



The effects of mindfulness-based stress reduction therapy on psychopathology symptoms and stress response in patients with multiple sclerosis: Short communication

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Short Communication

Abstract

BACKGROUND: Multiple sclerosis (MS) is a chronic inflammatory condition that affects the central nervous system (CNS). The purpose of this study was to examine how a mindfulness-based stress reduction (MBSR) intervention impacted psychopathology symptoms and stress responses in patients with MS.

METHODS: In the second half of 2018-2019, a quasi-experimental study was carried out with a pretest-posttest control design, followed by a one-month monitoring period in Kerman City, Iran. Through purposeful sampling, 30 patients were selected and then randomly divided into experimental and control groups, with 15 individuals in each group. The experimental group underwent MBSR therapy sessions, structured individually, spanning eight 90-minute sessions, and held weekly, following Kabat-Zinn's MBSR program. Data collection for the study was done using the Stress Response Inventory (SRI) and the Symptom Checklist-90-Revised (SCL-90-R). The collected data were analyzed using repeated measures analysis of variance (ANOVA) through SPSS.

RESULTS: Mindfulness Based Stress Reduction (MESR) did not significantly impact psychosis and paranoia symptoms ($P < 0.05$). The therapy also helped with stress response in these patients ($P < 0.05$). This effect lasted through the follow-up phase.

CONCLUSION: The study showed that MBSR therapy helped reduce psychiatric symptoms like anxiety and depression in patients with MS.

KEYWORDS: Mindfulness; Psychopathology; Stress Response; Multiple Sclerosis

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Introduction

Multiple sclerosis (MS) is a condition characterized by inflammation in the central nervous system (CNS) that leads to damage and destruction of the myelin sheath surrounding the brain and spinal cord. This disease primarily affects young adults, with women being more susceptible than men.¹ In

Iran, the random effects model estimated the prevalence of MS to be 29.3 per 100000 (25.6-33.5). Men had a prevalence rate of 16.5 per 100000 (13.7-23.4) while women had a rate of 44.8 per 100000 (36.3-61.6). The random effects model also estimated the incidence of MS in Iran to be 3.4 per 100000 (1.8-6.2).² Approximately 2.8 million individuals are believed to have MS globally, with a prevalence rate of 35.9 per 100000 people. The prevalence of MS has risen in all parts of the world since 2013; however, disparities in

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prevalence estimates remain. In 75 countries that reported data, the combined incidence rate is 2.1 per 100000 individuals per year, with the average age of diagnosis being 32 years. Women are twice as likely to have MS compared to men.³

Psychiatric comorbidities diminish the quality of life and worsen prognosis in these conditions, more so than in diseases like Multiple sclerosis (MS).⁴ Due to the wide-ranging effects of chronic illnesses such as MS on various aspects of life, including economic, financial, social, and emotional well-being, relying solely on medication and regular check-ups is not sufficient.⁵ Non-drug methods have become popular among patients, including those with MS, as complementary treatments.⁶ One popular method for managing stress related to diseases and physical complications is mindfulness-based stress reduction (MBSR) training, formerly known as the stress reduction and relaxation program.⁷ Kabat-Zinn is the originator and innovator of this approach, outlining the techniques for managing stress and the stress associated with physical ailments in his book "Full Catastrophe Living".^{6,7} The program has developed a range of therapies for patients with various conditions and long-term illnesses, with mindfulness meditation at its core.⁸

Previous studies such as those conducted by Sayyah et al.⁹ and Khazaeili et al.¹⁰ have shown that mindfulness-based interventions (MBIs) have been successful in decreasing psychological symptoms, anxiety, and caregiving burden. Furthermore, according to studies by Kriakous et al.,¹¹ Ensan et al.,¹² and Senders et al.,¹³ MBSR has been proven effective in reducing anxiety, depression, and stress while also decreasing fatigue levels. Consequently, the current study aims to determine if MBSR treatment influences psychological symptoms and stress response in individuals diagnosed with MS.

Methods

This quasi-experimental study was conducted with a pretest-posttest control design and a one-month follow-up. From December to June 2018-2019, the Kerman MS Association, Kerman, Iran, had records of all patients with MS who were included in the statistical population for this research. A sample of 30 patients was chosen using purposeful sampling and then randomly assigned to two groups: experimental (15 people) and control (15 people). The specified sample size was selected according to G*Power with a test power of 0.95, an effect size of 1.27, and a significance level of 0.05. Criteria for enrollment in the study included confirmation of MS diagnosis by a neurologist, ability to read, write, and understand, and willingness to complete questionnaires thoroughly. Exclusion criteria for participation in the research involved missing sessions of the intervention (two or more sessions) or having a comorbid chronic disease.

