KMANPUB | Health Nexus Vol. 1 No. 3 (2023): 106-113

Article history:
Received 09 April 2023
Revised 11 June 2023
Accepted 15 June 2023
Published online 01 July 2023

Effectiveness of Mindfulness-Based Therapy on Emotion Regulation and Perception of Rejection in Women with Multiple Sclerosis

Mohammad Najafi Aliekolaei[1], Elham Ghalandari[2*], Elham Mostafavi[3]

[1] M.A. Student in General Psychology, Rouzbahan Institute of Higher Education, Sari, Iran
[2] M.A. Student in Clinical Psychology, Sari Branch, Islamic Azad University, Sari, Iran
[3] Ph.D. Student, Department of Psychology, North Tehran Branch, Islamic Azad University, Tehran, Iran

*** Corresponding author email address**: eghalandari29@gmail.com

A r t i c l e I n f o

Article type:
Original Research

How to cite this article:
Najafi Aliekolaei, M., Ghalandari, E., & Mostafavi, E. (2023). Effectiveness of Mindfulness-Based Therapy on Emotion Regulation and Perception of Rejection in Women with Multiple Sclerosis. *Health Nexus*, *2*(2), 106-113.
https://doi.org/10.61838/kman.hn.1.3.14

A B S T R A C T

This study aimed to investigate the effectiveness of mindfulness-based therapy on emotion regulation and perception of rejection among women with multiple sclerosis using a quasi-experimental pretest-posttest and follow-up design with a control group. The population of this study included all women with multiple sclerosis in Tehran in the year 2023, who were registered with the Multiple Sclerosis Society of Iran. Using convenience sampling, 30 participants were selected and randomly assigned to two groups of 15, experimental and control. The experimental group received mindfulness-based therapy in eight 90-minute sessions (two sessions per week), while the control group received no intervention. The research instruments included the Emotion Regulation Questionnaire (ERQ) by Gross and John (2003) and the Perception of Rejection Questionnaire (PEQ) by Rohner et al. (1978). The results showed that after adjusting for pretest scores, there was a significant effect in the between-group variables for emotion regulation ($F = 4.49$, $p = 0.001$) and perception of rejection ($F = 47.34$, $p = 0.001$). Therefore, it can be concluded that mindfulness-based therapy impacts emotion regulation and perception of rejection variables, and these differences were maintained at the follow-up stage. The results indicate that mindfulness-based therapy is effective for emotion regulation and perception of rejection and can be utilized alongside medical treatments for women with multiple sclerosis.

Keywords: *Perception of rejection, emotion regulation, mindfulness-based therapy, multiple sclerosis.*

1. Introduction

Multiple sclerosis (MS) is a chronic inflammatory autoimmune disorder (1) that involves the degradation of the myelin sheath in the central nervous system (2). Multiple sclerosis affects approximately 2.8 million people worldwide (3). This disease impacts individuals in various ways, including motor, cognitive, and emotional changes (4). In the context of MS, emotion regulation plays a crucial role in managing the disease and its symptoms. Emotion regulation allows individuals to adapt and cope with stressful situations, particularly in conditions like MS, where emotional well-being can impact overall health (5). Emotion regulation involves processes such as selecting emotions, timing emotional experiences, and expressing these emotions, which people use to manage their emotions (6). Individuals who use adaptive cognitive emotion regulation strategies, such as positive reappraisal and focusing on positive planning, experience better psychological and physical health (7).

Patients with MS often experience social psychological tensions, stress, restlessness, anxiety, and rejection, which can exacerbate their symptoms (8). Perception of rejection refers to an individual's mental interpretation of the possibility of being rejected or not accepted by others and includes perceptions of non-acceptance, disbelief, suspicion, and stigmatization that lead to feelings of rejection. This perception can be influenced by various factors such as personal experiences, cultural norms, and emotional states. Studies have shown that the perception of rejection is closely associated with feelings of shame, guilt, and depression (9). Perception of rejection can affect self-esteem as it involves attitudes of approval or disapproval towards oneself (10). The perception of being rejected is closely linked to psychological security, where individuals feel they can express themselves without fear of rejection or negative consequences (11).

