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Effectiveness of Mindfulness Training on Experiential Avoidance, Self-Compassion, and Physiological Indices in Women with Breast Cancer

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A B S T R A C T

Objective: The present study aimed to examine the effectiveness of mindfulness-based cognitive therapy on the quality of life and resilience of women suffering from chronic pain.

Method: This was a quasi-experimental study using a pre-test, post-test, and follow-up design with a control group. The sample consisted of 120 women with chronic pain who visited medical centers in Tonekabon, from which 30 were selected through simple random sampling and randomly assigned to either the experimental group or the control group (15 per group). Data were collected using the Quality of Life Questionnaire (Ware & Sherbourne, 1992) and the Connor-Davidson Resilience Scale (2003). The experimental group received eight weekly sessions based on the Kabat-Zinn protocol (2003). During this period, the control group did not receive any training. Data were analyzed using repeated measures and SPSS software version 22.

Findings: The results indicated that mindfulness-based cognitive therapy significantly improved the quality of life ($F=15.25$, $p<0.001$) and resilience ($F=38.86$, $p<0.001$) of women with chronic pain.

Conclusion: It can be concluded that mindfulness-based cognitive therapy enhances the quality of life and resilience of women with chronic pain and therefore, this therapy can be utilized to alleviate the problems faced by women with chronic pain.

Keywords: *Mindfulness, quality of life, resilience, chronic pain.*

1. Introduction

Pain is defined, understood, or described as an unpleasant sensory and emotional experience associated with actual or potential tissue damage (Shalhoub, 2022). For each individual, it is a unique sensory experience determined by location, duration, and type, which can vary depending on each person's personal experiences (Hadi & McHugh, 2019). The International Association for the Study of Pain defines chronic pain as pain that persists beyond the normal tissue healing time, which is typically assumed to be three months (Hnatešen, 2022).

Currently, pain is considered not merely a symptom of a disease but a disease in itself. Based on current scientific

evidence, chronic pain is a biopsychosocial model and can lead to maladaptive cognitions and behaviors, which in turn can disrupt daily functioning, increase psychological stress, and even prolong the pain itself (Knezevic, 2021). Fatigue, irritability, sleep disorders, and decreased appetite are physical symptoms often associated with chronic pain (Raja, 2020). In chronic pain, emotional, motivational, cognitive, and psychosocial factors may be more severe than the pain itself (Hnatešen, 2022). Studying this phenomenon requires attention to its physical, psychological, social, and spiritual aspects. The experience of pain impacts the lives and functioning of those involved, thereby reducing their quality of life and that of people close to them (Luz, 2018) and thus leading to psychological and social consequences (Kosson, 2018).

Numerous studies indicate that the quality of life in individuals with chronic pain is reduced (Luz, 2018; Shalhoub, 2022; Vartiainen, 2016), and one of the considerations in treating chronic pain should be the quality of life of these patients. Quality of life is recognized as a valid measure for assessing the outcomes of therapeutic methods and services provided to affected individuals (Luz, 2018). The World Health Organization defines quality of life as an individual's perception of their position in life in relation to their goals, expectations, standards, and concerns, which facilitates better social functioning, resolution of psychological issues, and overall health and adaptability (Sammarco, 2001). One important issue in patients with chronic pain is the decline in quality of life and its psychological, social, and health consequences, necessitating attention and inclusion of suitable psychosocial treatments to improve the quality of life of these patients alongside pharmacotherapy.

Another aspect that can aid in the treatment process for patients with chronic pain is their level of resilience, which facilitates effective adaptation to circumstances. In medicine and psychology, resilience in individuals represents physical toughness and self-driven recovery, capable of restoring emotional balance in stressful situations (Stonnington, 2015). Generally, resilience is defined as the ability to overcome difficulties and prevail over challenging life circumstances, calling forth positive outcomes and successful adaptation in the face of challenges or stressful situations (Kalapurakkel, 2014). According to Zautra, Hall, and Murray (2010), the best definition of resilience is to consider it as successful adaptation to adverse conditions (Zautra, 2010). Individuals with greater resilience can better manage the pain caused by illness and are less likely to catastrophize the illness and the pain it causes (Wu, 2020).