Upon receiving authorization from the authorities at the Kerman MS Association, the author commenced data collection. Patients diagnosed with MS who met the eligibility criteria were included in the research after giving their consent and undergoing initial assessments by the researcher. Initially, 36 patients with MS were interviewed at the Kerman MS Association. The participants in the study were randomly allocated into experimental and control groups through a simple randomization process based on a random number table. Then, they were briefed on the research objectives, stages, confidentiality of the obtained results, and the right to withdraw from the research anytime they wanted. In the pretest stage, both two groups completed the research questionnaires. Then, the experimental group received the MBSR therapy (individually). This program was organized in eight 90-minute sessions (one session every week) based on Kabat-Zinn's

MBSR program.⁷ The validation of this approach was carried out by a clinical therapist at the facility who had completed therapy. Table 1 presents a summary of the MBSR sessions. The control group, however, did not receive any intervention during the therapeutic interventions for the experimental group and until the end of the post-test stage. The intervention sessions in this study were conducted by the first author who had attended specialized courses and workshops. Following the treatment sessions, all participants were re-evaluated using the instruments (posttest stage). Ethically, there was no relationship between the control and experimental groups during the study. The control group was treated by a specialist according to the current protocol and without any researcher's intervention. At the end of the study, the control group received either the MBSR program in a training package. It is important to mention that Islamic Azad University, Kerman Branch supported the project with the ethical code number IR.IAU.KERMAN.REC.1398.132.

After gathering the questionnaires in the recent study, the data were analyzed utilizing SPSS software (version 22, IBM Corporation, Armonk, NY, USA). Following the confirmation of assumptions, analysis of variance (ANOVA) was utilized with the repeated measurement technique to compare groups at three different time points.

Symptom Checklist-90-Revised (SCL-90-R):

The SCL-90-R, also known as the Revised Mental Symptom Inventory, is a clinical symptom inventory.¹⁴ It is a self-report psychiatric assessment where respondents rate 90 items on a 5-point Likert scale. Through Pearson correlation coefficients, it was determined that there were significantly positive relationships between the common subscales of the General Health Questionnaire-28 (GHQ-28) and SCL-90-R: somatization ($r = 0.671$), anxiety ($r = 0.728$), and depression ($r = 0.660$).¹⁵

Stress Response Inventory (SRI): In 2001, Koh et al. created a stress response questionnaire to investigate different facets of stress, such as emotional, physical, cognitive, and behavioral elements.¹⁶ This assessment is a self-administered tool containing 39 questions, with subjects required to indicate the extent of different stress indicators on a 5-point Likert scale (ranging from zero for "not at all" to four for "completely"). In an Iranian population, the negative factor, positive factor, and overall score all had high Cronbach's alpha coefficients of 0.86, 0.83, and 0.90, respectively. Additionally, there was a positive correlation between the Perceived Stress Scale-10 (PSS-10) and the Depression, Anxiety, and Stress Scale-21 (DASS-21) and its subscales, supporting its convergent validity.¹⁷

Results

In this research, the age distribution was analyzed in two separate groups.

Table 1. Description of mindfulness-based stress reduction (MBSR) sessions

Sessions	Content
1	Presenting and elucidating the idea of automated guidance
2	Encountering challenges, completing the previous week's assignment (engaging in body scanning meditation and reflecting on the experience)
3	Conscious awareness of the breath
4	Remaining focused on the current moment
5	Permission/authorization to stay (acknowledge thoughts and emotions)
6	Beliefs are not the same as truths
7	What is the most effective way to ensure my well-being?
8	Acceptance and change (applying the knowledge you have gained up to this point), body scan meditation, a short three-minute breathing exercise

The demographic features revealed that in the experimental group, 13.3% (4 individuals) were under 30 years old, 30% (9 individuals) were between 30 and 40 years old, and 6.7% (2 individuals) fell between 40 and 50 years old. On the other hand, the control group had 80% (12 individuals) under 30 years old, 13.3% (2 individuals) aged between 30 and 40 years, and 6.7% (1 individual) between 40 and 50 years old. The findings indicate that within the experimental group of 15 participants, 53.3% (8 individuals) were men and 47.7% (7 individuals) were women. In contrast, the control group of 15 participants consisted of 66.7% (10 individuals) men and 33.3% (5 individuals) women.