Meanwhile, mindfulness-based therapy has attracted significant attention in the field of psychology and mental health. Mindfulness-based therapy combines elements of cognitive behavioral therapy with mindfulness meditation, aiming to reduce disability in various chronic conditions, including pain-related disorders (12). Mindfulness involves consciously bringing a non-judgmental attention to present moment experiences (e.g., thoughts, emotions, physical sensations, behavioral urges) and this skill can be cultivated through mindfulness practice. In cognitive-based mindfulness therapy, daily focused attention practice is combined with verbal guidance and discussion led by a therapist with cognitive therapy for depression. It is thought that mindfulness practice facilitates a greater awareness of the maintenance cycle of depression while fostering a non-judgmental attitude toward present experiences and recognizing thoughts as mental events (13). Research has shown that mindfulness-based therapy can be effective in reducing psychological issues in patients with multiple sclerosis (13, 14). Mindfulness is recognized as a valuable approach for enhancing emotional regulation and managing stress (15-17). It is also an appropriate therapeutic approach for addressing various mental health concerns, including understanding rejection and stigma (18, 19).

In summary, the unpredictable nature of multiple sclerosis can impact individuals in various ways, including emotionally and cognitively, and may cause those affected to struggle with emotion regulation and experience feelings such as perception of rejection. Mindfulness-based therapy is one of the treatments of interest in this area. Research on the effectiveness of mindfulness-based therapy in improving emotion regulation and perception of rejection among women with multiple sclerosis is essential to enhance our understanding of effective interventions, increase the well-being of affected individuals, and contribute to the necessary evidence base. The current study was conducted to elucidate the effectiveness of mindfulness-based therapy on emotion regulation and perception of rejection in women with multiple sclerosis.

2. Methods and Materials

2.1. Study Design and Participants

This study is applied in nature and quasi-experimental in execution, conducted with a pre-test, post-test design, and a control group, followed by a six-month follow-up. The population for this study comprised all women diagnosed with multiple sclerosis in Tehran in the year 2023, who were registered at the Multiple Sclerosis Society of Iran. Using convenience sampling, 30 individuals were selected and randomly assigned into two groups of 15 each, experimental and control. Inclusion criteria included consent and

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E-ISSN: 2981-2569

awareness to participate in the study, age between 25 to 50 years, and a minimum education level of a diploma. Exclusion criteria included not meeting the entry criteria, incomplete self-report measures, withdrawal from the study, use of psychiatric medication, receipt of counseling services outside the sessions, or absence from more than one treatment session. After simple random assignment of two groups (even for experimental and odd for control), the experimental group received mindfulness-based therapy. Post-tests were conducted after the completion of the training sessions for both groups, and a follow-up was conducted after six months.

Ethical considerations in this study were that participation was completely voluntary. Prior to starting the project, participants were familiarized with the details and regulations of the plan. The views and beliefs of individuals were respected. Members of both the experimental and control groups were allowed to withdraw from the research at any stage. Furthermore, members of the control group could opt to receive the same interventions as the experimental group in similar therapy sessions after the project concluded. All documents, questionnaires, and confidential records were kept solely by the researchers. Informed written consent was obtained from all volunteers.

2.2. Measures

2.2.1. Emotion Regulation

Developed by Gross and John in 2003, this questionnaire includes 10 items and contains two subscales: cognitive reappraisal and emotional suppression. It is scored on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), with total scores ranging from 10 to 70. Higher scores indicate greater emotional regulation. The internal consistency coefficients for the cognitive reappraisal subscale are 0.72 for men and 0.79 for women, and for the emotional suppression subscale, they are 0.67 for men and 0.69 for women. Soleimani and Habibi (2014) reported Cronbach's alpha coefficients for the cognitive reappraisal subscale as 0.71 and for emotional suppression as 0.81 (Chitgarzadeh et al., 2023).