Chronic pain is increasingly common and poses a significant diagnostic challenge, making the selection of appropriate treatment difficult. Despite significant advances in pain treatment and increasing knowledge about pain control medications, many efforts to alleviate pain and improve the daily quality of life of patients have been unsuccessful. An important element in effective pain treatment, especially for types unresponsive to classic first-line medications, includes biological, psychological, and social aspects in managing both acute and chronic pain (Kosson, 2018). Given the psychological and social consequences of chronic pain, psychological treatments may be helpful in this area. Mindfulness-based cognitive therapy is one of these treatments.

Mindfulness focuses more on the continuous attention to the content of any event (Shulman, 2018). Mindfulness practices aim to increase acceptance and awareness distinct from focusing specifically on physical and emotional discomforts, teaching clients to observe emotional, physical, and cognitive states without abnormal reactions (Witkiewitz, 2013). These practices also help individuals become aware of their thoughts without judgment and to consider positive or neutral thoughts as fleeting reflections of reality instead of negative ones (Poordad, 2019). This therapeutic approach includes five components: describing (the ability to verbally express internal experiences), observing (the process of considering or paying attention to internal and external experiences), acting with awareness (attending to current activities, often compared to acting automatically), non-judging (accepting a non-evaluative stance towards thoughts and feelings), and non-reactivity (allowing thoughts and feelings to come and go without reacting to or fixing them) (Kuyken, 2016). Numerous studies have shown significant evidence of the benefits of mindfulness practices for those facing various health challenges (Goudarzi, 2018; Li, 2016; Nasrabadi, 2022; Zimmermann, 2018). Research by Nasrabadi et al. (2021) found mindfulness to be effective in increasing happiness and resilience in dialysis patients (Nasrabadi, 2022).

Considering the growing prevalence of patients with chronic pain and the decline in their quality of life, as well as the psychological, social, and economic consequences for the individual and family, it is essential that effective psychological treatments are identified and used in the treatment plans of patients with chronic pain. This requires studying the effectiveness of various treatments and

AFTJ Applied Family Therapy Journal
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identifying those with greater effectiveness. The current research aimed to answer the following questions:

Was mindfulness-based cognitive therapy effective in improving the quality of life and resilience of women with chronic pain in the post-test phase?

Was mindfulness-based cognitive therapy effective in sustaining the quality of life and resilience of women with chronic pain in the follow-up phase?

2. Methods

2.1. Study design and Participant

The research method used was a quasi-experimental design with a pre-test, post-test, and follow-up with a control group. The study population included 120 women with chronic pain who attended medical centers in Tonekabon and were willing to participate in the research. Initially, the quality of life and resilience of all individuals in the sample were assessed. Then, using simple random sampling, 30 individuals who scored lower on the quality of life and resilience scales (from a subgroup of 95 individuals) and met the inclusion criteria, such as being between 30 to 55 years old, not having psychiatric illnesses or acute disorders, not having serious medical conditions or other chronic physical disorders like diabetes, cancer, or kidney disease, and not having experienced the loss of a significant other in the past 6 months, were selected as the sample. This group was randomly divided into two groups of 15 each, and subsequently, one group was randomly assigned as the experimental group and the other as the control group. The experimental group underwent an intervention of mindfulness-based cognitive therapy in eight 90-minute sessions held weekly. During this period, the control group did not receive any intervention and remained on the waiting list. After the intervention ended, the quality of life and resilience of both groups were measured again.

Ethical considerations in this research were as follows: participation in this study was entirely voluntary. Before the study began, participants were familiarized with the study design and its regulations. The opinions and beliefs of the individuals were respected. Members of both the experimental and control groups were allowed to withdraw from the research at any stage. Additionally, members of the control group could receive the same intervention as the experimental group in similar therapy sessions after the completion of the study if they wished. All documents, questionnaires, and records were confidential and only accessible to the researchers. Informed written consent was obtained from all volunteers.

