores before, Immediately after, and Two Months after the Intervention in the Intervention and Control Groups

| Time | Intervention group Mean ± SD | Control group Mean ± SD | P-value (ANOVA) |
|--------------------------------|------------------------------|-------------------------|------------------|
| Before intervention | 12.56 ± 6.25 | 11.98 ± 3.29 | <i>P</i> = 0.144 |
| Immediately after intervention | 5.55 ± 3.75 | 12.01 ± 5.10 | <i>P</i> < 0.001 |
| 2 Months after intervention | 6.42 ± 3.23 | 11.53 ± 6.65 | <i>P</i> < 0.001 |

existed at baseline (*P* = 0.144).

Discussion

The findings of this study demonstrated that MBCT significantly improved self-concept among infertile women. This supports the hypothesis that MBCT can enhance psychological well-being by targeting cognitive and emotional processes that underlie self-perception. Although no prior study has specifically examined the effect of MBCT on self-concept in infertile women, the current results are consistent with research demonstrating the efficacy of MBCT in reducing stress, anxiety, and depression in other populations, which are closely related to self-concept (19–24).

A notable observation was that a high percentage of infertile women in both groups had a poor self-concept at baseline. This finding aligns with the study conducted by Taghizadeh et al, who reported lower self-concept among infertile women receiving donated eggs compared to fertile donors (15). This emphasizes that infertility is not only a medical condition but also a significant psychosocial stressor, particularly in cultural contexts like Iran, where extended families play a significant role in couples' lives. The pressure and expectations from relatives can exacerbate negative self-evaluation, highlighting the importance of psychological interventions (19).

The results indicate that MBCT can counteract these negative effects by increasing self-awareness and fostering adaptive cognitive and emotional responses. Research has shown that mindfulness is positively correlated with psychological well-being and mental health, suggesting a plausible mechanism for the observed improvements in self-concept (20).

Shahrestani et al found that MBCT effectively reduced perceived infertility-related stress and irrational beliefs in women undergoing IVF treatment, supporting our findings that cognitive and emotional restructuring is central to improving self-concept (19). Similarly, Rahmani Fard et al demonstrated improvements in various domains of quality of life among infertile women following mindfulness-based psychotherapy, indicating

that MBCT can have benefits beyond symptom reduction (21). Morone et al further highlighted that mindfulness exercises produce both immediate mood improvements and long-term quality of life benefits, suggesting sustained effects over time (22).

Salehpour et al observed reductions in irrational beliefs and emotional divorce following MBCT in married women, which parallels our findings in infertile women, as both populations experience significant self-evaluative stress related to perceived personal failure (23). Sotodeh Navrodi also supports the role of MBCT in decreasing depression and increasing marital satisfaction, which can be interpreted as improvements in self-concept and overall mental health (24).

Sharifi-Shaki et al reported that mindfulness training reduced anxiety and worry in infertile women with recurrent miscarriage, implying that coping skill acquisition is a key mechanism by which MBCT enhances psychological resilience (26). Segal et al argue that the core component of self-awareness in MBCT empowers individuals to respond adaptively in critical life situations, such as infertility, acting as a preventive measure against ongoing mental health challenges (16).

Importantly, our study demonstrates that the effects of MBCT on self-concept were maintained at the two-month follow-up, which aligns with previous evidence that MBCT yields durable psychological benefits (17).

Overall, these results highlight the potential of MBCT as a low-cost and effective adjunct to conventional infertility treatments. By improving self-concept and mental health, MBCT addresses a critical psychosocial dimension of infertility that is often neglected in clinical practice.

The current study has several limitations including a relatively small sample size, reliance on self-report measures, and lack of long-term follow-up beyond two months, which should be addressed in future research.

Conclusion

This study demonstrated that MBCT significantly improved self-concept in infertile women. The intervention led to notable improvements immediately

after the intervention, which were sustained at the two-month follow-up. These findings indicate that MBCT can be an effective psychological approach to enhance self-perception and mental well-being in this population.

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Authors' Contribution

Conceptualization: Ziba Raisi Dehkordi.

Data curation: Marzie Reisi.

Formal analysis: Marzie Reisi.

Funding acquisition: Marzie Reisi.

Investigation: Marzie Reisi.

Methodology: Ziba Raisi Dehkordi.

Project administration: Ziba Raisi Dehkordi.

Resources: Ziba Raisi Dehkordi.

Software: Ziba Raisi Dehkordi.

Supervision: Marzie Reisi.

Validation: Marzie Reisi.

Visualization: Ziba Raisi Dehkordi.

Writing – original draft: Ziba Raisi Dehkordi.

Writing – review & editing: Ziba Raisi Dehkordi, Marzie Reisi.

Competing Interests

The authors declare that they have no conflict of interests regarding this article.

Ethical Approval

This study was approved by the Ethics Committee of Shahrekord University of Medical Sciences (IR.SKUMS.REC.1396.242).

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