2.2.2. Perceived Rejection

The perception of rejection in this study was measured using the Adult Rejection Questionnaire with 60 items, developed by Rohner et al. (1978). It assesses four domains: intimacy/affection, hostile/aggressive behavior, indifference/neglect, and undifferentiated rejection. This questionnaire is scored on a 4-point Likert scale from 1 (almost never) to 4 (almost always), with total score ranges from 60 to 240, where higher scores indicate increased perception of rejection. Construct validity of the questionnaire has been established through factor structure examination in various studies. It has also reported an internal consistency coefficient for total rejection score above 0.80, and retest reliability results demonstrated a correlation coefficient of 0.97 in an American sample and Cronbach's alpha of 0.85 in another study. In Iran, Sayed Mousavi et al. examined the psychometric properties of this questionnaire. Confirmatory factor analysis in Iran validated the factorial construct of this questionnaire, and a significant relationship was found between scores from this questionnaire and the Psychological Adjustment Questionnaire as evidence of criterion validity. Cronbach's alpha in Iran ranged from 0.93 to 0.98, and retest reliability after three months was reported as 0.76 (20).

2.3. Measures

2.3.1. Mindfulness-Based Therapy

In this study, mindfulness-based therapy was conducted over eight 90-minute sessions according to the programs by Segal, Williams, and Teasdale (2018), and Dimidjian et al. (2023), where the group underwent mindfulness interventions (16, 21).

Session 1: Introduction and Group Norms

In the first session, participants will be welcomed and introduced to each other. The session will begin with an explanation of the group's rules and regulations, such as confidentiality and the importance of regular attendance. This is critical to establish a safe and trusting environment for the participants. At the end of the session, participants will be asked to complete pretest questionnaires to assess their baseline emotional state and perception of rejection. Additionally, reading materials about depression and

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E-ISSN: 2981-2569

mindfulness will be distributed as homework to prepare participants for the next sessions.

Session 2: Formal Practice of Mindful Awareness

The second session will focus on teaching formal exercises of conscious and mindful awareness during daily activities. Participants will engage in muscle relaxation exercises, which involve creating tension in the muscles and then releasing it. This practice helps in reducing physical stress and enhances participants' awareness of their bodily sensations, promoting a deeper understanding of mindfulness principles applied to body awareness.

Session 3: Sitting Meditation and Breath Focus

This session will review the formal and informal mindfulness practices introduced in the previous session. The core activity will be seated meditation focusing on breath and bodily sensations. Participants will practice mindful breathing for one minute in a non-judgmental, present-focused manner. This exercise helps in cultivating a calm mind, enabling participants to manage stress and emotional responses more effectively.

Session 4: Comprehensive Sitting Meditation

Building on previous meditation practices, this session introduces a comprehensive sitting meditation that incorporates attention to breath, body, sounds, and thoughts. The session aims to deepen participants' meditation experience and broaden their mindfulness skills across different sensory inputs. Discussion will include common stress responses and alternative attitudes and behaviors that can be adopted in stressful situations.

Session 5: Exploration of Bodily Sensations

Participants will continue practicing sitting meditation with an emphasis on observing a wide range of bodily sensations such as pain, itching, burning, lightness, heaviness, warmth, and coldness. This session encourages awareness and acceptance of physical feelings, regardless of their nature, and discusses how these sensations may correlate with thoughts and emotions, emphasizing the acceptance of current realities as they are.

Session 6: Generalization of Mindfulness

The sixth session focuses on generalizing mindfulness to every contact experience—such as the touch of a chair against the body or the feet on the ground. The session will revisit and apply breath meditation in daily activities and introduce mindfulness practices related to emotions, thoughts, listening, and mindful yoga. These activities enhance the participants' ability to integrate mindfulness into everyday life.

Session 7: Open Awareness Meditation

This session starts with open awareness meditation, focusing on whatever comes into consciousness at the moment. Participants will engage in an exercise to identify pleasant and unpleasant life events and discuss strategies to ensure a balanced inclusion of pleasant activities in their lives. This session aims to empower participants to take better care of themselves by recognizing and planning for enjoyable events.

Session 8: Body Scan Meditation and Application to Life

The final session begins with a body scan meditation to consolidate mindfulness skills. It will cover how to apply the lessons learned from the therapy in real life, identify potential internal and external barriers to maintaining therapeutic gains, and manage stress-inducing events that might trigger relapse. The session will conclude with a review of the homework, sharing experiences among participants, summarizing the outcomes of the sessions, and conducting a posttest to evaluate the effects of the therapy on the participants.

2.4. Data Analysis

Descriptive data analysis included statistical indices for each research variable. In the inferential statistics section, repeated measures analysis of variance was conducted using SPSS version 22.