Table 2 shows the mean and standard deviation (SD) of research variables in pre-test, post-test, and follow-up. In this research, a significance level of less than 0.05 was taken into account.

According to table 3, there was a significant impact of measurement time on the scores of various symptoms such as depression, interpersonal sensitivity, paranoia, anxiety, aggression, phobia, hypochondriasis, and obsession at the level of $P < 0.05$. According to table 3, the impact of measurement time on the stress response scores of patients was statistically significant at $P < 0.05$, indicating that there was a difference in average stress

response scores among patients in the pre-test, post-test, and follow-up regardless of the experimental group. There was a notable variance. The influence of the group on patients' stress response scores was also significant at $P < 0.05$, suggesting that there was a substantial contrast in the average stress response scores between patients in the experimental and control groups regardless of the measurement time. Furthermore, as the interaction effect between time and the experimental group was significant at $P < 0.05$, it can be inferred that the change in this aspect varies between the groups over time, highlighting the impact of MBSR treatment on patients' stress response.

Discussion

The focus of this study was to evaluate how MBSR therapy affected psychological symptoms and stress response in individuals with MS in Kerman City. Results showed that this therapy had a beneficial impact on decreasing psychological symptoms such as anxiety, depression, hypochondriasis, phobia, aggression, obsession, and interpersonal sensitivity in patients with MS and this improvement lasted even after the therapy ended. Nevertheless, there were no notable enhancements in symptoms of psychosis and paranoia with this treatment.

Table 2. Mean and standard deviation (SD) of pre-test, post-test, and follow-up scores of research variables

Variable	Experimental			Control		
	Pre-test	Post-test	Follow-up	Pre-test	Post-test	Follow-up
	Mean \pm SD	Mean \pm SD	Mean \pm SD	Mean \pm SD	Mean \pm SD	Mean \pm SD
Stress response	48.20 \pm 5.80	43.46 \pm 5.62	31.86 \pm 4.64	45.20 \pm 7.01	45.66 \pm 5.06	44.60 \pm 3.90
Hypochondriasis	7.53 \pm 1.40	5.20 \pm 1.52	5.06 \pm 1.70	7.13 \pm 1.35	7.20 \pm 2.24	7.80 \pm 1.47
Interpersonal sensitivity	19.33 \pm 4.57	14.66 \pm 4.06	13.33 \pm 3.15	18.73 \pm 3.01	19.06 \pm 3.67	18.33 \pm 3.15
Obsession	18.40 \pm 1.99	14.86 \pm 3.20	11.86 \pm 2.74	18.06 \pm 2.65	16.66 \pm 2.55	16.33 \pm 2.43
Depression	16.33 \pm 2.43	12.73 \pm 2.49	11.60 \pm 2.22	17.13 \pm 1.84	18.00 \pm 1.88	17.40 \pm 1.80
Aggression	10.33 \pm 2.31	8.46 \pm 2.06	7.13 \pm 2.32	10.40 \pm 1.72	9.66 \pm 1.39	10.00 \pm 1.51
Anxiety	9.20 \pm 2.24	6.73 \pm 1.57	5.26 \pm 1.57	8.80 \pm 2.07	8.06 \pm 1.62	8.33 \pm 1.63
Phobia	18.66 \pm 4.01	14.66 \pm 4.06	13.20 \pm 3.91	20.20 \pm 4.10	18.26 \pm 4.07	18.86 \pm 4.82
Psychotic symptoms	9.20 \pm 2.24	9.26 \pm 2.52	8.93 \pm 2.21	8.73 \pm 2.01	7.80 \pm 1.61	7.86 \pm 1.64
Paranoid	8.20 \pm 1.37	8.46 \pm 1.72	8.60 \pm 1.65	7.13 \pm 1.35	7.73 \pm 1.66	7.86 \pm 1.86

SD: Standard deviation

Table 3. The results of the analysis of variance (ANOVA) test with repeated measurement of the investigated components in the control and experimental groups