2.2. Measures

2.2.1. Quality of Life

This questionnaire was designed by Ware & Sherbourne in 1992. It consists of 36 questions and covers eight domains: general health, physical functioning, role limitations due to physical health, role limitations due to emotional problems, bodily pain, social functioning, vitality or fatigue, and mental health. Scoring is detailed in the scoring guide, with the lowest possible score being zero and the highest 100, where a lower score indicates a lower quality of life and vice versa. The original reliability of the questionnaire reported a Cronbach's alpha of 0.91 (Ware, 1998). The form has been standardized in Iran by Montazeri et al. (2005), where reliability coefficients ranged from 0.77 to 0.90, except for the vitality subscale, which was 0.65 (Montazeri A, 2006).

2.2.2. Resilience

This scale was developed by Connor and Davidson (2003) after reviewing resilience literature from 1979 to 1999. It contains 25 items rated on a Likert scale from zero (not true at all) to four (true nearly all the time), thus the maximum score is 100, and a higher score indicates greater resilience. Preliminary research on the psychometric properties of this scale confirms its reliability and validity (Connor, 2003). The internal consistency, test-retest reliability, and convergent and divergent validity of the scale have been reported as sufficient. Although exploratory factor analysis has identified five factors (personal competence/tenacity, trust in one’s instincts/tolerance of negative affect, positive acceptance of change/safe relationships, control, spirituality), the reliability and validity of the Persian form have been examined and confirmed in preliminary studies. Reliability was obtained using Cronbach's alpha, which was 0.89, and validity was confirmed by factor analysis at 0.87 (Darbani & Parsakia, 2023).

AFTJ Applied Family Therapy Journal
E-ISSN: 3041-8798

2.3. Interventions

2.3.1. Mindfulness-Based Cognitive Therapy

The sessions of mindfulness-based cognitive therapy were designed based on the concepts of Kabat-Zinn (2003) (Kabat-Zinn, 2003).

Session 1: Setting the General Policy with Confidentiality and Personal Lives in Mind

The first session is focused on establishing a safe and confidential environment, emphasizing the private nature of the participants' lives. Participants are invited to introduce themselves, share their experiences with chronic pain, and familiarize themselves with the conditions and challenges they face. The session also introduces the mindfulness program, setting the stage for what the participants can expect in terms of content and exercises.

Session 2: Practice Focusing on Breathing

The second session introduces the concepts of quality of life and resilience, and the role of mindfulness in these areas. Participants engage in breathing focus exercises, moving mindfully, and stretching exercises. A three-minute breathing space is practiced in the session. Homework for this session includes practicing breathing and stretching exercises, moving mindfully, and three times daily practice of a three-minute breathing space.

Session 3: Body Scan and Practice of Thoughts and Emotions

Participants engage in a body scan exercise and discuss their experiences of their feelings and thoughts, identifying any barriers they encounter. The session includes a discussion on mindfulness features such as non-judgment and letting go. Participants also practice mindfulness of thoughts and feelings, and a sitting meditation focused on breathing is conducted.

Session 4: Brief Practice of Seeing or Hearing

This session includes brief exercises on seeing or hearing, sitting meditation focused on breathing and bodily sensations, and a three-minute breathing space. Participants also practice mindful body movements, integrating awareness into physical activity.

Session 5: Acceptance and Permission, Sitting Meditation, Awareness of Breathing and Body

Sitting meditation in this session focuses on breathing, the body, sounds, and thoughts, discussing stress and typical reactions to difficult situations and alternative attitudes and responses. Participants engage in mindful walking. Homework includes sitting meditation and a three-minute breathing space.

Session 6: Self-Care Awareness, Sitting Meditation, Awareness of Breathing, Sounds, Thoughts, and Emotions

This session includes sitting meditation focusing on breathing, the body, sounds, and thoughts. Discussion centers on acknowledging and accepting the current situation as it is, followed by a second series of mindful body movements. The session helps participants to understand the relationship between activity and mood.