3. Findings and Results

The demographic data indicate that the average age of participants in the experimental group was 38.26 years, and the average age in the control group was 35.72 years. In the experimental group, 7 individuals (46.66%) had a diploma or lower level of education, 6 individuals (40%) held a bachelor's degree, and 2 individuals (13.33%) had a master's degree or higher. In the control group, 6 individuals (40%) had a diploma or lower, 8 individuals (53.33%) held a bachelor's degree, and 1 individual (6.66%) had a master's degree or higher.

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Table 1

Means and Standard Deviations of Research Variables

Variable	Group	Pretest Mean – SD	Posttest Mean – SD	Follow-up Mean – SD
Emotion Regulation	Experimental	30.93 – 6.47	43.00 – 6.97	42.40 – 6.57
	Control	31.26 – 7.03	31.53 – 7.03	31.46 – 6.47
Perception of Rejection	Experimental	200.33 – 9.58	180.60 – 14.49	181.26 – 14.66
	Control	199.40 – 8.99	199.60 – 8.63	200.06 – 8.84

According to Table 1, the mean scores for emotion regulation in the experimental group showed a greater increase in the posttest compared to the control group, and this improvement persisted during the follow-up. Similarly, the score for perception of rejection in the experimental group decreased in the posttest and this reduction was maintained at the follow-up stage, whereas the control group did not show significant changes. To determine effectiveness, the basic assumptions of the covariance test were examined. The normality of the distribution of scores was assessed using the Shapiro-Wilk test, and the results were not significant, indicating that the distribution of the dependent variable scores is normal. Homogeneity of variance errors was examined using Levene's test. The results of Levene's test indicated that the variance errors for emotion regulation ($p = 0.362$, $F = 0.860$) and perception of rejection ($p = 0.137$, $F = 1.307$) were not significant at the 0.05 level, thus the groups were comparable. The Box's M test for examining homogeneity of variance-covariance was statistically non-significant, indicating the homogeneity of the covariance matrix is assumed. Moreover, the interaction effect between group and pretest for emotion regulation and perception of rejection was not significant ($p > 0.05$), confirming the homogeneity of regression slopes and fulfilling the conditions for covariance analysis.

Table 2

Results of Multivariate Test Statistics in Multivariate Analysis of Variance

Test	Value	F	df Effect	df Error	Significance Level
Pillai's Trace	0.39	9.171	2	28	≤ 0.001
Wilks' Lambda	0.60	9.171	2	28	≤ 0.001
Hotelling's Trace	0.65	9.171	2	28	≤ 0.001
Largest Root	0.65	9.171	2	28	≤ 0.001

As shown in Table 2, the significance levels for all four multivariate statistics, including Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Largest Root, are significant at the 0.001 level. As evident from the table, our general hypothesis was confirmed; the mindfulness-based therapeutic intervention generally had an impactful effect on the dependent variables. Following this, the results of the covariance analysis for the dependent variables are presented.

Table 3

Analysis of Covariance Results for Research Variables

Variable	Source of Variation	Sum of Squares	df	Mean Square	F	Significance Level	Eta Squared
Emotion Regulation	Group	1029.70	1	1029.70	4.49	0.001	0.62
	Error	630.13	27	23.33			
	Total	2361.867	29				
Perception of Rejection	Group	2980.811	1	2980.811	47.34	0.001	0.66
	Error	1410.91	27	55.25			
	Total	6692.70	29				

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E-ISSN: 2981-2569

Based on the figures from Table 3, it is observed that after adjusting the pretest scores, there was a significant effect on the between-group factor for the variables of emotion regulation (F = 4.49, p = 0.001) and perception of rejection (F = 47.34, p = 0.001). Therefore, it can be concluded that mindfulness-based therapy significantly affects the variables of emotion regulation and perception of rejection.