Examined components	Source	SS	df	F	P	Effect size
Depression symptoms	Time	76.06	2.00	21.12	0.0001	0.430
	Group	352.04	1.00	34.91	0.0001	0.550
	Time*Group	113.08	2.00	31.40	0.0001	0.520
Interpersonal sensitivity	Time	160.02	1.41	13.12	0.0001	0.310
	Group	193.60	1.00	6.97	0.0100	0.190
	Time*Group	141.80	1.41	11.62	0.0001	0.310
Paranoia symptoms	Time	5.26	2.00	1.69	0.1900	0.050
	Group	16.04	1.00	3.05	0.0900	0.090
	Time*Group	0.55	2.00	0.17	0.8300	0.006
Anxiety symptoms	Time	77.60	2.00	23.96	0.0001	0.460
	Group	40.00	1.00	40.00	0.0200	0.170
	Time*Group	45.02	2.00	13.91	0.0001	0.330
Aggression symptoms	Time	51.80	1.39	24.81	0.0001	0.470
	Group	42.71	1.00	4.72	0.0300	0.140
	Time*Group	26.75	1.39	14.25	0.0001	0.330
Phobia symptoms	Time	205.48	2.00	15.73	0.0001	0.360
	Group	291.60	1.00	7.42	0.0100	0.200
	Time*Group	64.06	2.00	4.90	0.0100	0.140
Hypochondriasis	Time	21.48	2.00	5.70	0.0060	0.160
	Group	46.94	1.00	10.77	0.0030	0.270
	Time*Group	40.28	2.00	10.87	0.0001	0.270
Obsession	Time	295.46	1.61	43.82	0.0001	0.610
	Group	88.01	1.00	5.96	0.0200	0.170
	Time*Group	86.75	1.61	14.65	0.0001	0.340
Psychotic symptoms	Time	5.26	2.00	1.85	0.1600	0.060
	Group	22.50	1.00	2.25	0.1400	0.070
	Time*Group	3.80	2.00	1.33	0.2700	0.040
Stress response	Time	1163.46	2.00	30.27	0.0001	0.520
	Group	356.01	1.00	7.10	0.0100	0.200
	Time*Group	963.82	2.00	25.08	0.0001	0.470

SS: Sum of squares; df: Degree of freedom

According to Sayyah et al., research has indicated that group therapy with a positive focus can effectively reduce psychological symptoms like depression, anxiety, and stress in women with MS.⁹ The approach has also been shown to improve their quality of life (QOL) significantly. In a research conducted by Khazaeili et al., significant differences were observed in the post-test scores for anxiety and caregiving burden between the two groups. The group that received MBI reported a significant decrease in levels of anxiety and caregiving burden. Although there was a decrease in the average score for depression in the post-test compared to the pre-test, this difference was not deemed significant.¹⁰ The research by Maghsoudloo et al. demonstrates

that cognitive-behavioral therapy (CBT) has a significant impact on reducing anxiety and increasing life expectancy in women with MS who are part of the Tehran MS Association, Tehran, Iran. By utilizing CBT, it is possible to mitigate the harmful effects of MS and improve the well-being of these patients. Through the application of cognitive strategies and skill training, CBT can help women with MS challenge negative thoughts and behaviors, ultimately enhancing their QOL.¹⁸

The results of the study suggested that practicing MBSR therapy could reduce stress levels in people with MS, and the benefits were still evident during the follow-up period. Nevertheless, there was no significant improvement in symptoms of psychosis and

paranoia with this therapy.¹⁹

According to the study conducted by Kriakous et al., MBSR was shown to be successful in alleviating anxiety, depression, and stress among healthcare professionals (HCPs). Additionally, it was noted that MBSR helped increase levels of mindfulness and self-compassion in HCPs. On the other hand, the effectiveness of MBSR in reducing burnout and enhancing resilience among HCPs was not as prominent. Shortened MBSR programs were found to be equally effective when compared to the traditional 8-week MBSR programs.¹¹ Ensan et al. found that mindfulness had a significant impact on reducing fatigue in patients with MS according to their results. The results remained consistent during the follow-up period.¹² Additionally, Senders et al. found that emotional well-being could be enhanced through both MBSR and educational activities.¹³ The possibility of natural improvement as a factor in these results cannot be ignored; therefore, further research is needed to assess the effectiveness of mindfulness training in enhancing emotional health.

Throughout the research, the researcher faced obstacles that could affect the quality of the study. One of these limitations was the sampling technique used, prompting the recommendation of random sampling for a more accurate representation of the population. The research sample size is restricted to patients with MS, cautioning against generalizing the results to other patient groups and healthy individuals. Providing counseling and psychological services for patients with MS is crucial, and implementing treatment programs based on mindfulness for this patient group is essential. It is advisable to hold training workshops focusing on mindfulness-based treatment for individuals with MS.

Conclusion

The findings indicated that MBSR therapy made a difference in decreasing psychiatric

symptoms such as anxiety, depression, hypochondria, phobias, aggression, obsessive-compulsive behavior, and interpersonal sensitivity in individuals with MS. This impact lasted through the follow-up period.

Conflict of Interests

Authors have no conflict of interests.

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