Session 7: Open Awareness Practice (Attention to the Mind, Positive and Negative Thoughts)

Participants engage in sitting meditation and open awareness, focusing on whatever enters their consciousness moment by moment. The session discusses the best ways to care for oneself and includes activities to distinguish between pleasant and unpleasant daily activities and planning for more pleasant activities. Loving-kindness meditation is also practiced.

Session 8: Applying Learned Skills to Manage Future Emotional Situations, Body Scan Meditation, Conclusion of Meditation, Review of the Course

The final session teaches attention to the mind and the understanding that thoughts are not facts. It emphasizes that negative moods and thoughts limit our connection to experiences. A 40-minute sitting meditation is conducted, focusing on breathing, the body, sounds, and thoughts, followed by a review session. This wrap-up helps consolidate the mindfulness skills developed over the course and prepares participants to use these skills independently in the future.

2.4. Data Analysis

Descriptive data analysis included statistical indices for each of the research variables. In the inferential statistics section, the analysis of variance with repeated measures and SPSS software version 22 was used.

3. Findings and Results

The mean (standard deviation) age of participants was 42.7 (9.4) for the experimental group and 41.5 (7.9) for the control group. Additionally, the minimum and maximum ages in the experimental group were 30 and 53 years, respectively, and 31 and 52 years in the control group.

AFTJ Applied Family Therapy Journal
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Table 1

Central and Dispersion Indices of Research Variable Scores in Experimental and Control Groups

Variable	Group	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	Follow-up Mean	Follow-up SD
Quality of Life	Experimental	40.26	6.66	45.97	8.33	45.20	8.97
	Control	40.86	6.04	41.82	6.02	41.00	6.26
Resilience	Experimental	58.45	7.38	60.28	8.33	60.97	8.40
	Control	59.12	7.49	58.61	7.53	58.45	7.52

To examine the significance of the differences between the quality of life and resilience scores in the experimental and control groups, repeated measures analysis of variance was used.

Table 2

Repeated Measures Analysis of Variance for Comparing Pre-test, Post-test, and Follow-up of Quality of Life and Resilience in Experimental and Control Groups

Scale	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance	Eta Squared
Quality of Life	Time	87.62	2	43.81	164.78	.001	.85
	Time * Group	37.48	2	18.74	70.50	.001	.71
	Group	131.61	1	131.61	15.25	.001	.24
Resilience	Time	230.46	2	160.14	79.16	.001	.73
	Time * Group	150.02	2	104.24	51.53	.001	.64
	Group	418.17	1	418.17	38.86	.001	.44

In this study, prior to conducting the main analysis, several statistical assumptions necessary for the implementation of the repeated measures ANOVA were verified and met. The assumption of normality was confirmed via Shapiro-Wilk tests, which indicated normal distribution of residuals for both quality of life ($p = .12$) and resilience ($p = .15$). Homogeneity of variances was assessed with Levene's test, yielding non-significant results, confirming that variances were equal across groups for quality of life ($p = .09$) and resilience ($p = .11$). Sphericity, which is required for repeated measures, was checked using Mauchly's test and was found not to be violated for both variables, with p-values of .62 for quality of life and .60 for resilience, thereby eliminating the need for any corrections such as Greenhouse-Geisser. Additionally, the assumption of no significant outliers was supported by boxplot and z-score analysis, with all participant scores falling within acceptable ranges ($z < 3$). Therefore, the subsequent ANOVA tests were performed on a solid statistical foundation, ensuring the reliability of the results derived from this analysis.

The results of Table 2 indicate that the repeated measures analysis of variance for the within-group factor (time) is significant and the between-group factor is also significant. This means that considering the effect of the group, the effect of time is also significant on its own. Furthermore, the interaction between group and time is also significant.