Table 4

Differences in Paired Comparisons of Pretest, Posttest, and Follow-up Stages

Variable	Stage 1	Stage 2	Mean Difference Stages	SD	p
Emotion Regulation	Pretest	Posttest	-6.16	0.91	<0.001
	Pretest	Follow-up	-5.83	0.87	<0.001
Perception of Rejection	Pretest	Posttest	9.76	1.29	<0.001
	Pretest	Follow-up	9.20	1.33	<0.001

As shown in Table 4, there is a significant difference between the pretest, posttest, and follow-up mean scores for the variables of emotion regulation and perception of rejection. This indicates that mindfulness-based therapy significantly altered the posttest and follow-up scores for emotion regulation and perception of rejection compared to the pretest stage. Additionally, these changes continued during the follow-up period.

4. Discussion and Conclusion

This study was conducted to elucidate the effectiveness of mindfulness-based therapy on emotion regulation and the perception of rejection among women with multiple sclerosis. The results demonstrated that mindfulness-based therapy is effective in enhancing emotion regulation in women with multiple sclerosis. This finding aligns with prior studies (13-16). Mindfulness enables individuals to observe their emotions without becoming overwhelmed, which enhances emotion regulation—a critical skill for women with MS who face a broad spectrum of challenging emotions (22). By increasing present-moment awareness, mindfulness practices help develop skills for better emotional regulation, leading to improved management of anxiety, depression, and stress. These skills are particularly vital for women with MS, who often face unique emotional challenges due to their health condition. Mindfulness also fosters acceptance, which can be empowering for patients dealing with the unpredictability of MS (23). Moreover, mindfulness encourages the acceptance of one's current situation without judgment. This acceptance can translate into self-compassion, essential for women with MS who may struggle with self-blame or despair due to their physical limitations (24). Furthermore, mindfulness-based therapy is linked to improved quality of life by enhancing non-judgmental awareness of the present moment, helping individuals feel more connected and less emotionally overwhelmed by their condition (25).

The results also indicated that mindfulness-based therapy is effective in reducing the perception of rejection among women with multiple sclerosis. This finding is consistent with prior findings (13, 14, 18, 19). The therapy aids in shifting focus from external perceptions to internal awareness and acceptance, potentially reducing the impact of rejection experiences (Fedger et al., 2021). Mindfulness promotes a broader perspective on life events, decreasing the significance of rejection in the overall context of one's life. By cultivating a more accepting and open attitude, individuals can lessen the impact of rejection on their emotional well-being (26). The mechanisms through which mindfulness exerts its beneficial effects include enhancing non-judgmental awareness of the present moment, fostering compassion towards oneself and others, increasing self-awareness and flexibility, and encouraging a broader view of life events (27). By developing these aspects through mindfulness practice, individuals may devise better coping strategies for social interactions and rejection scenarios, leading to more thoughtful and emotionally resilient responses (27). Mindfulness training often involves elements of compassion, such as self-compassion and compassion towards others, which are valuable in addressing feelings of rejection, as self-compassion strengthens a kinder internal dialogue that can counteract self-blame often associated with rejection. Additionally, compassion towards others helps individuals understand that

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rejection may not always be personal but influenced by various external factors (26).

Overall, this research demonstrated that mindfulness-based therapy is effective for emotion regulation and perception of rejection in women with multiple sclerosis. Limitations of this study include reliance on self-report questionnaires and the limited sample to women in Tehran. Future research should employ interview tools as well. It is also recommended that similar research be conducted on men to determine gender differences and in other cities and provinces.

Authors' Contributions

M.N.A. conceptualized the study, designed the research methodology, and supervised the overall project. E.G., the corresponding author, was responsible for conducting the data analysis, interpreting the results, and leading the manuscript writing and revisions. E.M. contributed to the recruitment of participants, facilitated the mindfulness-based therapy sessions, and assisted with the data collection and initial analysis. All authors were involved in discussing the findings, critically reviewing the manuscript for important intellectual content, and approved the final version for publication.

Declaration

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

Transparency Statement

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

Acknowledgments

We would like to express our gratitude to all individuals helped us to do the project.

Declaration of Interest

The authors report no conflict of interest.

Funding

According to the authors, this article has no financial support.

Ethics Considerations

The study placed a high emphasis on ethical considerations. Informed consent obtained from all participants, ensuring they are fully aware of the nature of the study and their role in it. Confidentiality strictly maintained, with data anonymized to protect individual privacy. The study adhered to the ethical guidelines for research with human subjects as outlined in the Declaration of Helsinki.

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Health Nexus
E-ISSN: 2981-2569