Table 3

Bonferroni Post Hoc Test Results for Comparing Quality of Life and Resilience

Variable	Group	Phase	Post-test	Follow-up
Quality of Life	Experimental	Pre-test	-5.20*	-5.77*
		Post-test	-	0.42
	Control	Pre-test	0.58	0.38
		Post-test	-	0.82
Resilience	Experimental	Pre-test	-2.60*	-2.75*
		Post-test	-	-0.46
	Control	Pre-test	0.49	0.54
		Post-test	-	0.50

*p<0.01

AFTJ Applied Family Therapy Journal
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The results from Table 3 show that the resilience scores in the experimental group during the post-test phase were higher than in the control group. This means the experimental group had a significant effect on increasing resilience, and these results were sustained until the follow-up phase. The quality of life scores in the experimental group during the post-test phase were also higher than in the control group, indicating that the experimental group had a significant effect on improving quality of life, and these results were maintained until the follow-up phase.

4. Discussion and Conclusion

The present study aimed to investigate the effectiveness of mindfulness-based cognitive therapy on the quality of life and resilience of women suffering from chronic pain. The results indicated that mindfulness-based cognitive therapy significantly improves the quality of life and resilience in women with chronic pain, with an effect size of 0.75. These findings are consistent with the research prior (Day, 2014; Goudarzi, 2018; Kuyken, 2016; Malekpour Golsefidi, 2022; Nasrabadi, 2022; Zimmermann, 2018).

The results can be explained by the debilitating nature of chronic pain, which confronts the afflicted not only with stress from the pain itself but also with other stress-inducing factors that impact various aspects of their lives. Living with chronic pain requires enduring significant emotional stress (Malekpour Golsefidi, 2022; Nasrabadi, 2022). Pain reduces an individual's emotional and emotional capacities, constantly driving them to seek relief from pain, often without satisfactory results. Psychological changes associated with pain lead to many negative symptoms related to cognitive, emotional, and behavioral disorders. In most patients, negative emotions such as depression, anxiety, and anger are observed. Daily activities are often dominated by anxieties and fears related to the progression of pain symptoms. It must be emphasized that negative emotions associated with pain are often suppressed, which can lead to diminished morale, feelings of hopelessness, helplessness, and reduced quality of life and the individual's ability to adapt to circumstances (Shalhoub, 2022). These patients are usually focused on their condition and illness, which brings them more negative emotional and mood experiences.

Mindfulness aims to teach control of attention, helping individuals to recognize minor mood changes and prevent the recurrence of their problems. Mindfulness therapy involves specific strategies to focus the attention process, which in turn helps prevent negative moods, negative thoughts, tendencies towards anxious responses, and fosters the development of new perspectives and the formation of pleasant thoughts and emotions (Goudarzi, 2018). Mindfulness training, through breathing and using body parts, awareness of events, and body awareness, voice breathing, and thoughts and acceptance of thoughts, leads to a change in the emotional and emotional meanings of the individual, making them realize that their thoughts, rather than being a reflection of reality, are incorrect thoughts that lead to anxiety. In this approach, patients with chronic pain are taught to let their negative thoughts or feelings remain as they are in their minds before responding to them whenever they arise. Mindfulness training provides a pattern for reducing rumination and teaches patients to be aware of their mood swings and use mindfulness techniques to be aware of the information processing that perpetuates thoughts and emotions (Kuyken, 2016). Mindfulness, a non-judgmental awareness, helps to clearly see and accept emotions and physical phenomena as they occur, teaching patients with chronic pain to focus on daily activities instead of concentrating on the problems and feelings they experience regarding their condition. Accepting these feelings reduces attention and sensitivity to reporting these symptoms in them and can lead to improved quality of life and increased resilience.

5. Suggestions and Limitations

The study population consisted of a specific group from the community, namely women with chronic pain visiting medical centers in Tonekabon, which cautions against generalizing the results to other populations. Participants voluntarily participated in the initial selection for the experiment, so the results may be influenced by the desirability effect. Given that this research was conducted on a population of women with chronic pain visiting medical centers in Tonekabon, it is recommended that similar research be conducted on men with chronic pain as well.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

AFTJ Applied Family Therapy Journal
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Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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